TriCaster User Guide

Version 8-4

TriCaster®

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There are general best-practice solutions, these include setting the antivirus software to not scan the systems during operating hours and that the Vizrt components, as well as drives on which clips and data are stored, are excluded from their scans (as previously stated, these measures cannot be guaranteed).

Technical Support

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CONTENTS

PART I (GETTING STARTED)

Connections and registration, and a top-level overview of the primary features of your live production system.

Chapter 1 ABOUT THIS MANUAL

This manual tells you everything you need to know to perform common operations with TriCaster®. It attempts to convey this essential information in a friendly yet concise way, while also providing a deeper reference section you can turn to when you really need more detail.

> ➢ *PART I – GETTING STARTED*
> Introduction – connecting devices (cameras, monitors, etc.) and registration, ending with Chapter 4, Web Features which, among other things, includes an overview of online resources to help familiarize you with common operations and features.

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

> ➢ *PART III – APPENDICES*
> In this section you will find a breakdown of the following for your TriCaster model, (Note: TriCaster Mini systems are covered in a separate user guide):

> - Key features
> - Technical Specifications
> - A/V input and output

Also included in this section are certain topics which benefit from in-depth coverage, along with cross-references to relevant information elsewhere in the manual and a keyword index. Appendix F: lists all shortcut keys.

Note: The Control Panel section is in the Automation, Integration & Control guide located in Notifications Pane> Web Browser> LivePanel> Resources > Documentation (see Section 4.1 LivePanel).

Chapter 2 INTRODUCTION

TriCaster serves as an invaluable tool for content creators across various domains, tailored to the needs of YouTubers, streamers, podcasters, houses of worship, live event producers, and educators alike. This innovative system offers an all-in-one platform that enhances production quality significantly.

TriCaster Vizion and TriCaster Vectar are also the first and only major live production solutions offered both as a software download for local installation on a consumer PC and as a virtualized package for private or public cloud environments. Both solutions are graphic-intensive and have specific GPU processing requirements as described in section Installation Requirements.

SECTION 2.1 OVERVIEW

Time and again, innovative Vizrt live production systems have redefined broadcast workflows, provided new creative possibilities, and delivered significant cost benefits. Our products include the most complete, reliable, and efficient integrated systems available for live production and web streaming, with capabilities suited to almost any broadcast need. You can produce and distribute live video programs from diverse sources in ultra-high-definition formats (up to 2160/59.94p).

Understanding the features and connectivity options of your TriCaster is essential for harnessing its full potential and tailoring it to your unique production needs. Join us as we explore how this cutting-edge technology revolutionizes the way we connect, inform, and entertain in the digital age.

The capabilities of different TriCaster models vary slightly, so please note that some images and text may pertain to features that are not found on all models (we've provided a comprehensive feature list in Appendix A: Features & Specifications).

2.1.1 LAUNCH SCREEN

The *Launch Screen* appears shortly after you power up your live production system. This is the command center where your production projects are configured and launched.
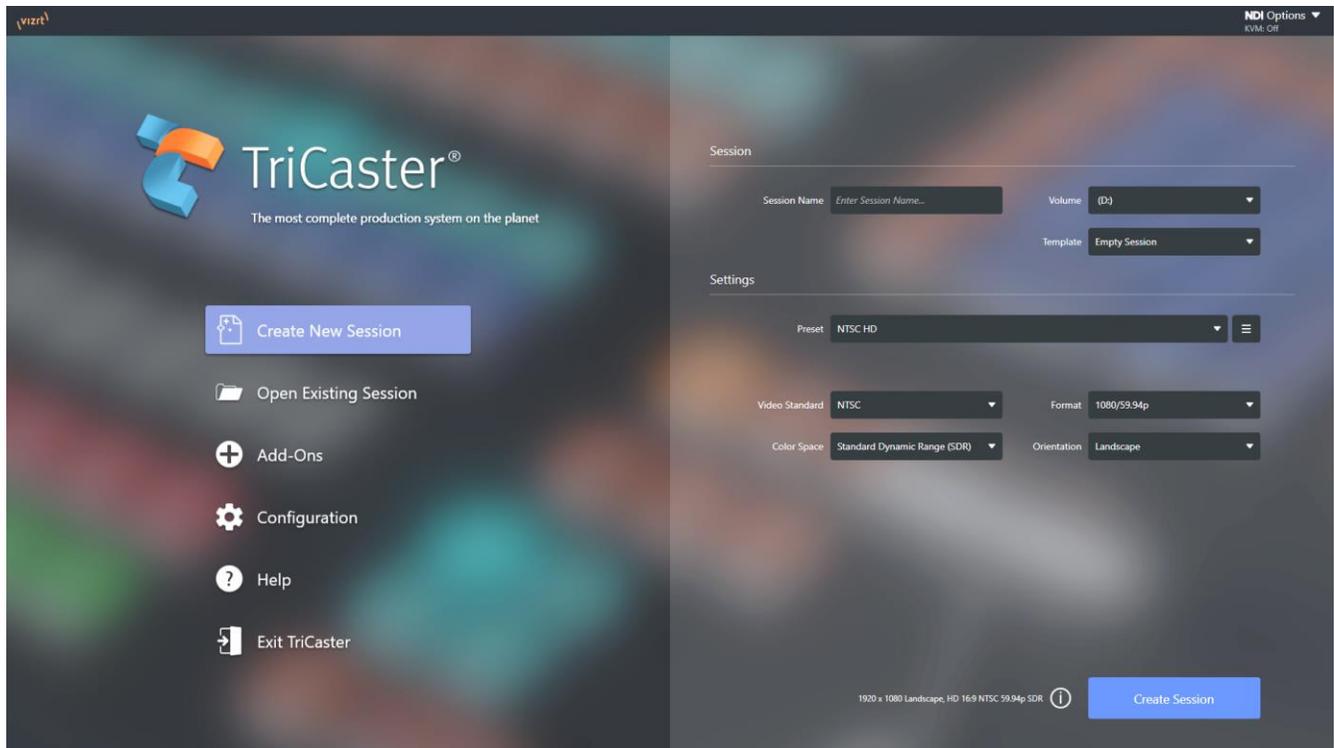
The *Home page* of the *Launch Screen* provides a number of important functions, notably allowing you to create (and re-open) *sessions*. Sessions are an important concept – essentially a custom preset prepared for an individual production or other purpose. Later, when you re-enter an existing session, all its assets, settings, and even control states are remembered.

Selecting a session takes you 'into' the session. TriCaster will show you the *Session Page* next, where you can prepare *Graphics* (title pages), *Manage* content, and more – or launch the *Live Desktop* to begin production.

2.1.2 LIVE DESKTOP

Your system's live production features are all available from the *Live Desktop*, which in many ways mimics familiar video production equipment. However, the *Live Desktop* provides far more functionality in its integrated environment than similar single-purpose devices.

The various features, controls and modules comprising the *Live Desktop* are arranged in horizontal bands, as seen below.

- The top-most band comprises a convenient and powerful *Dashboard.*
- The area just below the *Dashboard* is *normally devoted to a multi-pane monitoring display, providing source and output views.
  * This pane can be re-sized, even completely hidden; or the display can be customized to complement external *Multiview(s),* or for numerous other purposes.
- The central *Live Control* section is home to the *Switcher*, *Transition, DSKs* (overlay channels*)* and *M/E* controls (*Mix Effect* panes can be minimized and are hidden from view).
- By default, the bottom third of the *Live Desktop* is home to tabbed control modules, including *Media Players, Buffers,* and the *Audio Mixer*.

Chapter 3 SETTING UP

This chapter explains how to connect power, monitors and audio-visual sources, and external control devices to your TriCaster live production system. After completing this short section, you'll be set to begin using your new unit.

TriCaster Vizion & TriCaster Vectar software information on installation requirements, audio and video connections is provided in Appendix B under B.10 TriCaster Vizion & TriCaster Vectar Software.

SECTION 3.1 HARDWARE COMMAND AND CONTROL

Hint: The user interface requires a minimum monitor resolution of 1920x1080.

1. Connect an external computer monitor to a video output port on TriCaster's backplane (see Appendix B: TriCaster Connections).
2. Connect the *mouse* and *keyboard* to any of the USB ports.
3. Connect the *power cord* to an A/C power receptacle.
4. Connect one end of a network or ethernet cable to one of TriCaster's network ports, and the other to your network. (This connection is not required for basic operation but is necessary for initial set up.)
5. Turn on the computer monitor.
6. Press TriCaster's *Power* switch, located behind the unit's faceplate.

A word about UPS devices:

'Modified sine wave' UPS devices are popular due to low manufacturing costs. However, such units should generally be viewed as being of low quality and possibly inadequate to fully protect the system from abnormal power events.

For a modest added cost, consider a "pure sine wave" UPS. These units can be relied on to supply very clean power, eliminating potential problems, and are recommended for applications demanding high reliability.

At this point, the blue *Power LED* will illuminate, and the device will boot up. (If this does not happen, check your connections, and retry.)

Though not a requirement, we do strongly recommend that you use 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.

Warning: Risk of Electric Shock. Disconnect all power sources before servicing.

SECTION 3.2 WINDOWS LOGIN

Although the system can be operated without a password, it is recommended to use one to secure your system from unwanted use or intrusion. Use of a password is required if you intend to use the system's support for Skype TX™ a/v sources. Thus, a password is required by default.

SECTION 3.3 LICENSE AND REGISTRATION

On first launch, your system will present an *End User License Agreement* dialog. After you accept this, one or more *Registration* dialogs are presented. If requested, enter the unique *Serial Number* for your system.

> *Hint: If the Serial number doesn't appear automatically and you can't find it on your unit, contact Vizrt's Support center.*

You can register and obtain your registration code directly on the local system, or on another system connected to the Internet. If the system is connected to the Internet, the registration process guides you through the necessary steps.

> *Note: Information on connecting to a network can be found in Section 3.12.*

After registering, enter the resulting *registration code* into the field provided in the *Registration dialog*.

> *Hint: It's a good idea to record the login name and password you choose when creating your website profile and keep them in a safe place.*

3.3.1 TRICASTER VECTAR LICENSE ACTIVATION

TriCaster Vectar uses a dongle-free WIBU licensing model. You can install your license directly on the TriCaster Vectar machine or retrieve it from a dedicated network license server. For detailed instructions on installing and managing WIBU licenses, refer to the Vizrt Licensing Administrator Guide.

Important Pre-Installation Information

1 **License Portal Access** (https://license.vizrt.com):

- Ensure you have access to the Vizrt License Portal with the email address provided at the time of your TriCaster Vectar order.
- An account activation email will be sent to this address.
- You will receive a **Ticket ID** associated with your TriCaster Vectar license.

2 **CodeMeter Runtime:**

- TriCaster Vectar automatically installs CodeMeter Runtime, which is necessary for WIBU licensing.

3   **Cloud or Virtual Machine Deployments:**

- If TriCaster Vectar is running in a VM or cloud environment, choose **CmActLicense Smartbind Loose Container Type** when activating the license.
- If the loose container option is not visible in your portal, contact Vizrt Support to enable it for your account.

License Activation

1   **Open the License Portal**

- From the machine where the license will be installed (TriCaster Vectar machine or the designated license server), visit https://license.vizrt.com.

2   **Choose Online or Offline Activation**

- **Online Activation** (Recommended): The license is imported automatically into the environment.
- **Offline Activation:** Follow the instructions in the Vizrt Licensing Administrator Guide if internet access is restricted.

3   **Network License Server** (Optional):

- If you are hosting licenses on a dedicated server, configure TriCaster Vectar to point to that server in **CodeMeter WebAdmin** (http://localhost:22352/dashboard.html).
- For further details on setup, see the Vizrt Licensing Administrator Guide.

Whenever possible, use **Online License Activation** – whether directly on your TriCaster Vectar machine or license server – to automatically import and activate your licenses. This ensures a smoother and faster setup process.

SECTION 3.4 UPDATES

This would be a good time to check for recent free software updates for your system – visit https://www.vizrt.com/support/product-updates/to do so.

SECTION 3.5 ENHANCED SUPPORT (PROTEK)

Vizrt's optional ProTek℠ service programs offer renewable (and transferable) coverage and enhanced support service features extending well beyond the standard warranty period. Please see https://www.vizrt.com/support/vizrt-protek/or your local authorized Vizrt reseller for more details regarding ProTek plan options.

SECTION 3.6 INPUT CONNECTIONS

TriCaster connection options vary slightly. For that reason, we have linked the appropriate details for your convenience in Appendix B: TriCaster Connections. This appendix provides guidance on how to establish connections between your A/V devices and TriCaster.

SECTION 3.7 STARTING A SESSION

The *Launch Screen* consists of two similar pages labeled *Home* and *Session*. Among other things, the *Home Page* is where you choose basic session settings (see Section 5.1 for a discussion of sessions).

If your system is not already running, power it up now to reveal the *Launch Screen*.

3.7.1 THE HOME PAGE

When no previously created sessions exist, the actions panel dominating the *Home Page* defaults to New, inviting you to create a new session.
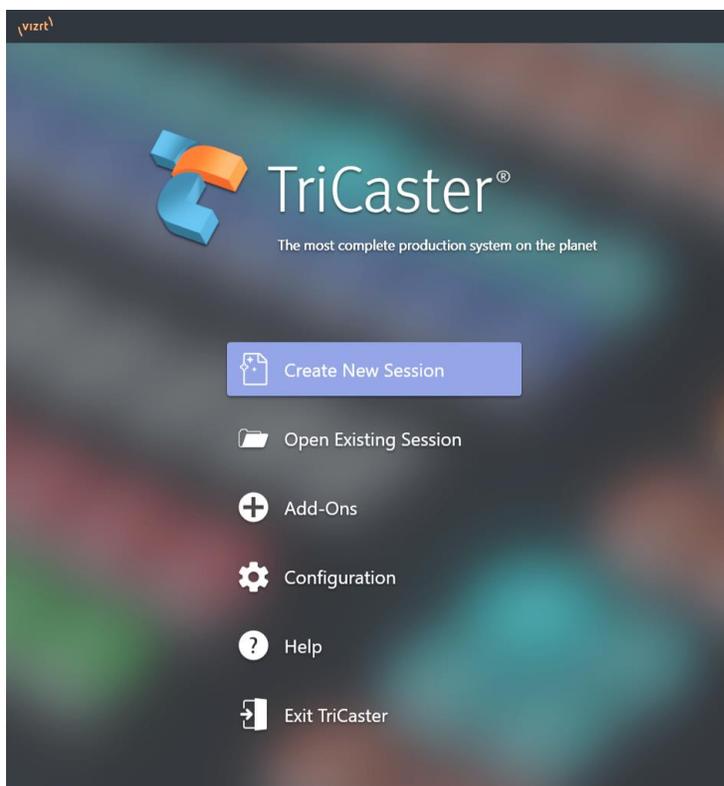
Continue with session creation by designating the video Standard used in your locale. For the moment, let's click the HD button in the Preset list, setting the format to 1080/59.94p, then click the Start Session link below. By default, new sessions are created on the D: (Media) drive (see 5.2.1 Create New Session for a discussion of session Volume options).

Note: A variety of session configuration options are provided for your live production needs. On selected models you can choose either 4K (UHD), HD (High Definition), or SD (Standard Definition) operating modes. SD options include both 4:3 and 16:9 (widescreen) image aspects. You can also select between different video Standards according to your locale, choosing NSTC or PAL.

3.7.2 THE LIVE DESKTOP
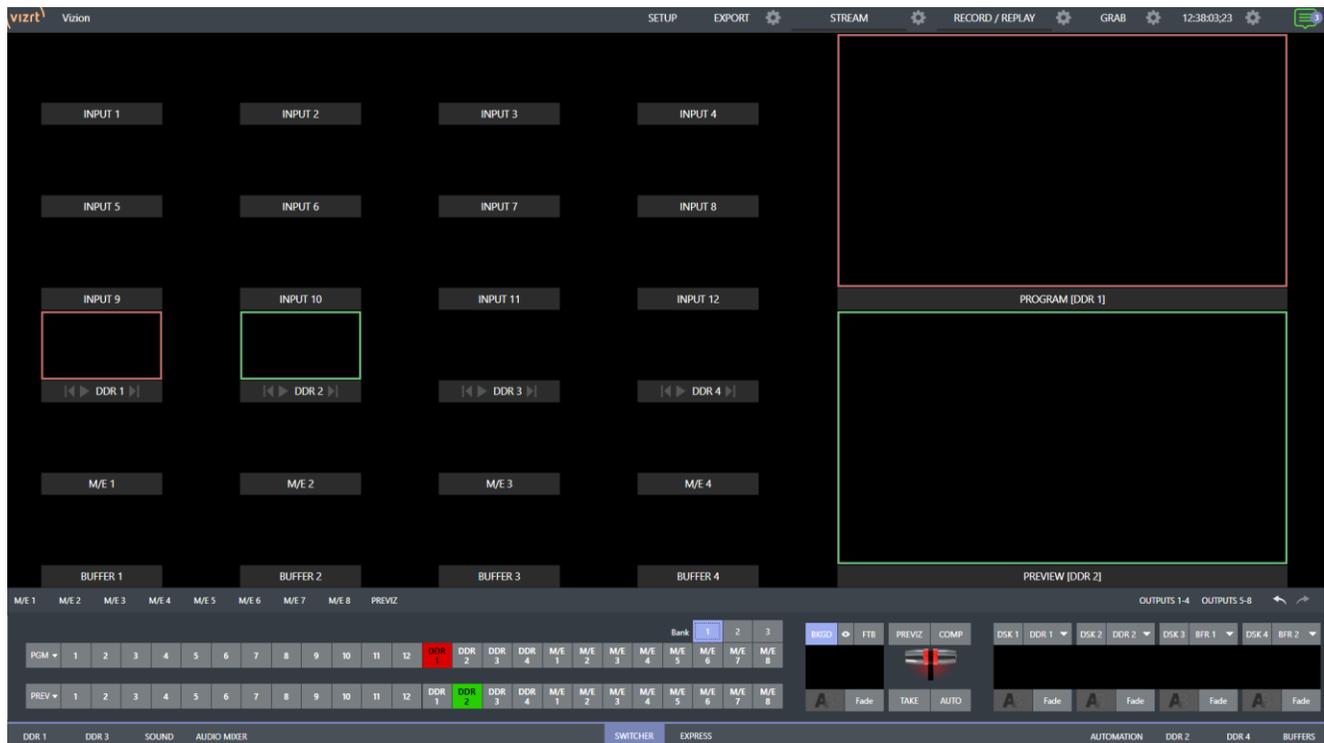
Initially, as you have yet to configure input devices or add content, the *Live Desktop* will look a bit barren. Take a quick look around but then let's continue to configure your devices. (We had a brief glimpse at the *Live Desktop* back in 2.1.2, but we'll examine it further in Chapter 6, Live Desktop coming up soon.)

SECTION 3.8 CONFIGURE A/V OUTPUT

3.8.1 PRIMARY OUTPUTS

Complete video monitoring is provided right on the *Live Desktop* in a multiview occupying the upper section of the screen. This lets you operate without even connecting downstream video monitors or devices. For facilities using NDI-enabled broadcast devices and systems, there would be no necessity to bother with *any* traditional connections.

Often, though, you will want to connect external monitors or other downstream devices to the unit's output connectors. In either case, you will be faced with decisions about the output formats, and audio and video sources provided to downstream systems.

Hint: There can be many additional outputs apart from these primary ones and the Stream outputs configured in the same pane. We'll discuss supplemental outputs in Section 3.8.2.

Let's take a closer look at output configuration options (this panel will look different depending on your TriCaster model, for a list of features see Appendix A:). Click on the *Setup* tab located in the *Dashboard*.
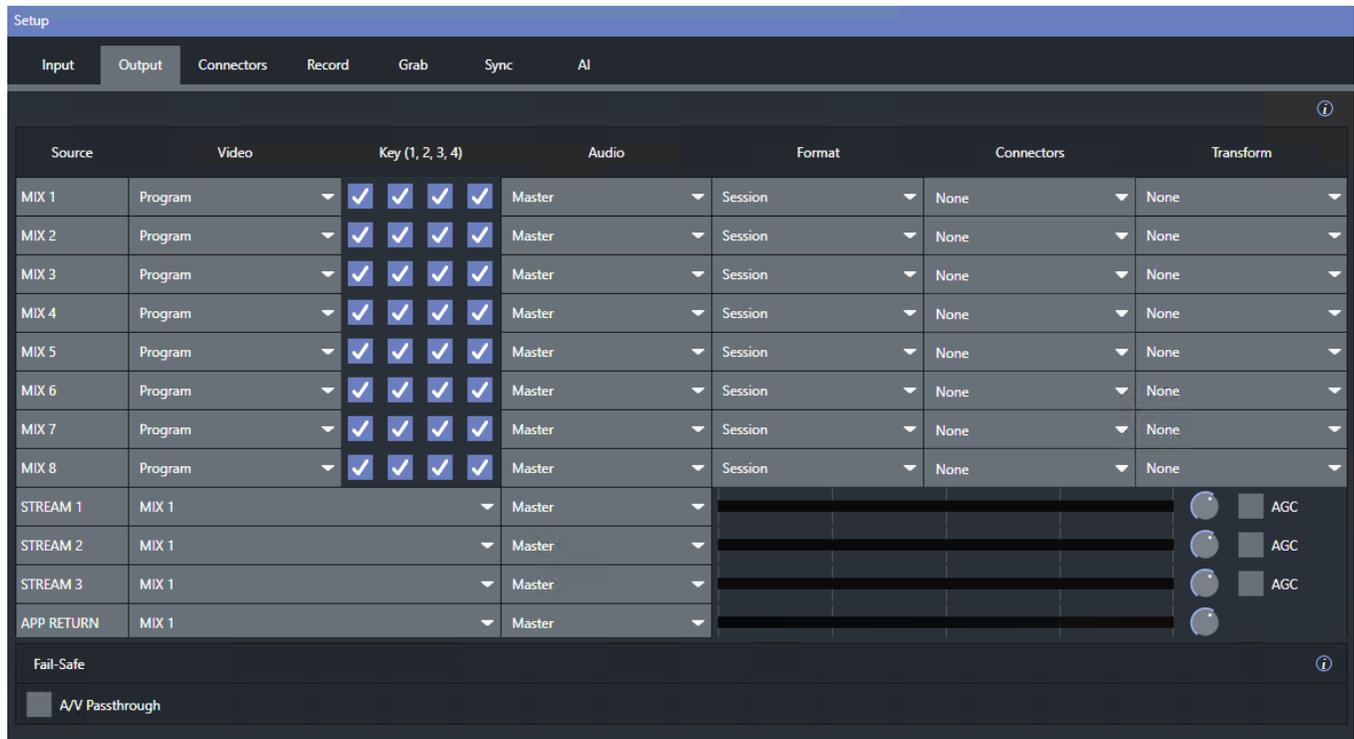
The *Setup* panel hosts multiple tabbed panes for configuration. The Output tab is where the signals are sent to each of the video output busses designated *MIX 1- 8* (varies by model) are configured. There are various decisions to make for each output:

- What video source will you assign to the output?
- What audio source will accompany it on digital connections that carry both signals?
- Which video format will be transmitted?

And so on …

Hint: LUT (Look Up Table), Format and color adjustments for devices connected to the various 'monitor ports' on the backplane are located in the Display Settings panel, accessible from the Workspaces menu in the Dashboard at the top of the Live Desktop.

Output Channel Options

Let's review the *Video* selection first. A drop-down menu by that name permits you to select sources for the primary outputs.
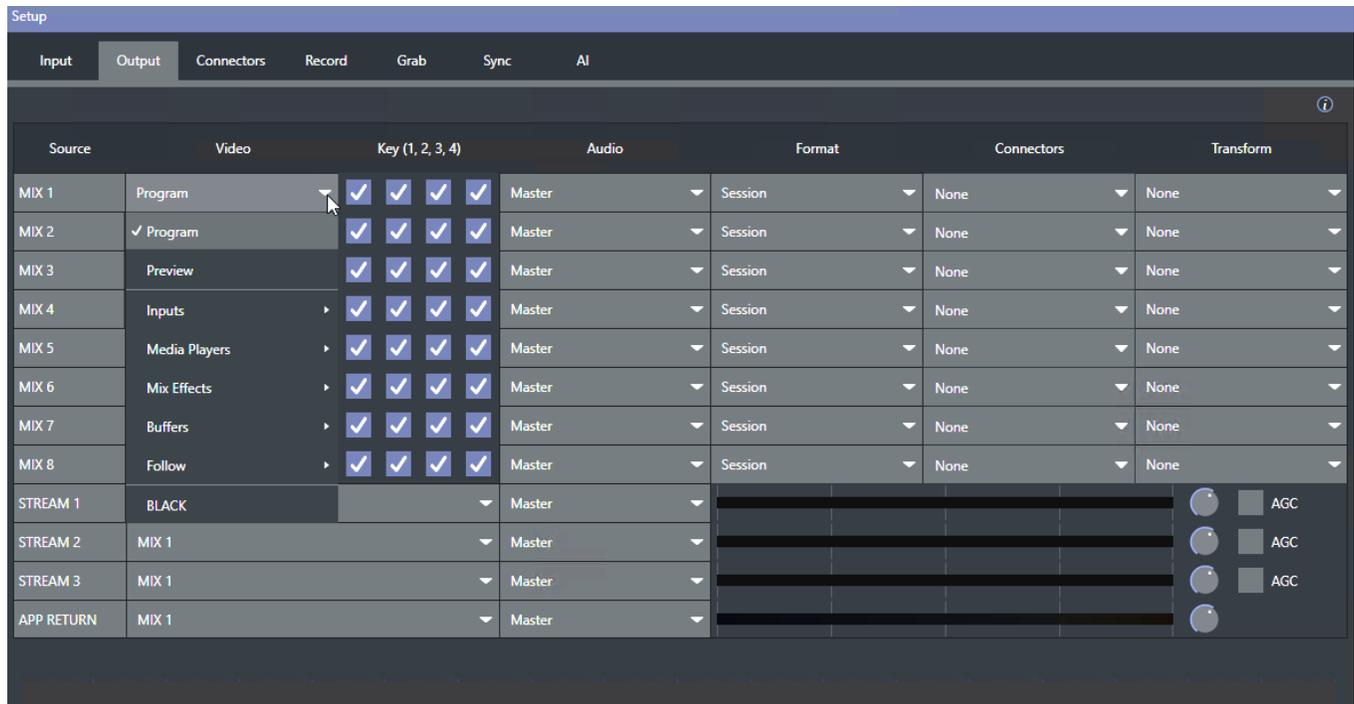
Hint: NDI sources are listed by supporting systems as machine_name (channel_name). So, if your system is named MyTC, the 2nd output appears as "MyTC(MIX 2)".

Optional *Source* selections for *MIX* output channels include any of the following:

- *Program* output
    - A clean *Program* feed
- The 'look ahead' *Preview*
- The feed from any input
- Graphic or video output from a *Media Player*
- Mix Effects
    - Direct output from any *M/E*
    - Clean output from any *M/E*
- Output from any of the *Buffers*
- *Follow* selected *M/E Program* or *Preview*, or a *Switcher* color group
- Black

The *Key (1,2,3,4)* tab offer individual Key layers to be toggled on a per-Mix basis.

Audio output menu options include either the *Master* or *Aux* mix, or sound from a selected audio input.

The *Format* menu on selected models lets you independently configure the format for each output.

Connectors provide a pull-down menu listing output connectors suitable for assignment to individual MIX outputs.

Note: The Connectors tab varies by model and will only appear when there are SDI connections.

Transform permits rotation and selection of segments of the output image.

Note: See Section 8.2 for detailed information on all output options.

3.8.2 SUPPLEMENTAL OUTPUTS

Direct support for internet streaming, multiviews, and recorders drastically reduce the need for 'outputs' as traditionally defined in this space. And extensive NDI support provides your live production system with more powerful and plentiful output capabilities than almost any other video mixer on the market.

FULLTIME NDI OUTPUTS

Among NDI sources provided (automatically, without any configuration steps required) to outboard systems over the network (on selected models) are the following:

- Local hardware-supplied sources, if in use.
- Mix 1-(n) – all mixed *Switcher* outputs (count varies by model).
- Multiviews – with the NDI KVM feature enabled each monitor screen is available over NDI, with or without remote mouse and keyboard connection capabilities.
- Teleprompter – the *Automation* tab at right in the lower third of the *Live Desktop* of selected models provides a great teleprompter over NDI at no additional expense.

SECTION 3.9 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 before continuing.

The individual monitor viewports on the *Live Desktop* can be flexibly assigned to different *Switcher* sources and outputs. Complete monitor layouts can be stored and recalled using tools located in the *Workspace* menu, located in the *Dashboard* across the top of the screen.

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.

1. Click *Workspace* in the *Dashboard* (at the top of the *Live Desktop*). Monitoring *layout presets* are listed at the top of the menu as *Interface A* through *D.* Select the layout labeled *A* under *Multiview 1* (if it isn't already check-marked).

2. By default, this default monitoring pane shows individual viewports for the various Switcher sources.

3. To continue to assign sources, you could select Configure from an input monitor's (right-click) context menu, but let's take a different approach.
    a. TriCaster provides a *Setup* panel located in the *Dashboard*. Here you can access input and output configuration, among many other options. Click on *Setup* and it will open to the *Input* configuration tab, here you can add your source and format.

Note: To access the complete set of configuration options and features for a specific input, click the configuration gear in the "Config" column at far right for each individual input.

    b. You can also select Configure from an input monitor's (right-click) context menu.

    c. Or move your mouse over the viewport for *INPUT 1* and notice that a *Configure button* (*gear* icon) appears at lower right. Click this to open a tabbed settings panel.
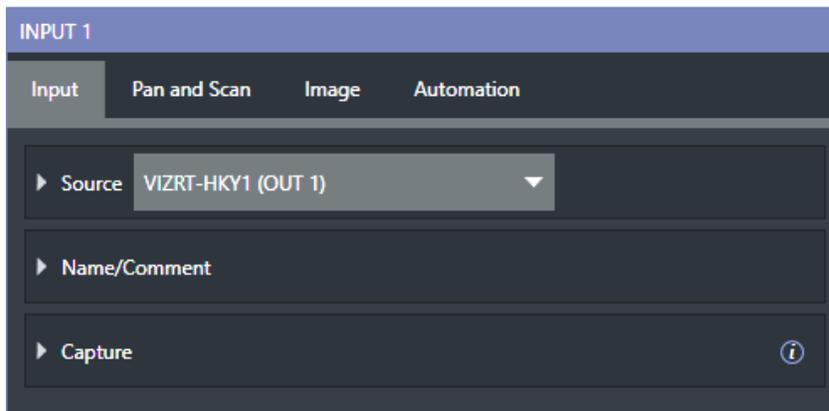
4. Click the *Source* drop-down menu to see a list of sources you can select. HDMI inputs and *Black*, along with *Skype TX Caller* connections are listed first under the *Local* heading. Additional NDI sources discovered on your network are grouped below under source device headings.

For NDI sources, simply selecting one completes the connection. If you choose an HDMI or other source, further selections may be required.

5. The *Format* menu defaults to *Auto-Detect*. Generally, this option will suffice. Otherwise, for many sources you can manually select the correct *Format*.

6. Close the *Configuration* panel for now (click the *Close* button, or simply 'click outside' the panel to close it).

7. Continue to 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 3.10 CONFIGURE AUDIO

Click the *Audio Mixer* tab (centered in the lower third of the *Live Desktop)* to reveal audio features, including configuration controls for all internal and external audio sources and outputs, including streaming.

Each input and output have its own control column with *Volume* slider(s), VU meter(s), and other convenient features. An identifying label sits at the top of each control panel. Roll the mouse pointer over the label to reveal a *Configuration button* (gear) at right which, when clicked, opens the *Configuration* panel for the input.

In this latter panel, click the *Connection* menu to display options for an input. You will see the local hardware inputs listed in the *Local* group as "IN 1", "IN 2", etc.

Local connections in some models can be assigned to 'listen' to either an HDMI embedded audio source connected to the corresponding video input, or analog audio inputs provided on the unit.

> *Note: Analog audio levels conform to SMPTE RP-155. The maximum input/output level is +24 dBu and the sample rate is 48 kHz.*

Beyond this, you have the option of assigning the audio delivered over the network from any NDI or other supported network audio source (such as Audinate's Dante™ sources) available on the system.

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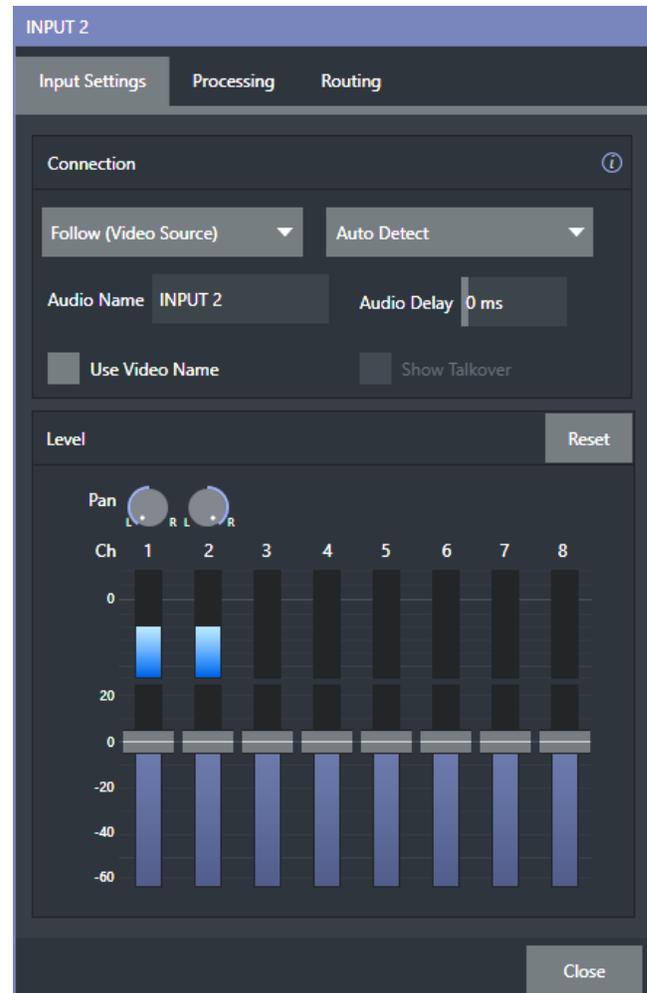
In the former category, volume sliders are provided below *VU meters* for each audio source and output. Source sliders default to their 0dB gain setting on first launch. After adding audio sources, adjust these sliders as required.

> *Hint: Most numeric controls in the interface can be reset to their default values by double-clicking on the slider or control knob. The default value for Gain sliders is 0dBVU.*

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 corrected later. For this reason, it's customary to configure normal operating level (also referred to as the 'alignment level', and sometimes, 'nominal level') well below the clipping limit – sufficiently so that occasional excessively loud sounds (say, loud laughter or applause) can be accommodated.

This range between nominal level and the highest *possible* level is referred to as 'headroom'. What is considered suitable headroom can vary from one locale to another, in different industry applications, and even in individual studios. TriCaster follows established audio conventions, providing 20dB of headroom above nominal level (+4dBu at 0dB 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 dB FS (Decibels Full Scale) with 0dBFS – the absolute maximum signal level that can be recorded – at the top. TriCaster's VU meters have selectable indexing, allowing you to view a traditional dB VU scale or dBFS as you please (see Section 18.3).*

Whatever scale you choose, use *Volume* controls (and, for *Mic* connections, the *Gain* controls in the *Configuration panel*) to avoid over-modulation. The *Compressor/Limiter* feature (also located in the *Audio Configuration* panel) is another powerful tool to help you prevent clipping – see Section 18.10.

> *Hint: On supporting models, audio channels can be mapped to Supplemental Output Devices including NDI audio-only outputs or supported third-party audio drivers (such as Audinate's Dante™).*

SECTION 3.11 CONFIGURE NDI GENLOCK

NDI Genlock synchronization allows video sync to reference a network-supplied external clock signal over NDI. This type of synchronization will be key to future 'cloud-based' (and hybrid) production environments.
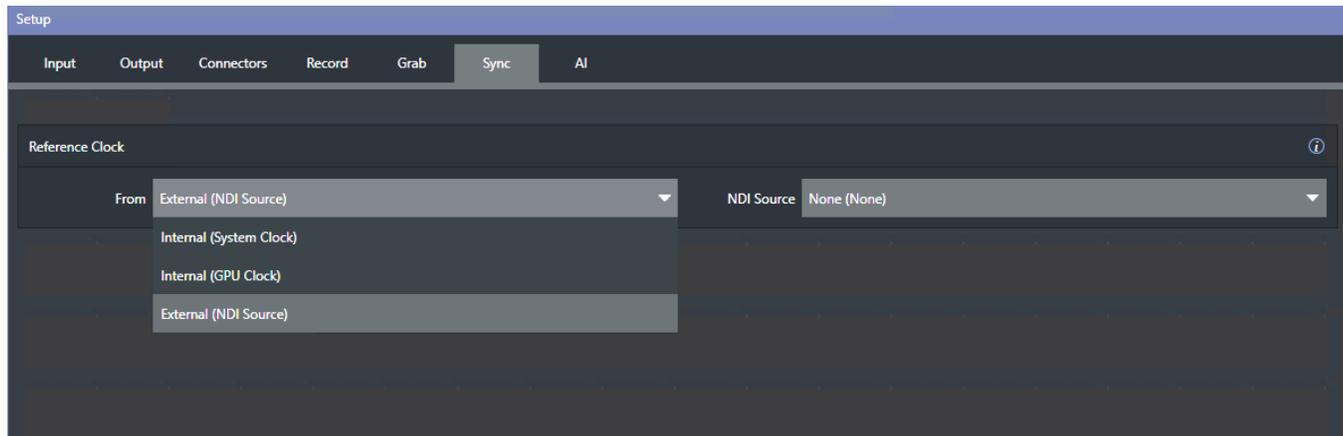
Note: TriCaster Vizion supports External Genlock Source, see Appendix B: TriCaster Vizion Blackburst.

The Sync feature allows TriCaster to 'lock' its video output or NDI signal, to timing derived from an external reference signal (house sync, such as 'black burst') supplied to its genlock input connector.

This allows TriCaster output to be synchronized to other external equipment that is locked to the same reference. TriCaster comes with additional options for Synchronization, the pull-down menu conveniently centralizes all sync options and allows them to be changed on the fly.

Ideally both the cameras and your TriCaster system's output should be genlocked. If they are not genlocked to the same reference signal, by default the *Switcher* will automatically apply a TBC (Time Base Correction) operation. (Time base correction may drop or insert frames as necessary to maintain sync, hence is a less desirable approach.)

Genlocking is not an absolute *requirement* in most cases, but it is recommended whenever you have the capability.

Tip: "Internal Video Clock" means clocking to the SDI output (best quality when connecting a projector to an SDI output).

"Internal GPU Clock" means following the graphics card output (best quality when connecting a projector to a Multiview output).

When genlocking is active and properly configured, the timecode in the *titlebar* will display in green.
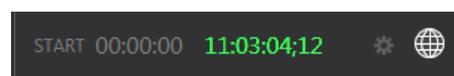
SECTION 3.12 NETWORKING

Of course, the system provides extensive support for NDI sources and outputs across a network. Few will be surprised to find that this next generation feature requires your system to be connected to the network.

Various TriCaster models provide different configurations of network ports. Generally, simply connecting a suitable cable from one of these ports on the unit's backplane 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.

The next section (Chapter 4, Web Features) will introduce you to online tutorials, training materials and other assets to guide you through your learning experience.

Chapter 4 WEB FEATURES

This chapter provides information meant to guide you to other resources that will introduce the major components and functions of your TriCaster system. This includes extensive online training resources, friendly and helpful online communities, web-based external control, and more. More detailed reference material on all aspects follow in Part II (Reference).

Having made the essential external connections in the previous section, you'll want to start your first practical live production session, and skim through some important fundamentals. This would be a good time for us to introduce you to a special feature of your system: Your TriCaster has its very own local webpage. Selected models also include a browser-based control system, referred to as LivePanel.

SECTION 4.1 PASSWORD PROTECTION

First though, let's note that (for security reasons) features that can control your production over the network are under password protection by default. Initially, the username and password are both set to "admin."
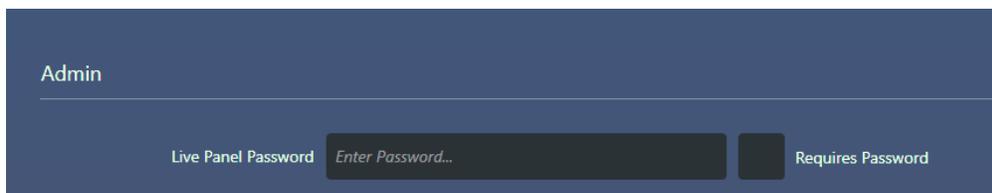
To enable or disable this security feature, or to modify the password, select *Configuration* from *Home Page* main menu and set your *Live Panel Password* under the *Admin* section in the *Session Page*.

SECTION 4.1 RESOURCES

The basic webpage system provided by all TriCasters primarily features a *Resources* page, discussed shortly in the context of the more sophisticated *LivePanel* implementation (included on selected models). In addition to the *Resources* page, you will find pages listing system keystroke shortcuts, as well as a reference to your TriCaster system.

SECTION 4.1 LIVEPANEL

Having launched a session click the *Notification* button at extreme upper-right in the *Dashboard* at the top of the *Live Desktop* and click the *Web Browser* button in the footer of that panel to view the webpage in a local browser. (See Section 7.6 for more details about the *Notification Pane*).

IMPORTANT NOTE: This view is provided so you can preview the TriCaster LivePanel features. It is not intended that you use the LivePanel web apps in a browser running on the local system.

To view the *LivePanel* webpages externally instead, simply connect any suitable device (be it a laptop, tablet, or desktop computer) to the same network, open this external device's web browser and navigate to the URL shown beside the *Web Browser* button.

Hint: Access to LivePanel does not require an external Internet connection, though some of the links provided on the Resources page will fail without one.

The *Resources page* is always available, and – by virtue of links to online documentation and assets – and thus is also always up to date and relevant. You can, for example, access the *Resources* page from a tablet or other mobile device to follow along with the steps outlined in an online video tutorial, or view details of a feature in the *User Guide* while operating live. For a deeper dive into LivePanel, see Chapter 13.

<div align="center">SECTION 4.2 VALUABLE CONTENT</div>

You'll notice different types of content including the following linked on the *Resources* page:

- The Viz DataLink™ web browser extension.
- Documentation
    - User Guide – the document you are reading
    - *Automation, Integration & Control Guide (*including a Chapter on all Vizrt Control Panels).
    - Macro and keyboard shortcut listings, and more
- Vizrt University – online video classes and Operator Certification programs.
- Extras – download updates, codecs, and utilities
- Communities – YouTube videos, Facebook, and more …
- Support – Customer Service and product protection programs.

The 'hamburger' menu at left in the titlebar of LivePanel's web page provides access to additional web assets, including:

- Preview Presets – which among other things provides a very convenient extension to TriCaster's PTZ control features.

- Shortcut Commands – a categorized listing of shortcut commands for use in macros or custom network control systems.

<div align="center">SECTION 4.3 VIDEO TRAINING</div>

Vizrt is in the video production business, and it couldn't be more appropriate for us to provide online classes to help you get the most out of your system. Vizrt University provides an opportunity to gain the skills and knowledge you or your team need to succeed. Classes range from Viz 3Play Operation to Live Production with TriCaster to NDI and Performance Media

Networking. Also included are a sample of Vizrt University online classes with several free courses.

Visit our webpage to find more or see our YouTube channel for a long list of tutorials for Vizrt products designed for all users, novice, or adept. From initial product registration to live production, streaming and exporting to social media services, you'll find it illustrated and explained here.

It's very likely that you will be able to easily learn the basics of live production with Vizrt systems by viewing these videos. When you need deeper knowledge, you will find Part II of this guide, the Reference section, helpful.

SECTION 4.4 OPERATOR CERTIFICATION

Vizrt's official Operator Certification program Viz University might interest you too, both as a way to obtain relevant skills and knowledge as well as to assure potential clients that your attainments have been validated and recognized.

PART II (REFERENCE)

A thorough examination of the various aspects of your TriCaster. Every button, menu item, feature and control are considered in this section, so you can take full advantage of your system.

Chapter 5 THE LAUNCH SCREEN

The Launch Screen is the gateway to a suite of applications, such as maintenance, management features, HDR support and I/O Card Configuration for both sessions and the system. We'll discuss each of these in the pages that follow, beginning with a review of the concept of sessions.

If you're familiar with TriCaster, you will notice TriCaster's new *Launch Screen*. We've enhanced it with additional features to streamline your workflow and make your experience more seamless.

Home Page	Session Page
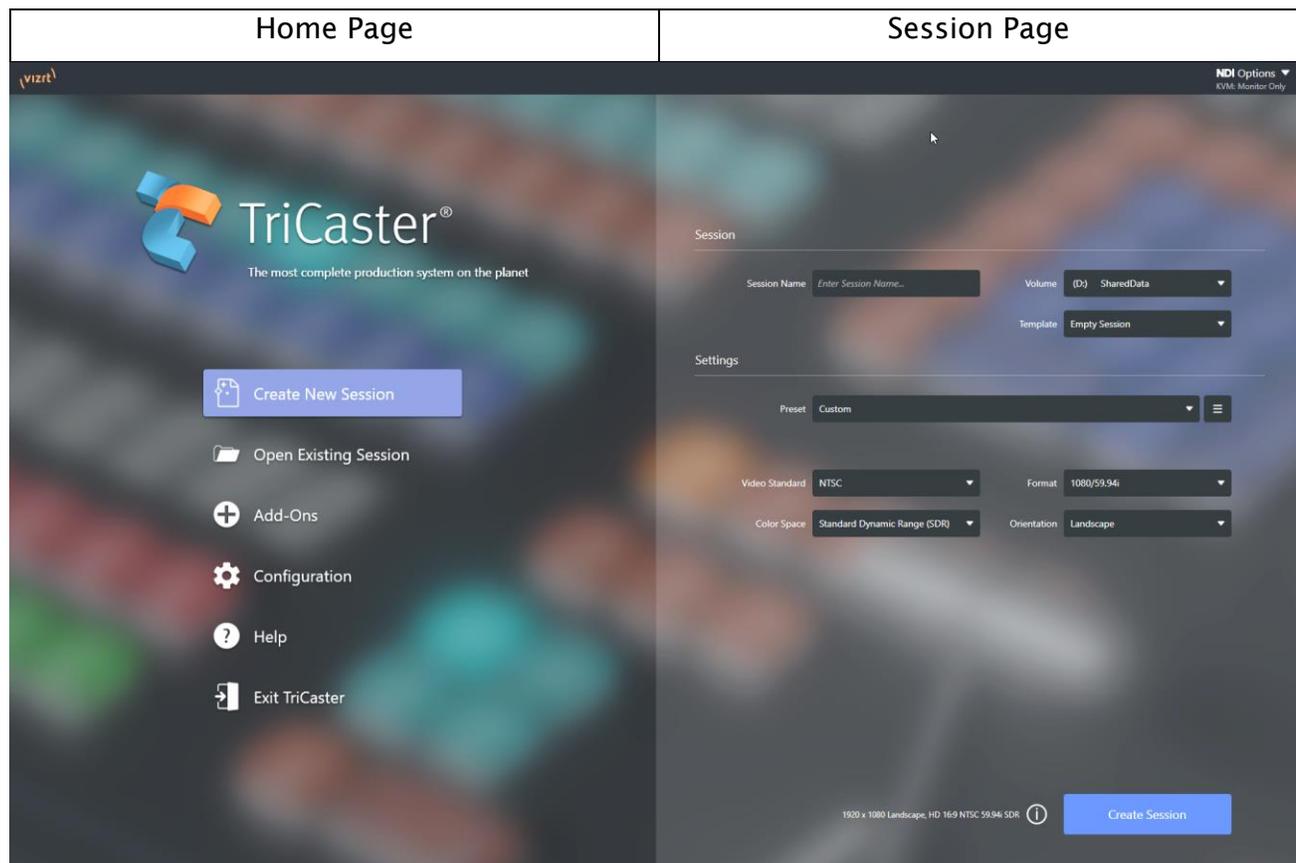
The Launch Screen's *Home Page* appears whenever you launch your TriCaster. From this screen you will create and launch *sessions*, then choose what sort of operations you wish to perform within it by selecting a link on the (similar) *Session Page*.

Your intention may be to begin a new live production, or to produce another episode of a live series. Perhaps you wish to prepare title pages for an upcoming event or perform system maintenance. We'll look into each of these in turn, but first let's consider a fundamental production concept, the *session*. What is a session, and why are sessions both important and valuable to you?

SECTION 5.1 INTRODUCTION TO SESSIONS

Any production involves a specific operating environment. The *session* is where TriCaster stores the details of that environment. Obviously, then, configuring session settings properly is important:

- What broadcast standard is used in your locale? Is it *PAL*, common in Europe among other places, or perhaps *NTSC*, standard throughout North American?
- Are cameras connected using hardware inputs (on supporting models), NDI, or a mixture of both connection types?

As you continue, you may make other adjustments relevant to your current production requirements:

- You might adjust cameras using the *Proc Amps* provided in *Input Configuration* panels.
- If your production plans include the use of greenscreen staging, you will doubtless adjust the *LiveMatte* settings for one or more cameras to provide optimal keying.
- Perhaps you will use Workspace *Display Settings* to adjust the preview monitor color characteristics or enable LUT.
- What are your output device connection preferences?
    - What video mixes and other internal sources do you want to route to which outputs?
    - Do you intend to configure a connection for a projection system? What external audio connections and adjustments are required?
- You might create a playlist of custom title pages in a *Media Player*, along with additional graphic elements for the *Buffers*.

During the actual live production, you may perform further fine-tuning, and add to the media content used in the presentation:

- You might grab a series of still images from *Program Output*.
- Or record video clips from the production for replay.
- And capture the network *Stream* output as a file.

> **Finding your files – automatically.**
>
> Typical sessions include many media clips, along with graphics, titles, and buffers. Naturally, users must ensure that all of media required is on hand for the session.
>
> To help with this task, the system will automatically locate the necessary media, even when drive settings have been changed on the system (as, for example, when a session backup has been restored onto different drives compared to the original setup).

The list of adjustments, activities and assets involved in a specific production goes on, but the main point to grasp is that the *session* is comprised of <u>all of the above</u> collectively. If you do not deliberately delete the session, all your session media and all your session 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.)

Naturally, you can store multiple sessions and re-open them freely. This greatly simplifies management of files associated with producing unique programs and easily accommodates different users with their own individual requirements and preferences.

<div align="center">SECTION 5.2 THE HOME PAGE</div>
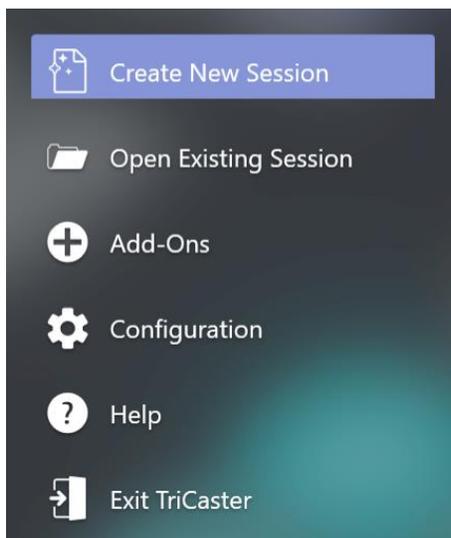
Having discussed sessions, let's go on to consider how sessions are created, and how you choose which one to work on. These items, along with a few other top-level functions, are found on the *Home Page.*

This primary screen is the first thing you encounter after launch. It is dominated by the main menu.

Choosing a link from the menu updates the right-hand pane of the *Session Page* to provide options and controls related to your choice.

For example, the first thing you will likely do on launching a brand-new unit is create a session.

In anticipation of this, the *Create New* Session button is pre-selected automatically whenever there are no existing sessions. This results in the relevant session options being displayed at right.

5.2.1 CREATE NEW SESSION

As previously mentioned, clicking the Create *New Session* button populates the *Session* screen at right with related options.

Note: Only selected TriCaster models support all features on this page, see Appendix A: Features & Specifications for a detailed list.

SESSION

SESSION NAME

You can click in the *Session Name* field to modify the default name (which will be the current date) using the keyboard.

VOLUME

The *Volume* drop-down menu designates a primary hard drive for the session (and its associated content) to be created and stored on.

TEMPLATE

The *Template* drop-down menu lists all sessions currently available on the system. If you select an entry, the session you create subsequently retains all settings of the source session.

SETTINGS

Principally, for each session you must designate (from the pulldown menus) your local video standard.

PRESET
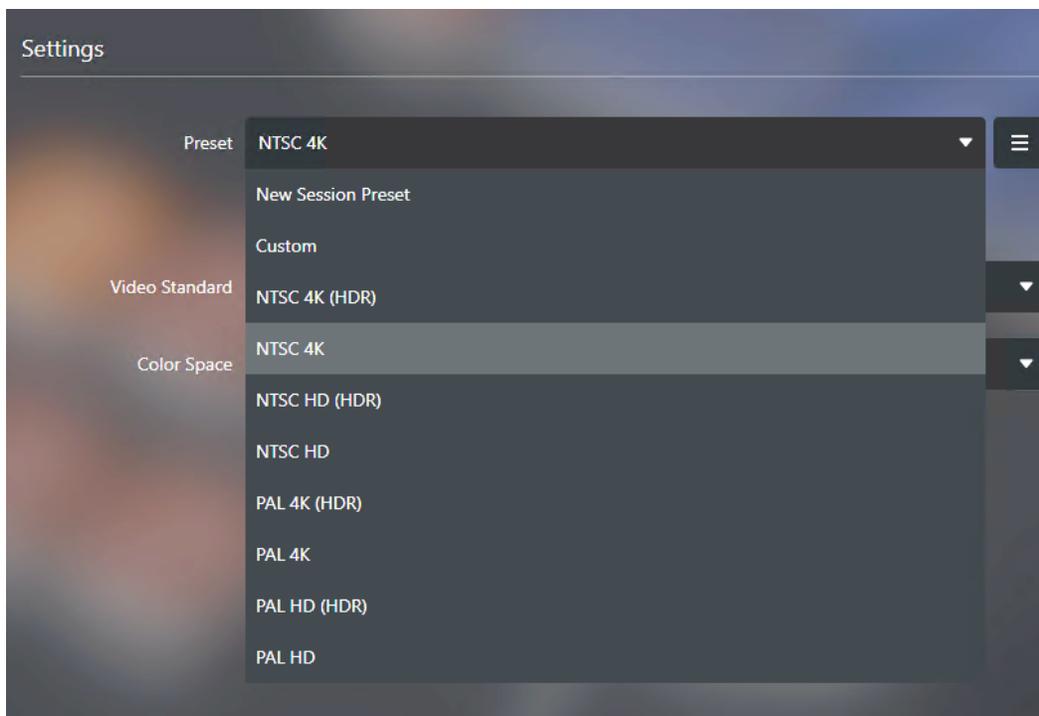
The *Preset* dropdown menu lists 4K, HDR or SDR default presets depending on TriCaster model. When modifying any of the video default options from the Settings menu, the preset will change to Custom. How to save the Custom preset is described next.

CUSTOM PRESET OPTION MENU
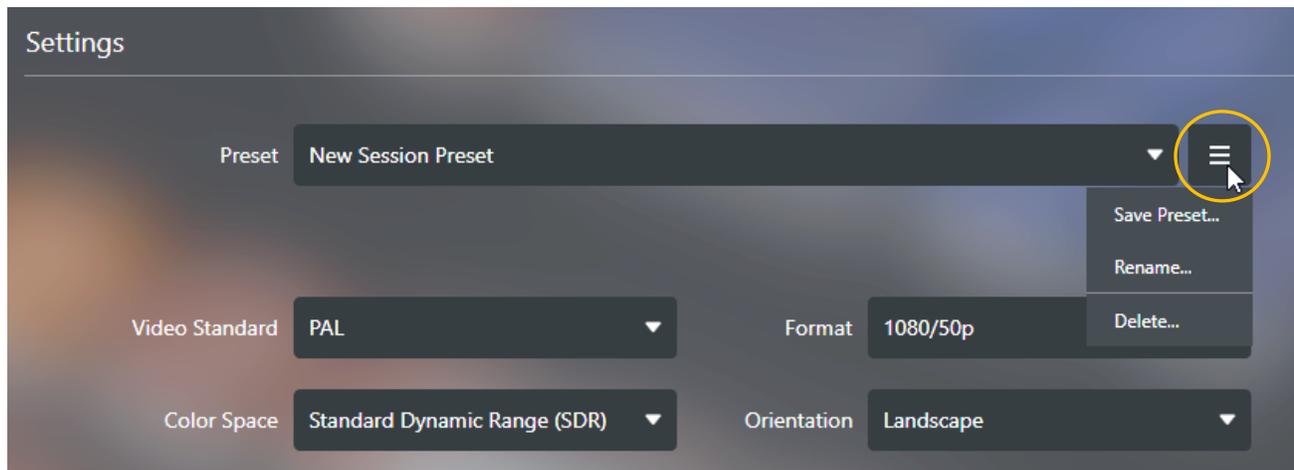
In supporting models, opening the *Preset Options* hamburger button to the right of the preset dropdown will reveal options for preset management. Once your preset is saved, your *Custom Preset* will appear in the dropdown menu.

- *Save Preset* – opens a dialog to save a new file or an existing file to a new location or with a new name.
- *Rename* - opens a dialog to rename the currently selected preset.
- *Delete* - deletes the currently selected preset.

VIDEO STANDARD

Select NTSC or PAL

FORMAT

In the Format selector, you will find that traditional video formats have been complemented by appropriate non-standard options including, for example, portrait aspect 1080x1920/59.94p and 1080x1920/29.97p options, and so on.

COLOR SPACE

Color Space (varies by model) is crucial for LUTs (Look-Up Table) because it defines the range of colors that can be represented by a specific device, allowing a LUT to accurately translate colors from one color space to another. For example, High Dynamic Range (HDR) to Standard Dynamic Range (SDR).

LUT menu options are located in the Setup > Input pane (see Section 8.1 Input Configuration) and in the *Workspace* menu in the *Dashboard* (see Section 10.3 *Workspace Presets)* for LUT menus with common conversion LUTs, the ability to load custom LUTs from disk (10-Bit), and an option for no conversion.

When you select a default video setting from the *Preset* menu, TriCaster will automatically select the *Color Space*. This can be modified to your preference, but the preset will change to *Custom*, and you can then save your settings in the *Preset Options* menu as described above.
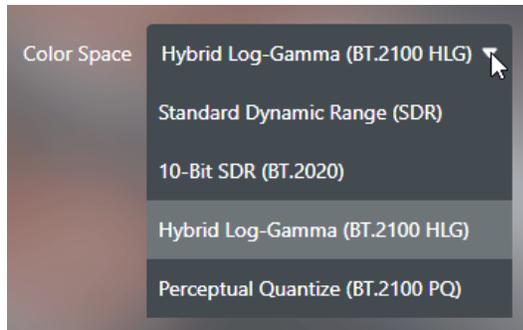
ORIENTATION

Allows you to choose between landscape (horizontal), square, or portrait (vertical) aspect modes.

Remember that for live production, you can simultaneously supply both SD and HD output for *either* SD or HD sessions. The session setting does have some significant ramifications, though. For example, if your session format is SD 4:3, this is the file format captured by the *Record* function when capturing *Program* output – even when the video cameras supplying your inputs are HD; and the opposite is also true.

> *Note: See Section 8.2 for more information on Video Output configurations.*

SESSION FORMAT DESCRIPTION

Located at the bottom of the *Session* page (left of the *Start Live Production* button), the current session format will be listed regardless of the preset name

Having made your selections, you would normally click the *Start Live Production* button at lower right to launch the *Live Desktop* – but first, let's explore a few other features of the *Home Page*.

CREATE SESSION

Clicking the *Create Session* button will take you to the *Session* page, here you can choose your session and click on the *Start Live Production* button to launch the *Live Desktop*, which is where you will spend all your time during live production.

5.2.2 NDI KVM

KVM is an abbreviation for "keyboard, video and mouse". You will notice an *NDI KVM* menu at the top right of the *Session Page*. This feature leverages NDI protocol to provide superb KVM functionality, giving you complete control of your system from anywhere on the network where you can run the Windows version of NDI Studio Monitor.

To enable this feature select which operating mode you wish to apply, choose between *Monitor Only* or *Full Control* (which passes mouse and keyboard operations to the remote system).
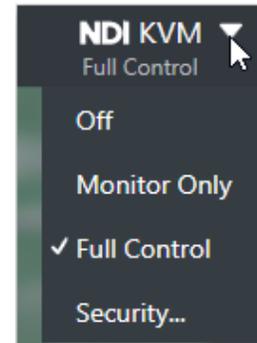
Use the *Security* option in this menu to apply *NDI Group* control to limit who on your network can view the *NDI KVM* output from the host system. To view the output from the remote system and control it, select the machine's NDI output in the *Studio Monitor* application supplied with the free NDI Tool pack, and enable the KVM button overlaid at upper-left when you move the mouse pointer over the screen.

> Hint: Note that Studio Monitor's KVM toggle button can be relocated to a more convenient spot by dragging.

You can select to view or control the User Interface or another *Multiview*, or both with multiple instances of *Studio Monitor* open on the receiving unit.

Note, too, that this feature gives you a great way to multiple your *Multiviews* around your studio or campus. You can even use these displays as video sources for another NDI-enabled system. System audio will also pass to the receiver, and you can even copy and paste text between the two systems.

With the User Interface running full screen in *Studio Monitor* on a receiving system, it's hard to remember that you're controlling a remote system. Even touch is supported, meaning you can run the User Interface output on a Microsoft Surface™ system for portable touch control over your entire live production system.

> Hint: To learn about using NDI KVM with audio, see Section 18.4.2 NDI KVM Audio.

5.2.3 OPEN EXISTING SESSION

If there are existing sessions on the system, the main menu on the *Home Page* will default on opening your last session. Clicking *Open Existing Session* causes the *Sessions List* to appear at right. This pane lists all sessions stored on currently mounted storage media (shown on following page).

Available sessions are grouped on the *Session Page* under the names of the storage volume they are located on. The listing shows the *Session Name* and *Format* for each session, on each drive. Above the list is an option to search for an individual session. Let's look at the *Sessions List* briefly before we open a session.

AUTO-LAUNCH SESSION

Normally, a few seconds after launch, TriCaster automatically reloads the last session you were in, allowing you to basically power up into the last session unattended. You can, of course, interrupt this process by selecting another session or pressing any key. Advanced users can modify this behavior, either by designating a specific session to auto-launch irrespective of the most recent manual selection, or by disabling the feature entirely.

> *Important Note: Modifying this feature requires changes to the Windows registry. We strongly recommend that edits to the registry be performed only by experienced people, as the system can be rendered inoperable if this is done improperly.*

To do this, add a new value named *auto_launch_session* to:

HKEY_LOCAL_MACHINE\SOFTWARE\Vizrt\XD\Admin Screen

Set its value data to the name of an existing session, and that session will auto-open on launch (instead of the 'last open' session). If the specified session does not exist, the auto-launch feature will not proceed, by setting *auto_launch_session* to "_Disabled" (or some other suitable string) rather than a real session name you can effectively disable auto-launch.

RESTORE SESSION BACKUP

To restore a session you have previously archived, click the *Restore Backup Session* button (located to the top right above the *Session List*) and use the file explorer provided to select a *Session Backup* file.

Click *Open*, and a progress gauge will track the restoration process. In due course, the newly restored session will be added to the *Session List* for the specified drive.

> *Hint: Restoring a session that has a lot of content can take considerable time. Be judicious, then, if considering a restoration shortly before a scheduled live production.*

OPENING A SESSION

Highlight a name in the *Session List* you wish to open, then click on the *Start Live Production* icon at the bottom right of the *Session Page*. This will open the *Live Desktop*, your live production center.

SESSION DETAILS

Below the *Session* list you will find *Session Details* panel provided for any individual session highlighted. Details include name, location, date it was created, video standard, frame size, frame rate, orientation and color space

—

MANAGE SESSION

The *Manage Session* icon in the *Session Details* group provides an alternative approach to file management. At times you may find it useful to be able to quickly access the various files associated with specific sessions. Selecting the *Manage Session* gear provides options with a number of convenient items.

BACKUP SESSION

Clicking the *Backup Session* link opens a system file explorer that you can use to assign a storage location for the backup files. A progress gauge is displayed during processing, and if necessary, you may *Cancel* the operation. Of course, the session to be backed up is the current session (to back up a different session, return to the *Home Page* and *Open* a different session.

> Note: The backup operation feature does not 'gather' media files in the backup, but it does store Media Player playlists. Provided the media files are still available; they will appear as expected when the session you backed up is restored.

RENAME SESSION

Highlight the session you wish to rename, click on *Rename Session* and enter the new name.

CONFIGURE DATALINK KEYS

DataLink allows the handling and updating of text and image data from both internal and external source for use in title pages in real-time, as well as other purposes. Briefly, *DataLink* tracks variables (called *DataLink keys*) and their values and updates these values on-the-fly when used as entries in title pages.

> Hint: DataLink keys can serve in other ways, too, for example to automatically insert information such as time or scores into labels and comments of social media uploads, or as instant replay clip metadata

Since *DataLink* falls into the general realm of automation and has access to external sources, complete coverage of its features and capabilities is found in the companion *Automation, Integration & Control Guide* included with this product; but we'll mention a few highlights as we go along as well.
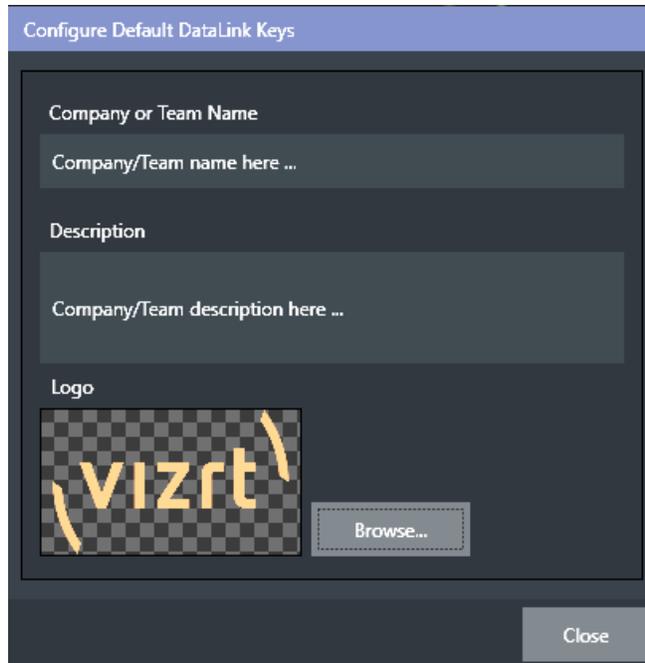
The *Configure Datalink Keys* link opens a dialog that allows you to pre-assign values to three special *DataLink* keys.

These *session keys* serve as the default first and second line text inserts and image used by many of the supplied template title pages. (By taking a moment to populate these keys with, for example, a company name, motto, and logo, you will find much of the included graphic content ready to use for a given production without ever having to type another line.)

BROWSE TO SESSION FOLDER

Under the *Browse To Session folder*, you will see direct links to the *Clips*, *Still*, and other content associated with the current session. Clicking one of these links (or selecting it with the up/down arrow keys and pressing Enter) opens a system file explorer.

You can use the familiar features and shortcut keystrokes in these windows (Cut, Copy, Paste, Rename, Delete and so-on) to manage the session content.

Hint: Of course, you can open several of these folders simultaneously and navigate these file windows to other locations as well. For example, you might copy the title page (.cgxml) files from the Titles folder of one session into the Titles folder of a different one before deleting the first session.

DELETE SESSION

Be aware that the *Delete Session* function should be used thoughtfully, as it cannot be undone.

All content stored in the named session's folders will be deleted, including imported clips, images, titles, and any clips captured to the default session folders.

Note: Content that is not local to the session, but which was used in it is not deleted. For example, you may have added still images to your playlist directly from a USB thumb-drive, doing so without actually importing the files into the session. Those external files will not be deleted.

5.2.4 ADD-ONS

Vizrt offers additional software tools to expand the power of your TriCaster system. The icon labeled *Add-Ons* on the *Home Page* provides access to some of these tools.

When you select the *Add-Ons* icon, links are displayed at right for installed software applications, allowing you to launch them.

For example, you will see links to the included *Animation Store Creator* utility, the very useful *DataLink Configuration* applet (please refer to the accompanying *Automation, Integration & Control Guide* for full details on DataLink's many powerful source options and a deep dive into Vizrt Control Panels), and much more.
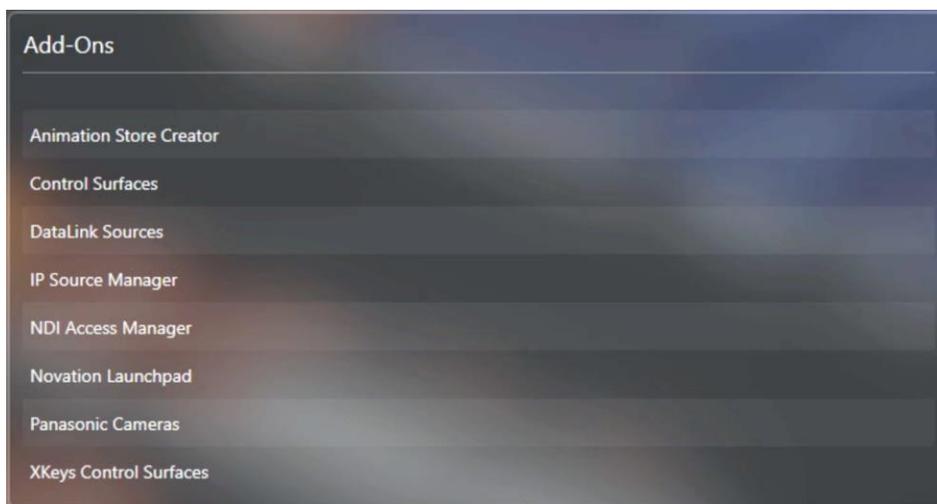
Note: For information on adding a Control Surface to your TriCaster, please see the accompanying Automation, Integration and Control guide located in LivePanel.

5.2.5 CONFIGURATION

Note: The Connectors tab in the Configuration page is a TriCaster Vizion feature only.
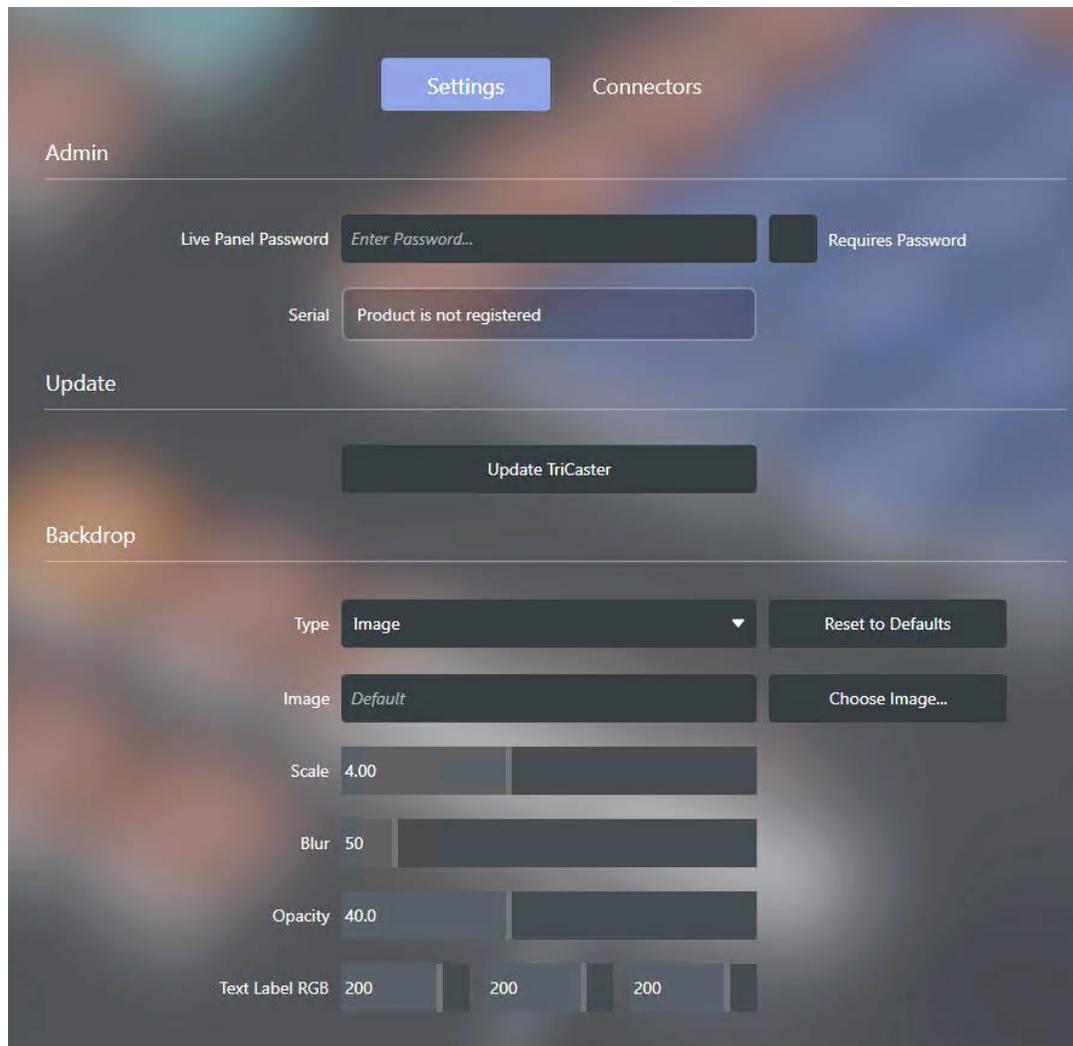
SETTINGS

Selecting *Configuration* from the *Home* page menu takes you to a new screen that offers several functions and settings having to do with *Live Panel* password, updating your TriCaster and customization options.

ADMIN

Live Panel Password – Configure the password for access to the web pages and network control features provided by the unit.

Serial & Hardware ID – your ID numbers will appear if your product is registered.

Note: For those who have purchased Premium Access for your TriCaster TC1 and TriCaster 410 Plus models, a Feature Key field will appear (under the Serial field) for your Premium Access serial number. A popup will appear indicating you have successfully enabled this feature.

UPDATE

Vizrt may periodically provide software updates. Updates can enhance performance, security or even add useful new features. If the unit is connected to the Internet, clicking *Update TriCaster* takes you to the *Updates and Downloads webpage* where you can locate the most recent software version.

Having done so, you can download and run the *Auto Updater* for the new version, or use the *Download Tool* option, which allows you to store the related files on another system for later transfer to your TriCaster live production system.

BACKDROP

The new *Backdrop* feature in TriCaster provides the ability to customize the *Launch Screen.* From the pull-down menu under *Type,* you can select either an image, company logo, solid color or simple two-color gradient. You can also change the *Scale, Blur* or *Opacity* of an image.

The *Text Label RGB* section at the bottom allows you to change the color of the font within the *Launch Screen.* Simply click the *Reset to Defaults* button to go back to the default screen.

TRICASTER VIZION CONNECTORS PAGE

Note: On selected models the Connectors feature will not appear for TriCaster Vizion's without Matrox cards.
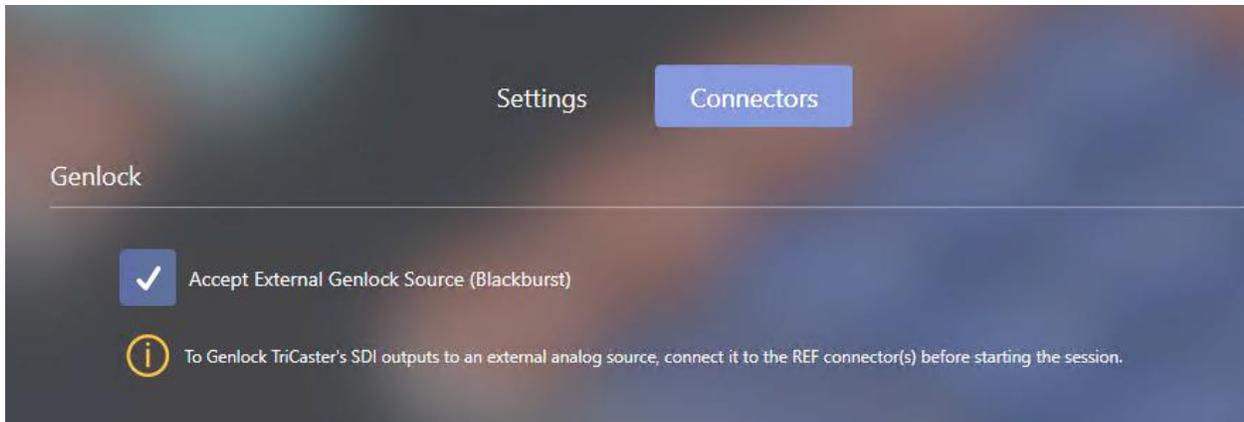
EXTERNAL GENLOCK (BLACKBURST)

For TriCaster Vizion models with either one or two Matrox cards, a toggle control provided in the *Session* page enables or disables the REF (Reference) connector. When enabled, an *External* (*Blackburst*) signal supplied to the REF input prior to launching the session is used to genlock the SDI outputs.

Clocking for other output options is driven by another source selected in the Live Session using controls in the Setup > Sync tab. Optional sources are Internal (System clock), Internal (GPU clock), and External (NDI). See 8.2.4 Sync Tab for more details.

SDI Configuration

TriCaster Vizion models come with one or two Matrox DSX LE5 12G LP/8 cards. These cards each have 4x 12G SDI connectors, and 4x 3G SDI connectors (plus reference connector). In the *SDI Configuration* panel there are predetermined patterns as either inputs or outputs. This feature is provided for your review and to confirm your configuration each time TriCaster is launched.

In the *Live Desktop* the connectors are labeled to identify assignment (In/Out), card (A/B), and connector, as for example: Input A2, Output A3, etc. The default presets are predefined for both HD and UHD sessions. To the far right of card A and Card B is a representation of which connectors are 12G or 3G.

> Note: Changing the SDI connector mapping may require a system reboot to take effect.

If an existing session from disk has a different SDI configuration saved than what the current hardware configuration is, a warning dialog will be displayed with the following options:

- Cancel
- Load session, keep hardware mapping
- Update hardware SDI connector mapping

5.2.6 HELP
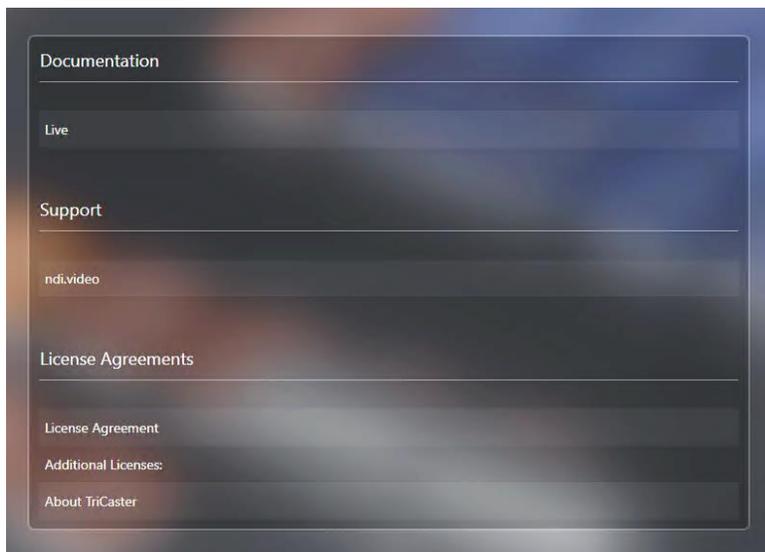
Select the *Help* icon to reveal links to open manuals and other information.

The primary User Guide is found here. Click the *License Agreement* link to review the end user license requirements, a link to the NDI website, or the *About* link to list software version information, credits, and acknowledgments.

5.2.7 EXIT TRICASTER

- *Exit to Windows* – Leave the *Launch* screen and display the standard system desktop.
- *Restart TriCaster* – Restart your system.
- *Shutdown TriCaster* – Shutdown your system.
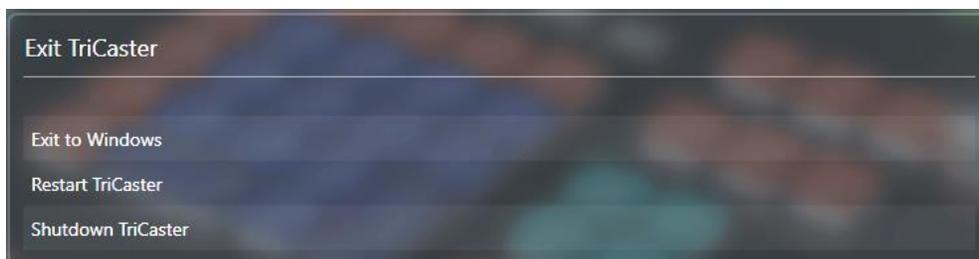
Chapter 6 LIVE DESKTOP

The Live Desktop is the control center for all your live production work. It Provides control over switching, transitions and overlays, titles and graphics, audio mixing, playback of digitized content, and much more. In addition, streaming and recording features are located here, along with keying and virtual set tools.

SECTION 6.1 DISPLAY REQUIREMENTS

The *Live Desktop* requires a *minimum* screen resolution of 1920x1080

The *Live Desktop* is launched by creating (or opening) a session in the *Session Page* on the Launch screen, then selecting *Start Live Production*.

SECTION 6.2 OVERVIEW

The *Live Desktop* provides visual feedback for operations, including monitoring, live switching, and so on. While it is seldom necessary for it to appear as heavily populated as seen in, we display it this way to illustrate that it can be logically divided into five horizontal bands, described from top to bottom in the following table.

1 - Dashboard

· Quick access to interface options and important tools, including *Publish* and *Macros* (or *Commands*) along with *Record*, *Stream, Workspace* and *Timecode* options.

2 - Monitors

· User configurable layouts – monitor live inputs along with internal sources (such as *DDRs*, *M/Es*, and *Buffers*) plus *Look Ahead Preview* and *Program* output
· *Waveform* and *Vectorscope* monitors

3 - M/Es & Matrix Router

· *Effect* mode – control up to four primary video layers plus 4 overlay channels
· *Mix* mode – secondary switcher controls plus 4 overlay channels
· Each *M/E* includes dedicated an extensive complement of *Keyers*, transition generators, scaler/positioners, and more
· The two Matrix Router (OUTPUTS 1-4 & 5-8) provide eight routable crosspoints with NDI outputs (varies by model).

4 - Switching

· *Switcher* rows – *Program* and *Preview* rows
· *Transition* controls – *T-bar* and *Delegate* buttons
· *DSK* video layer configuration and controls

5 - Tabbed Control Modules

· Internal *Media Players* and *Buffers*
· *PTZ* (robotic) camera controls
· *Audio* (mixer) – input configuration, level control, *EQ* and *Compressor/Limiters*

SECTION 6.3 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.
Rotation X 0°	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. Hold down Alt while dragging vertically to modify the third value (Z) when provided.
Level -66.7 Pan L R L R	Rotary Knob (single-value)	Audio Gain	Drag left-right to adjust the current value.
02;09 S 02;00 M 01;00 F 00;15	Combo-Slider	Transition, Zoom Duration	• Drag left/right to raise or lower the current value. • Click the digits to type in a new value. • Or click the triangle to open a drop-down menu.
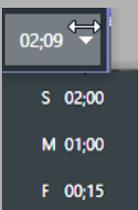
To make very fine adjustments to slider values, hold down the Ctrl key while dragging the mouse (this increases accuracy by 10x). Hold down the *Shift* key and double-click most controls to reset them to their default values.

SECTION 6.4 CUSTOMIZING THE DESKTOP

The *Live Desktop* layout can be adapted to many different scenarios and provides a number of customization options that can be of benefit in your workflow. In this section, we'll touch on several of these.

6.4.1 RENAMING INPUTS

As charming as descriptive names like *Camera 1*, *DDR 2* and *M/E 5* are, you may wish to change these labels to something more appropriate for your local needs.

To do so, you will need to open the *Input Configuration* pane for the *Switcher* source in question. There are several ways to open this panel. You can use any of the methods described below to do so.

- Click on *Setup* (located in the *Dashboard*) to open the *Input* configuration panel. In the *Video* column, you can edit the name of the selected source. To add a comment, click the gear to far right of the *Input* tab to open a more detailed version of the *Input* configuration panel (as shown below).

- Roll the mouse pointer over the viewport for the source and click the *configuration* (gear) icon shown at lower right.

- Right-click a viewport in the *Live Desktop* or external *Multiview*, or a Switcher button, and select Configure from the context menu.

- 'Two finger tap' the viewport.
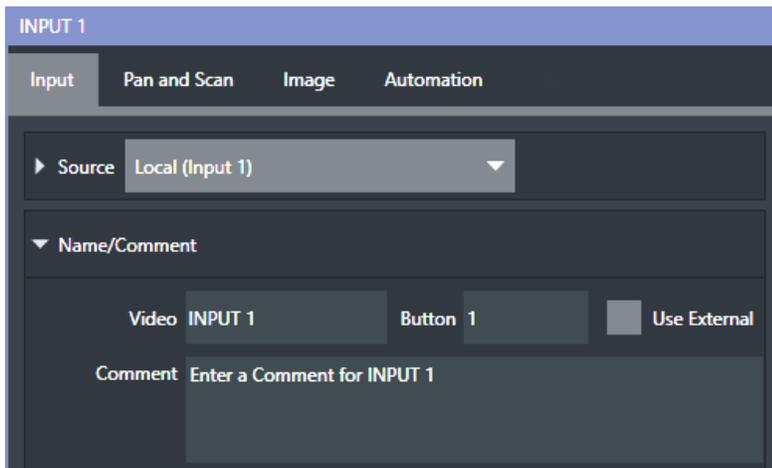
Expand the *Name/Comment* group in the *Input* tab of the *Input Configuration* pane, by clicking the twirl-down triangle at left. This group contains several editable text fields, including *Video* (the label shown under monitors), a shorter Switcher *Button* label, and the longer *Comment* field.

Hint: The Comment entry is more than just memory aid. DataLink feature can automatically update title pages as inputs are displayed by drawing on the information you enter here.

6.4.2 WORKSPACES

Various layouts and custom monitoring options for the *Live Desktop* and *Multiviews* are provided in the *Workspace* menu.

When one or more *Multiviews* monitor is in use, *Workspace* preset options can be combined with great flexibility, letting you see *what* you want to see *where* you want to see it.

It's easy to set up complementary displays. Each connected monitor, including the *Live Desktop* screen (listed in the *Workspaces* menu as *Multiview 1*) has four unique presets, labeled A-D. You can load a different viewport layout into each of these presets, and recall them easily using this menu, or perhaps using Macros assigned to keystrokes.

In addition, each individual viewport can be assigned to any *Switcher* input source or output using its own context menu. So, for example, even if you initially use *Load Default* to assign identical viewport layouts to preset A and preset B for a given screen, you can configure each viewport differently in the two presets.

Switching between presets, then, will allow you to view different sources. Even the overlays (such as *Safe Area* display) for each viewport are fully independent.
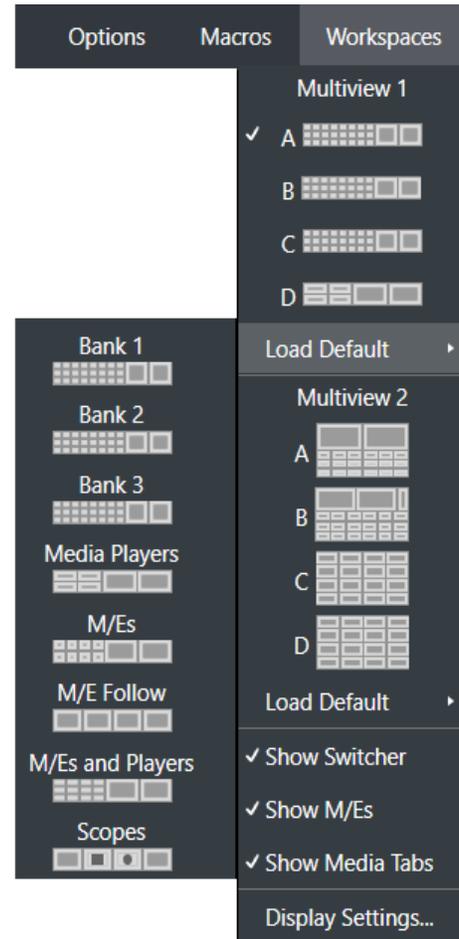
> Note: For information on Display Settings, including enabling LUT, (varies by models) see Workspace Presets Section 10.3.

SCREEN DIVIDERS
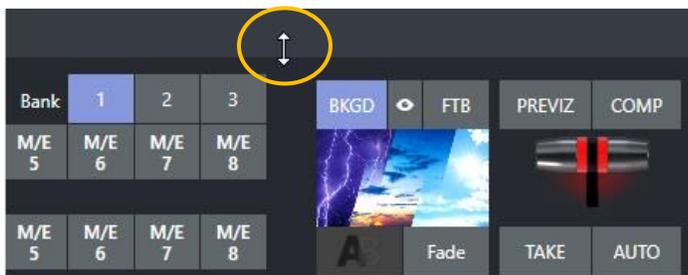
Notice too that, when the lower tabbed modules are visible, you can also drag the horizontal divider between the *Live Desktop* monitor pane and the *Switcher* up or down to modify its position.

You can even move the horizontal divider all the way up to the bottom of the Dashboard, thus hiding the Desktop monitor pane entirely, providing much more room for other modules in the process.

Hint: Reset the horizontal divider to its default location by double-clicking it. Also, note that a vertical drag bar is provided just left of the Program and Preview viewports in some Workspaces.

Neither is it necessary to display modules you don't access frequently (say, for a simpler production) at all times. For example, the M/E pane is hidden by default; click the *Mix Effects* label or an *M/E tab* above the *Switcher* to toggle display of the *M/E* pane – or press the keyboard shortcut "m".

6.4.3 EXPRESS SWITCHER MODE

TriCaster's alternative *Switcher* interface provides new opportunities to customize both the interface and workflow. The Switcher's *Express* mode is very compact, freeing valuable *Live Desktop* space. Viewports in the multiview area above are significantly larger than in the more familiar two row (Program/Preview) *Switcher* mode.
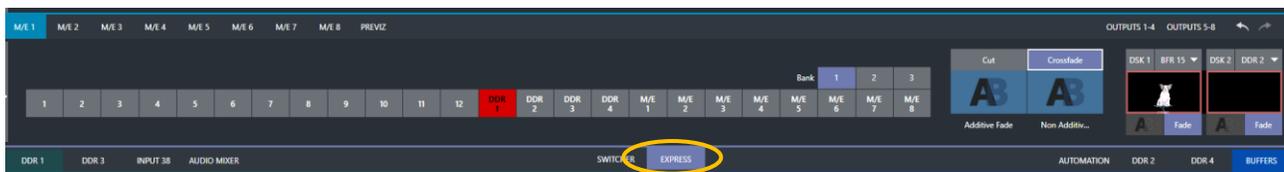
Too, *Express* mode provides a simple 'single-click' workflow, ideal for less complex productions, when a control panel is in use, or in environments involving student or volunteer operators who may struggle with traditional switcher workflows.

You can easily switch between the standard *Switcher* mode and *Express* operating modes by clicking their eponymous tabs at right in the horizontal bar just above the *DSK* controls.

For more information on these two modes of operation, see Chapter 9, Switcher, Transitions and Overlay. Several additional workflow and interface options are hosted in the *Options* menu, which we will discuss shortly (in Section 7.2).

Chapter 7 THE DASHBOARD

The Dashboard groups important production features along with configuration and display controls in one convenient place for quick access and review. Also, the Dashboard serves to provide information on the current session, status updates and storage usage, along with timecode and the Macros and Options menus.

The *Dashboard* is home to several important displays, tools, and controls. Prominently located at the very top of the *Live Desktop*, it occupies the full width of the screen.

Initially, to avoid overwhelming us, the left end of the *Dashboard* simply shows the name of the current session. Moving the mouse pointer to the top of the screen reveals the set of menus.
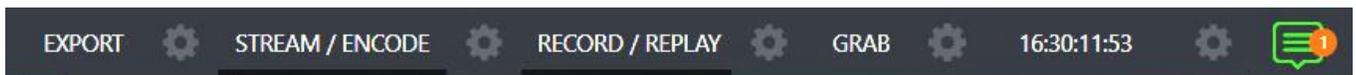
The right half of the *Dashboard* contains additional features and tools that are more frequently accessed, for which reason they are displayed full-time. The various elements comprising the entire *Dashboard* are listed below (starting from the left):

1. *File* menu – see Chapter 3
2. *Options* menu - see Chapter 7
3. *Macros* menu – see Chapter 20
4. *Workspaces* menu – see Chapter 10
5. *Setup* menu – see Chapter 8
6. *EXPORT* button and Configuration (gear) – see Chapter 23
7. *STREAM/ENCODE* button and *Configuration* (gear) – Chapter 22
8. *RECORD/REPLAY* buttons and *Configuration* (gear) – see Chapter 24
9. *GRAB* button and *Configuration* (gear) – see Chapter 24
10. *Clock(s)* and *Configuration* (gear) – see Chapter 7
11. *Notification Panel* – see Chapter 7

Some of these items are so important that they rate their own chapters. Others are detailed in various sections of this guide (cross references to the relevant sections of the manual are provided above). In this chapter, we'll focus on those *Dashboard* features not discussed in greater depth elsewhere.

SECTION 7.1 FILE MENU

This menu drops down to reveal the following items:

- *Eject* – opens a sub-menu that lets you safely disconnect selected storage volumes
- *Import Media* – easily add media files from external sources to the appropriate session folders and automatically transcode them to friendly formats for optimal playback if necessary.
- *Share Media Folders and Buffers (see* Section 11.3)
- *Exit* – close your live production session, and return to the *Session page* of the *Launch Screen* (all session settings are stored on exiting)

SECTION 7.2 OPTIONS MENU

Several very useful interface and workflow options are presented in the *Options* menu.

- Tabs Follow

  - Enable *Follow Preview Row for All Inputs* to display the tabbed pane for a *Preview* row source automatically on selection changes (for *M/E* selections, the *M/E* pane must be maximized to see the *M/E* tab update).

  - When *Tabs Follow Preview for M/Es* is checked, only the *M/E* pane selection updates (when you select an M/E as source on *Preview*).

  - *Tabs Follow All Delegates* updates the *Desktop* in sync with control panel delegate changes.
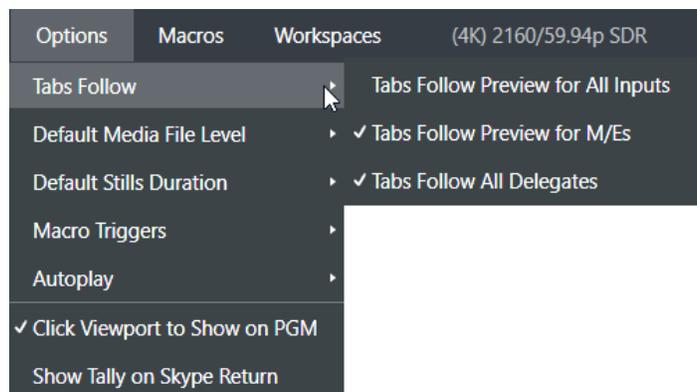
  Hint: Control panel delegate operations can sometimes result in a tabbed module that you want to view being obscured when certain options are enabled. When this happens, press the control panel Delegate button again to re-display the tabbed pane you are interested in.

- *Default Media File Level* – the default 'per-clip' audio level applied to imported media files is controlled by this option.
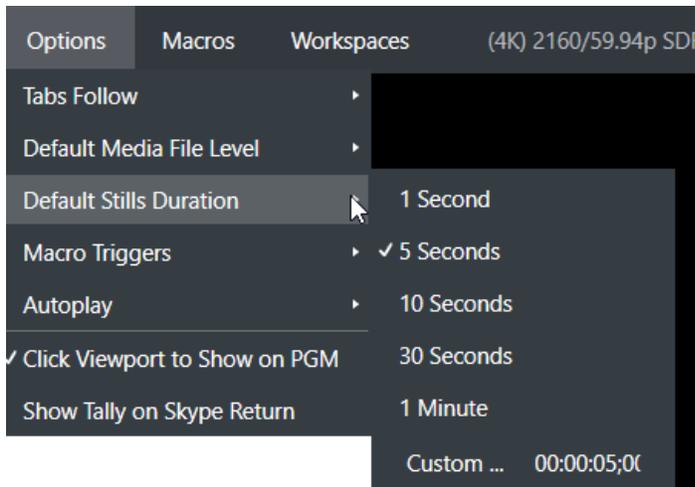
- *Default Stills Duration* – the default duration of a still can be applied, along with creating a custom default.

- AutoPlay
    - *Enable Autoplay Out on M/Es* – Enables *Autoplay's* transition-out behavior for *M/E's* (*Mix* mode) displayed on *Program* out (off by default).
    - *Extend Play* – When enabled along with *Autoplay* in the *DDR …*
        - Playback will extend past any marked out point, up to the last frame of the file even if the operator manually removes the *DDR* from output.
        - After the last frame is displayed, the playhead advances to the next playlist item.

- *Click Viewport to Show on PGM* – When this feature is enabled, clicking a viewport (or, on a touchscreen, tapping a viewport) selects the corresponding video source on the main Switcher's *Preview* row and performs the current *Background transition* to display it on *Program* output.

- *Show Tally on Skype Return* – The return video sent to remote Skype TX callers shows a tally overlay.

SECTION 7.3 MACROS/COMMANDS

Click *Macros* to show a menu containing a *Configure Macros* item. This opens a large panel that allows you to create, organize, and even edit macros.

Macros provide extremely important production benefits – sufficiently so that we have not only given them a place of their own in the User Guide (Macros and Automation), but they are also discussed in greater detail in the accompanying *Automation, Integration & Control Guide*. Also, note that the *Shortcut Commands* used in macros are listed on your TriCaster's locally served Resources web page in LivePanel.

SECTION 7.4 WORKSPACES

The *Workspaces* menu opens when clicked to reveal control groups for each detected screen. These control the monitor viewport layouts shown on the *Live Desktop* and external *Multiview* displays. Workspace *Presets*, including enabling *LUTs* (in supporting models, are discussed in Section 10.3.

SECTION 7.5 CLOCK

The Dashboard also hosts a clock which, in addition to showing the current time, can display countdowns to event start and end times when enabled.

To access time features, click the small gear icon next to the timecode display at right in Live Desktop's *Dashboard*.

Hint: You can set the system clock, as for any computer; simply exit to the Windows Desktop to do so.

7.5.1 LTC TIMECODE
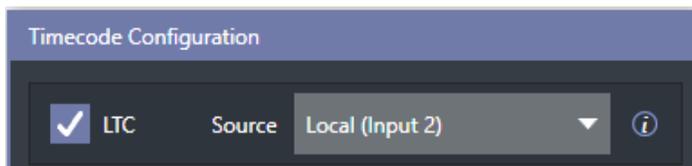
Linear timecode has long served as a method of sharing an external timecode reference in video production. Output from an external *timecode generator* is supplied to devices in the video pipeline using a standard audio connection.

Choose an LTC source in the *Timecode Configuration* panel, and the feature will decode time stamps from the audible signal, using the values for clock displays as well as embedded timecode when recording video (if the file format supports this). This is a great asset for post-production purposes.

Hint: The timecode display in the Live Desktop titlebar is tinted blue when external timecode is in use. If the external connection is lost for any reason, the display changes to white. TriCaster will attempt to maintain continuous timecode from the interruption on, until a valid signal is restored (in which case the display turns blue once more).

7.5.2 EVENT TIME
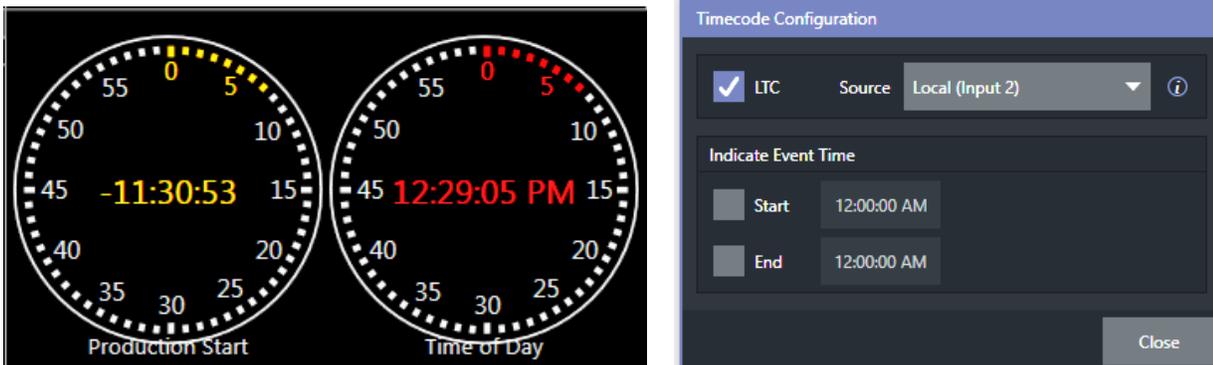
Two switches under the label *Indicate Event Time* allow you to configure *Start* and *End* times for your upcoming show. Beside each of these is an editable time field. Enable the *Start/End* switches, then click inside the field to modify the time value by direct entry or drag left right to raise or lower the current value.

During live production, the *Dashboard* and as well as monitor panes and default *Multiview* layouts offer *Broadcast Clock* displays based on the current timecode. Secondary clock displays show a useful countdown to the (production) *Start* and *End* times when the corresponding switches are enabled in the *Timecode Configuration* panel.

SECTION 7.6 NOTIFICATIONS

The last item at right on the *Dashboard* is the *Notification* icon (shown on following page). A 'number bubble' indicates how many un-viewed entries have accumulated.

Clicking the icon displays the *Notification Pane*, which provides both helpful information and some very useful tools.

The *Notification* icon can be colored white, green, amber or red. The color indicates the type of messages available for review:

- A green icon denotes an informative message, as well as the availability of new media.
- An amber icon indicates a warning message has been received.
- Higher priority alert messages are denoted by a red icon.

The highest priority (un-viewed) item in the list at the moment determines the *Notification* icon color. After you open the panel to review the notifications in the list, the icon turns white.

Individual items can be cleared from the list using the context menu opened with the triangle gadget shown on the right when you roll the mouse over an entry, or you can empty the list with one click using the *Clear All* button in the footer of the panel.
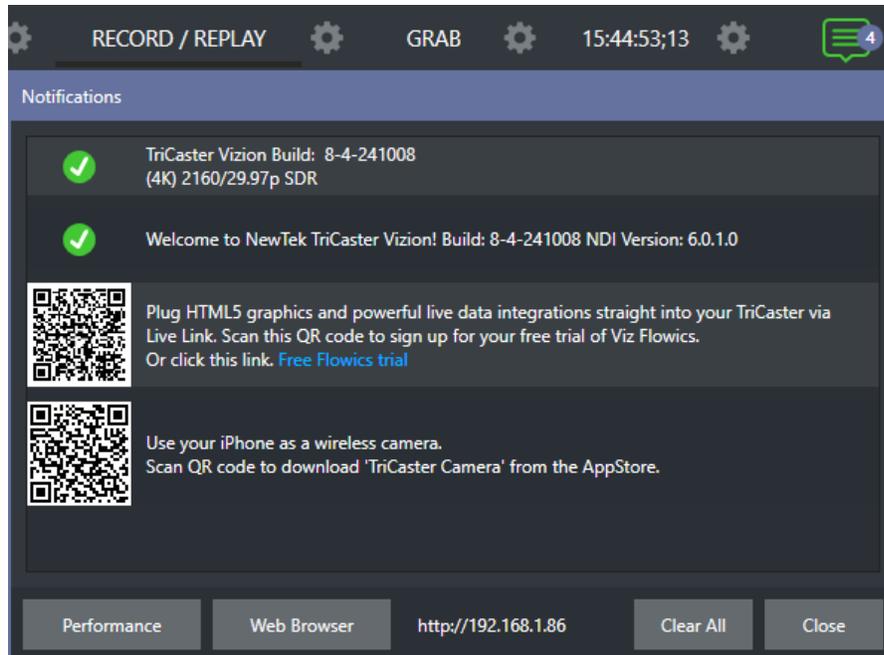
Information appearing in the *Notification Pane* can include the following:

- Session name, format, and software build number (press *Alt + b* on the keyboard to update this item)

- Status messages pertaining to operations or system conditions; these may be benign notifications or cautionary. For example, a message indicating that the connection to a control panel has been lost is given an icon with an amber color. A higher priority warning triggers a message with a red icon.

- Clicking the *Performance* button displays statistics for *CPU*, *Memory*, *Disk* (with a pulldown menu for all drives) and Network NIC (Network Interface Controller). The *Network* NIC section (also with a pulldown menu for multiple NIC ports) provides the percentage of traffic relative to the total available bandwidth.
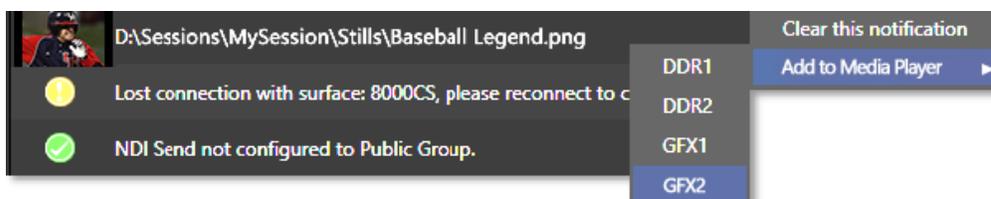
- A special message is added if a clip or still image is added to one of the *Session's* media file locations (such as the session *Clips* and *Stills* folders). These entries show a thumbnail icon on the left, along with the filename and path. In this case, the item's context menu includes an *Add to Media Player* option which lets you immediately append the new file to a selected *Media Player* playlist.

Hint: This last feature is particularly handy when adding files across the network, as perhaps when using the DataLink for TriCaster plugin to import images from the popular Chrome web browser.

Chapter 8 I/O CONFIGURATION

Your TriCaster system provides extensive control over video sources, along with endless creative features. Each source has Proc Amp, keyer (LiveMatte) and Crop (a.k.a. 'garbage matte') features. The number and flexibility of outputs supplied is impressive, too, and we'll discuss these fully in this chapter.

The all-new Setup tab allows you to manage input, output, SDI, and in supporting models - programmable outputs, and HDR color settings all in one place. This design reduces the need to navigate through multiple menus, making production workflows more efficient.

NDI support provides you with virtually unlimited input and output possibilities. Generally, an NDI source needs little if any configuration; other source types may require you to choose between optional connection methods and settings.

SECTION 8.1 INPUT CONFIGURATION

8.1.1 INPUT TAB

Any external NDI source, Skype TX Caller, output from a video conferencing app on the App Desktop, or a local hardware source connected to one of the system's hardware input connectors, can be flexibly assigned to any Switcher input.

This also means that sources can be easily re-ordered on the Switcher.

(Likewise, default audio sources for Switcher inputs can be flexibly re-assigned in the Audio Mixer module. For example, audio Input 1 and video Input 1 are not inextricably linked.)

The assignment of one of the various types of sources to a Switcher button (e.g., "Input 1" on the Switcher) is made in the *Input Configuration* panel.

Open the *Input Configuration* by one of the following methods:

- TriCaster Vectar and TriCaster Vizion feature the *Input tab* within the Setup Panel, click the *Setup tab* located in the *Dashboard* and then click on the *Input tab*.
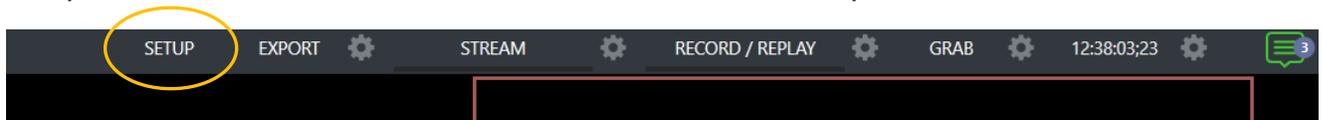
- For all TriCaster models, click the configuration (gear) icon shown at lower right when the mouse pointer is rolled over above the viewport (supported in all models).
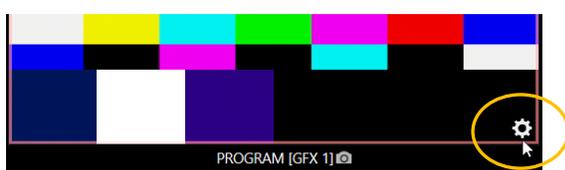
- If you have a touchscreen, you can two-finger tap the viewport.

Though there are several options to open the *Input Configuration* panel, first we will go over the newly implemented version (supported by TriCaster Vectar and TriCaster Vizion) by clicking on *Setup* in the *Dashboard* of the *Live Desktop.* (For all other TriCaster models, input configuration options are similar by clicking on the gear in the viewport.)

Note: Any HDR related options will not be shown in an SDR session.
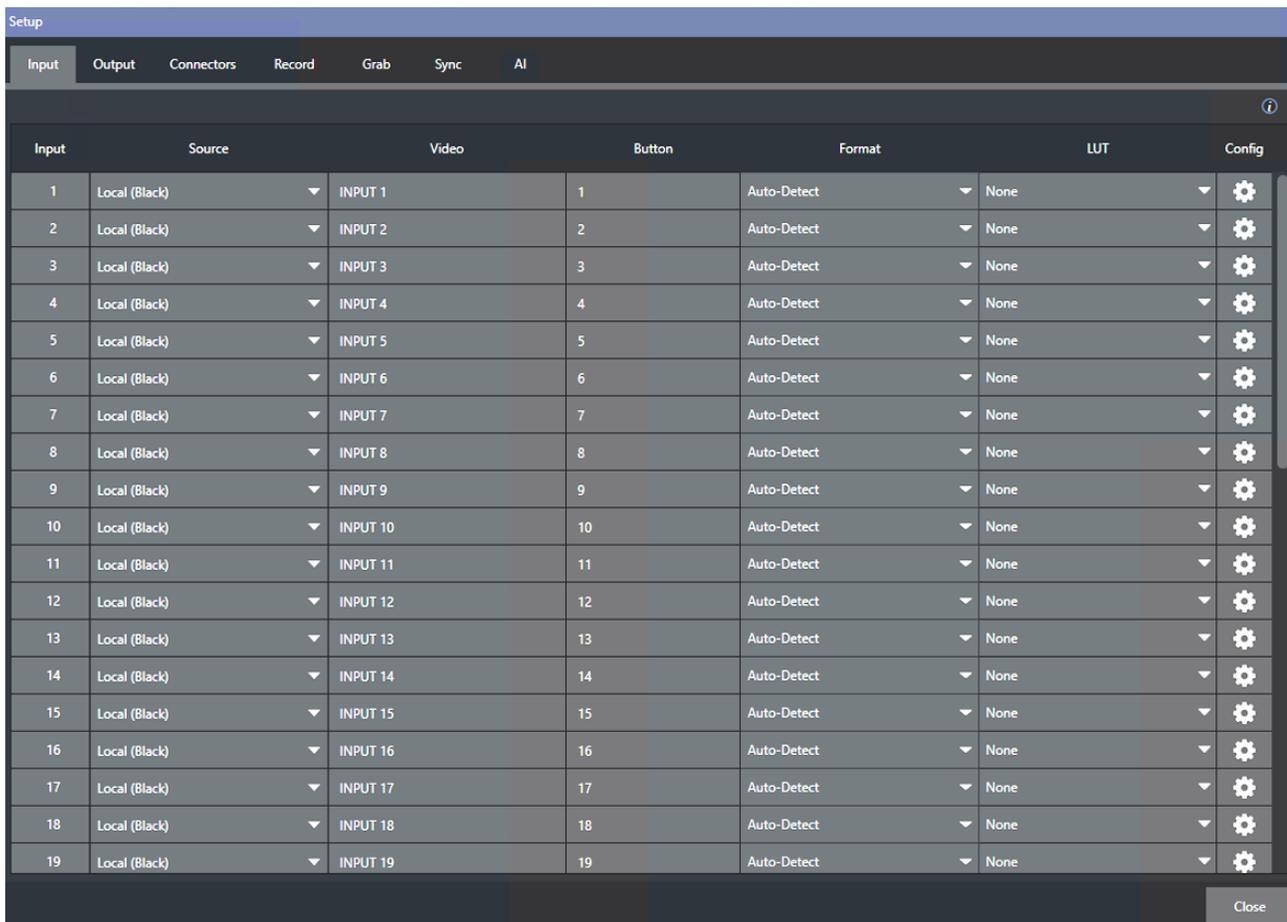
TriCaster Vizion shown above

Note: Input counts vary by TriCaster model.

Let's go through each of the columns in the *Input* configuration tab:

INPUT

A numbered list of the source inputs.

SOURCE

Use the Source pulldown menu in this panel to assign one of the many sources available to the corresponding Switcher input. Available video sources are grouped under labels named for the device supplying them.
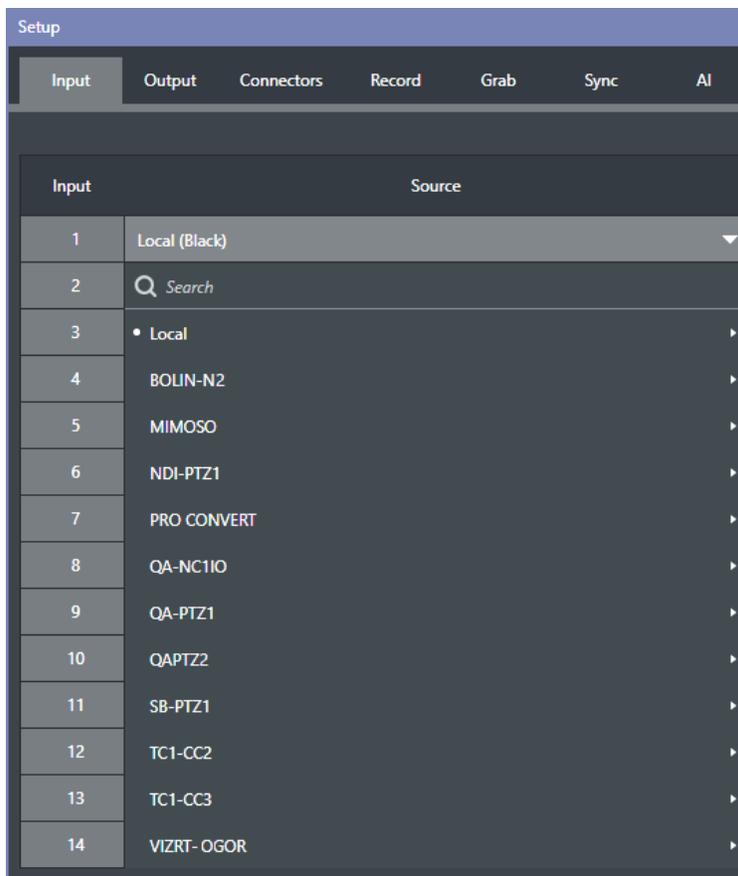
The Local group in the Source menu (shown below) includes those sources connected locally to the system's hardware inputs, any other local hardware sources detected (such as a webcam), video conference application, along with Skype TX Caller connections hosted by the local system, and Black.

* Please refer to Chapter 18 (Skype and Skype TX), for more details on this source option.

Note: Quality Monitoring displays Resolution and frame rate of every video source coming into TriCaster Vizion at the top of the Input Configuration panel, to ensure the quality of your sources.

SOURCE MENU SEARCH

Managing multiple sources on your network can feel overwhelming when trying to locate a specific one. TriCaster's new Source Menu Search feature simplifies this process by allowing you to search by source name or category.

If you are unsure of the exact source name, you can search by category to display all related sub-items, even if the individual source names don't match your search term. For instance, you can search for a machine name to find all sources associated with it, making it easier to navigate without needing the precise source name.

VIDEO

An editable text field showing the default or custom full-length name for the associated source. The Video entry will appear beneath viewports in multiviews and some menus (where space permits).

BUTTON

An editable text field showing the default or custom short name shown on the Switcher button for the associated source.

> Note: For Comment entry, see 8.1.2 Additional Input Configurations.

FORMAT

A combo box listing source appropriate video formats. For more detailed options open the configuration 'gear' in the last column of your input source.

LUT

In supporting models, the LUT (Look Up Table) dropdown menu includes the most common conversion LUTs, ability to load custom LUTs from disk (10-Bit) and includes a 'None' option (default) for no conversion (varies by model).

CONFIG(URE)

Clicking the 'gear' icon (in supporting models) opens the full-featured 'modal' input configuration popup for the corresponding source. Here you can access multiple settings as we will go over next.

8.1.2 ADDITIONAL INPUT CONFIGURATIONS

As mentioned above, additional input configurations are available when you click the 'gear' to the far right of your selected input row within the Setup> Input Tab, or you can click the gear withing the viewport.

Clicking the *Add IP Source* entry opens the *IP Source Manager.* Adding entries to the list of sources shown in this panel causes corresponding entries for new sources to appear in the Local group shown in the source menu of the Configure panel.

To A*dd IP Source,* select a source type from the dropdown list provided (as shown in image on next page). This opens a dialog suited to the particular source device you wish to add, such as one of the numerous supported PTZ camera brands and models.

Additional protocols have been added to provide more options for video sources. RTMP (Real Time Message Protocol), a standard for delivering streams to your online video platform. RTSP (Real Time Streaming Protocol), used for establishing and controlling media sessions between end points.
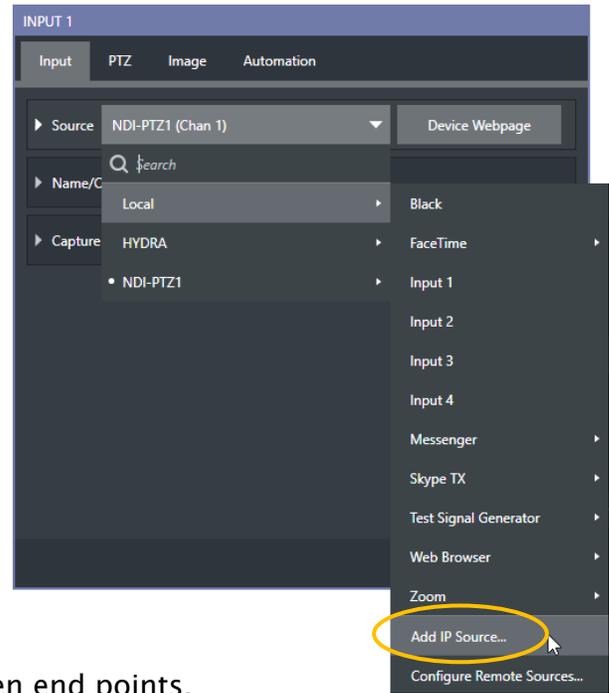
SRT Source (Secure Reliable Transport) is an open-source protocol that is managed by the SRT Alliance. SRT can be used to send media over unpredictable networks, like the internet.

To open an SRT source, you will need to fill out the following information to configure the *SRT Input Connection.*

Note: It is strongly recommended to get the stream working in VLC first, then copy the URL into TriCaster Vizion.

- *Memo* – enter a brief description for later reference.

- *Server URL* – the server URL must be the public IP address of the remote source, either as a numerical address, or named such as:
  "entrypoint.cloud.website.com".

- Port – each SRT stream must have a unique port number. This can be any valid port, but ports in the 9000 or 10000 range are common.

- Listener Mode – the stream connects to the Caller machine, then waits for it to
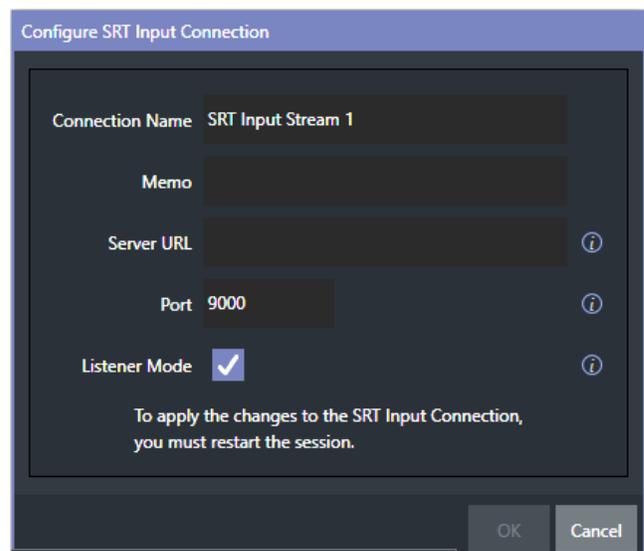
initiate streaming. Otherwise, this machine is the Caller, and the other side must be the Listener.

The IP Source manager panel displays the selected source, here you can edit by clicking the gear to the right of the source name or click the x to remove the source.

Note: After adding an IP source, you must exit and restart the software for the new settings to be applied.

CONFIGURE REMOTE SOURCES

The last option in the Source pull-down menu is *Configure Remote Sources*, this is a feature that requires NDI Remote and a link for the installer is provided.

SETUP

FORMAT
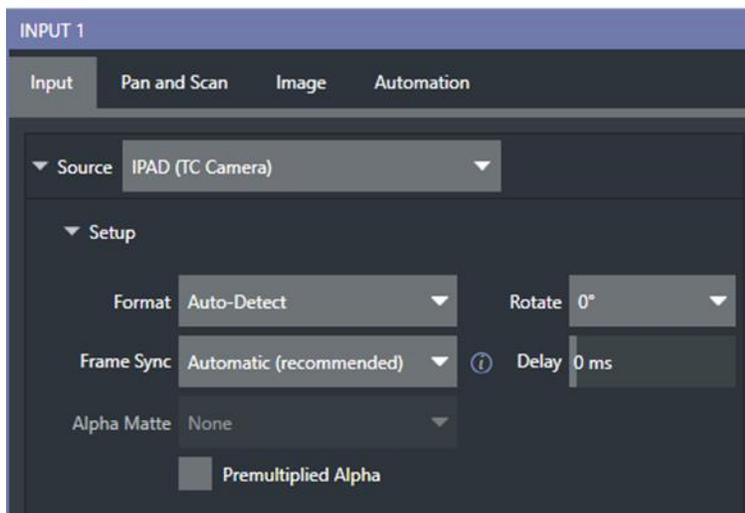
If you use the twirl-down triangle gadget at left to expand the Source > Setup control group, you will see that the Format for these diverse source types of defaults to Auto-Detect. In the case of an NDI source (and often, for hardware sources too) no further settings are required.

For hardware video sources, additional *Format* options are provided in this menu, allowing you to choose a setting manually if the *Auto* option is unable to correctly identify the format. Let's explore other features located in the *Input Configuration* panel.

INPUT ROTATION

To complement non-traditional sessions and handle unusual *Switcher* sources (e.g., non-landscape mobile device output) each input now features a new *Rotate* menu, which also includes *Flip* options.

FRAME SYNC

By default, Frame Sync is set to Automatic for all external source types, allowing you to work with a wide array of potential video sources without concerns about video timing.

This option (Automatic) enables the full array of timing correction tools available to achieve smooth and accurate frame timing in your productions, including features that correct for issues caused by 'less than ideal' networks.

The next menu option *On* enables full-time frame synchronization and may well suffice in some video pipelines. This alternative has the benefit of ensuring the lowest throughput latency possible on a video switcher using frame-sync (2-3 frames).

The final Frame Sync option is *Off*. Disabling Frame Sync altogether ensures the very lowest possible throughput latency for genlocked sources. Note that sources with Frame Sync disabled must be genlocked, and in phase (that is within 180° of the current Switcher output).

DEVICE WEBPAGE

For network connected sources (such as NDI sources), a *Device Webpage* button may appear just right of the *Source* menu. Click this button to access the remote device's own configuration webpage.

VIDEO DELAY

At times, typically due to upstream processing and architecture, video may arrive at the system's inputs ahead of the corresponding audio. The *Video Delay* feature allows you to compensate for these issues to establish a/v sync.

ALPHA MATTE

Select the Alpha Matte source connection for the key/fill source input pairs here (both sources must share sync, format and framerate). The menu will default to "None" (equivalent to 'off').

PREMULTIPLIED ALPHA

If you are supplying imagery (video sources, video clips, or still images) that support transparency by means of an embedded alpha channel, your choice here will be important. There are two 'flavors' alpha channel pixel encoding. The first is often called 'straight' or may be referred to as 'non-premultiplied'. Unsurprisingly, the alternative is 'premultiplied'.

The *Premultiplied Alpha* switch is off by default. Making the correct selection is necessary for correct compositing over other imagery.

LOW BANDWIDTH

For NDI sources, a *Low Bandwidth* option is shown. This allows you to force the sending device to a lower quality video stream that may nevertheless be quite useable if the source is not intended to be displayed full screen. This option may be preferable in network settings with limited capacity (such as WiFi).

PTZ Control

For many source types, a *PTZ Control* menu is shown in the *Source* control group. The default control *Connection* type is *NDI* which, assuming you are configuring an NDI source, makes life a lot easier because there is nothing else to configure.

Otherwise, if you *must select a 'legacy' control connection like RS422, etc., or perhaps a non-NDI network connection, additional controls may be shown in this group to let you configure things like *Baud Rate*, *Com Port*, *IP Address*, and the like.
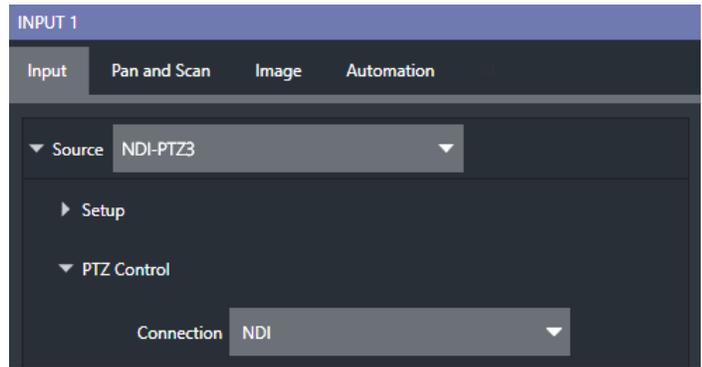
Comment
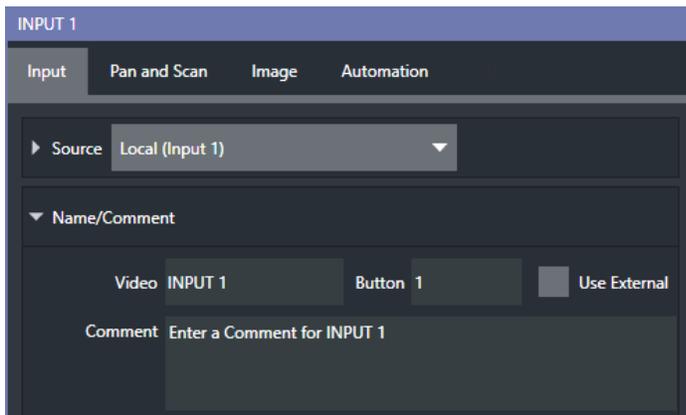
The *Comment* entry lets you enter memo text that can serve as memory aids. The values entered in these two fields supply the values for special *DataLink* keys. Among other things, the values from these *DataLink* keys can be used to update text values in title pages, or to add information to the filename of recordings.

Hint: For example, you could use a macro to automatically display a title page briefly any time you switch cameras. The Name and Comment entries for inputs update the values assigned to DataLink Keys named %PGM Source Name% and %PGM Source Comment% base on Program row selections.

You might enter "Bill Jones, CEO" as the Video name for a camera, and "Megadyne Computronics, Inc." as the Comment. Continue to give unique values to inputs in similar fashion. Then enter %PGM Source Name% on the first line of a title page, and %PGM Source Comment% on the second line. When you change cameras, your macro will display the page, correctly identifying the talent based on the input Name and Comment.

Each Switcher source has a *Capture* and *Grab* group in the *Input* tab. This control group shows settings and options for grabbing still images and, for appropriate sources, recording.

These important capabilities are discussed in full in Chapter 24, Record, Grab, and Replay. The controls shown are detailed in Section 24.1.2
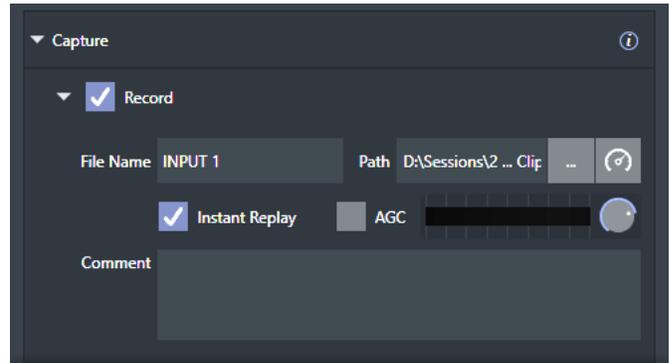
Note: ISO Recording of UHD NDI HX is not supported. If you have selected such a source, please route through a MIX to record. Go to ndi.tv/formats for additional information.

8.1.3 PTZ/PAN AND SCAN PRESETS

Another control group appears on the second tab of the Input configuration panel. This group may be labeled either *PTZ Presets* or *Pan and Scan Presets*, depending on the source type.
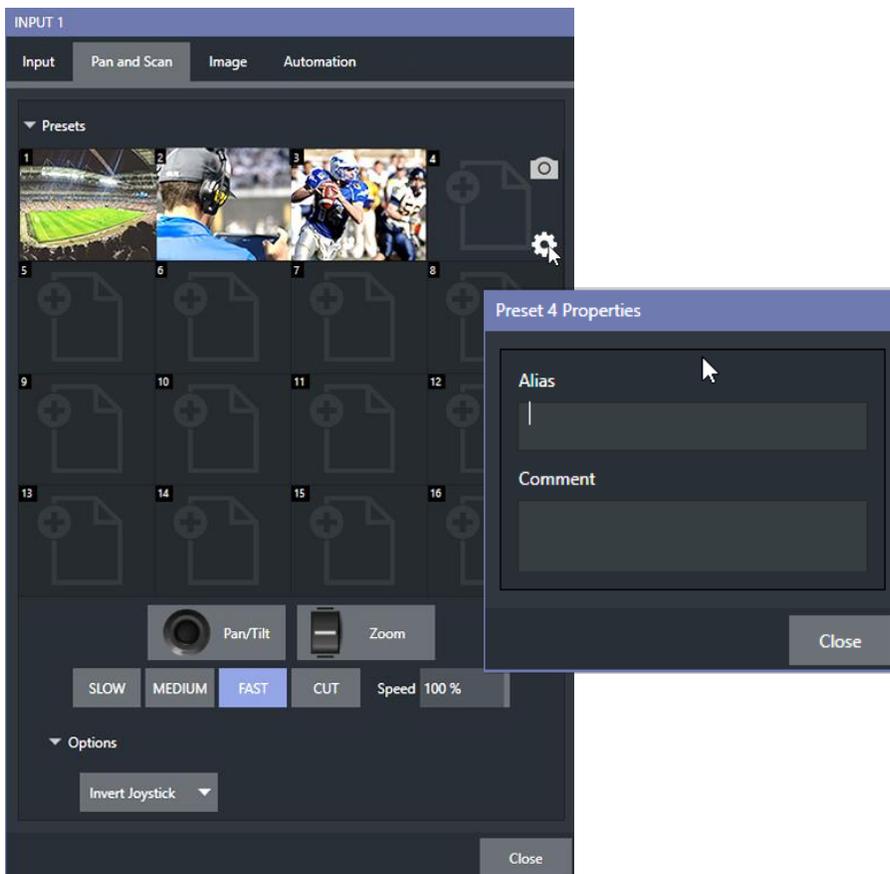
In either case, the features and options presented in this group are similar. At the top, you will see 16 numbered preset slots. Rolling over these slots reveals two gadgets: Click the snapshot

(camera) gadget to store or update a preset. Click the configuration (gear) gadget to show a *Preset Properties* panel with two text boxes labeled *Alias* and *Comment*.

The entries in these two text boxes, like the *Name* and *Comment* values discussed earlier, provide the values for special *DataLink* keys that store the values from the last PTZ preset applied, as follows:

PTZ PGM Alias

PTZ PREV Alias

PTZ PGM Comment

PTZ PREV Comment

A set of controls located below the *Presets* bin allows you to control connected PTZ cameras, or to affect sources supporting *Pan and Scan* features in similar fashion (you might think of these sources as providing a sort of 'virtual PTZ' functionality).

Note: Viz NC1 Spark units connected by NDI will show Virtual PTZ (Pan and Scan) controls.

SLOW, MEDIUM, and *FAST* preset buttons complement the numeric *Speed* control slider on the right. These affect the speed of the transition from the current position to that stored in a newly selected preset.

The *Options* group, when expanded, reveals *White Balance* options along with a menu that allows you to invert the operation of the *Joystick* on individual axes (both in the interface and on connected hardware control panels).

Note: Focus, Iris, and White Balance features are only shown when a PTZ camera is connected to the input. However, features in the Input Configuration panel's Image tab, discussed next, can provide similar functionality to White Balance.

8.1.4 IMAGE TAB
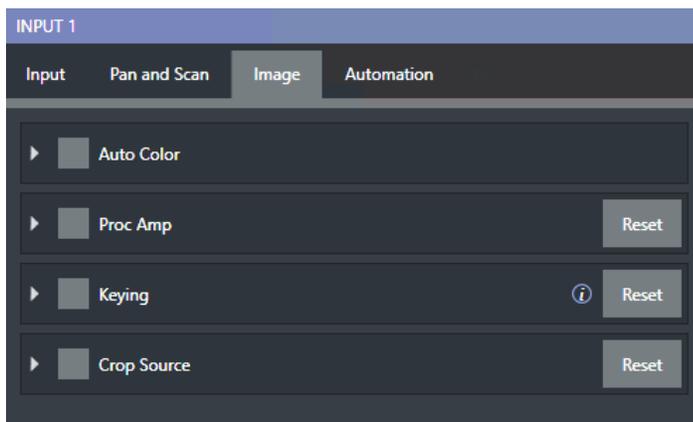
The *Image* tab in the *Input Configuration* panel hosts a set of features that provide extensive color control processing, chromakeying, and cropping options for every video source.

AUTO COLOR
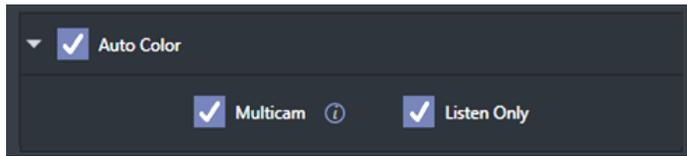
Lighting conditions can change dramatically during many live events, especially those held outdoors. Adding to this problem, production usually involves multiple cameras and, all too often, these may not have uniform color characteristics. Ensuring consistent color when switching from one angle to another, avoiding unwelcome brightness or color shifts as evening falls or when a cloud obscures the sun briefly can be troublesome, and expensive.

Auto Color, a unique feature capable of dynamically adapting the color characteristics of your video sources as lighting conditions vary, can minimize these problems. For many productions, simply enabling *Auto Color* is all it takes to produce a show that looks amazingly consistent.

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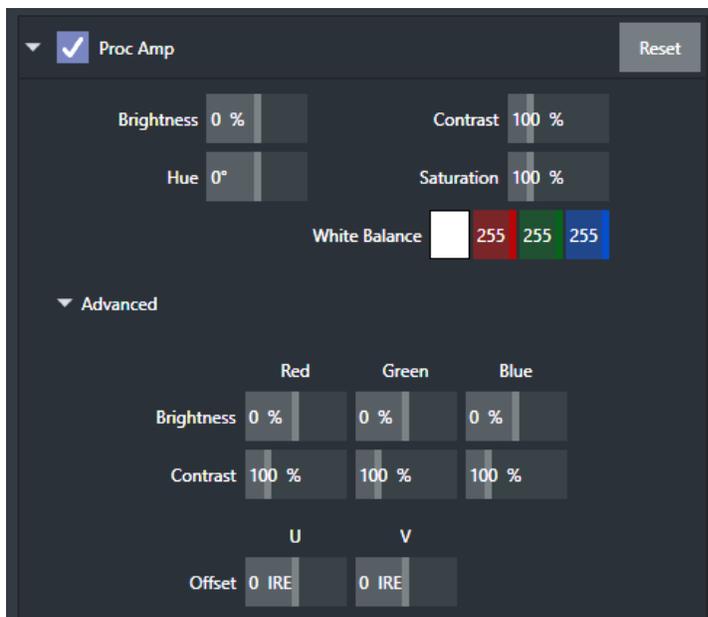
A switch at the top of the *Proc Amp* control group toggles the feature on/off. Other controls operate as follows:

- *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 ranges 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 ranges 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 applied downstream of LiveMatte, 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

This secondary control group is revealed when you click the expander (triangle) beside its label.

In addition to per color channel (RGB) Brightness and Saturation 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.

Hint: Your system provides Waveform/Vectorscope monitors, which are an invaluable aid to you for accurately calibrating your video sources.

The Keying control group in the *Image tab* hosts *LiveMatte*, a powerful real-time keying system for live production. Keying is a popular and powerful method of compositing multiple images, whether photos, video clips or live camera streams.
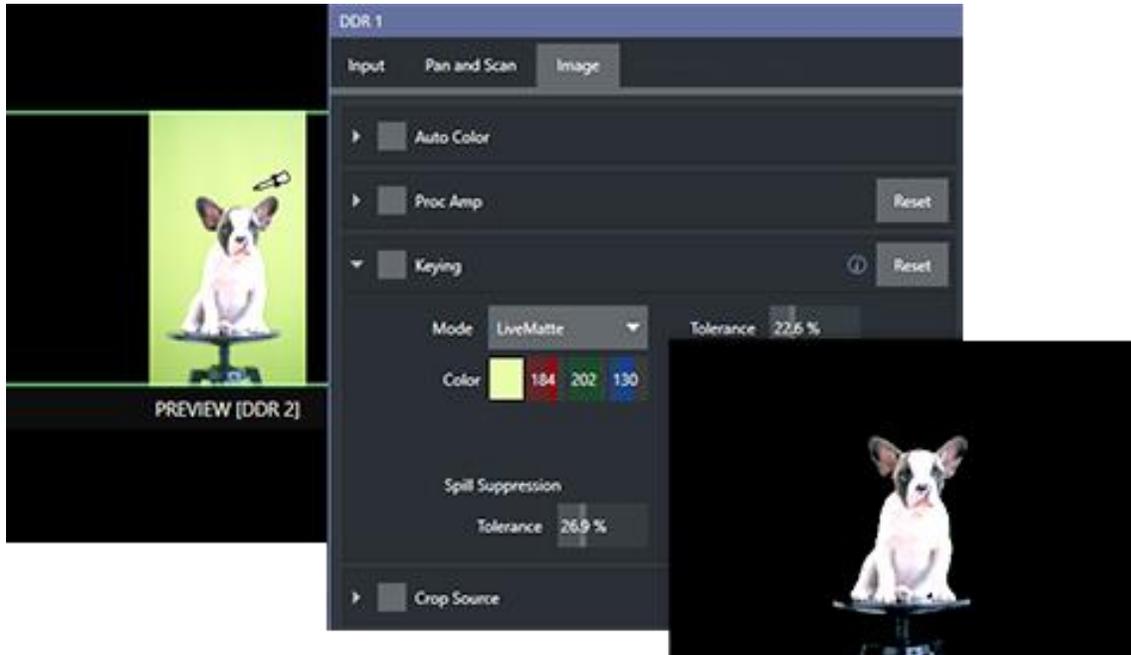
The process involves eliminating a portion of the video image (effectively cutting a digital 'keyhole' in it) to reveal a user-defined background scene.

This feature also plays an important role in the workflow of *LiveSet*, a powerful virtual set technology.

LiveMatte's controls are deceptively simple, making a great deal of complex digital manipulations easy to use. Even so, much can be said about getting the best results. For that reason, we've devoted a whole chapter in this manual to discussing it – please see Chapter 15, LiveMatte.

> *Hint: When LiveMatte, Proc Amp, or Crop settings are active for a source, bright green, blue and yellow indicators are lit under its monitor.*

CROP SOURCE

It is very common for a source to be supplied with unintentional inclusions; these are often items that remain after chromakeying is applied, but which need to be removed along with the background. (Common examples include microphones or lighting fixtures dangling from above, or perhaps a harsh crease, blemish, or tear in the background screen.) Or, as is frequently the case, the source video itself may have a few pixels of black or video 'noise' along one or more of its edges.
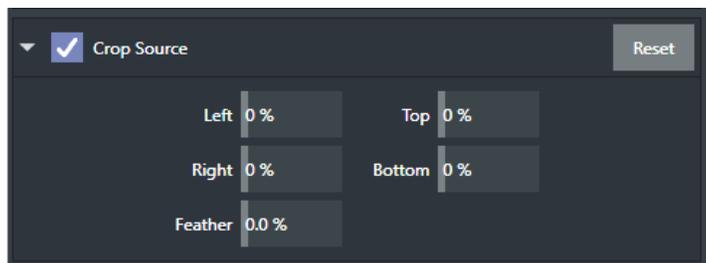
The settings in the *Crop Source* control group can be used to remove such unwanted 'garbage' from the scene, and for other purposes, too – such as to isolate a portion of the screen for use as a 'Picture in Picture' overlay.

Numeric controls in this group let you define margins for each side of the frame. Drag left or right on the number fields to adjust the values interactively or click a field to enter an exact value using the keyboard. The region defined by these controls is completely removed. Use the *Feather* setting to soften the edges.

> *Hint: For added convenience, similar cropping tools are available separately in the Position panels of DSKs, along with the Key and, for LiveSet Effects, each layer's settings for MEs.*

8.1.5 AUTOMATION TAB

Automation is one of those wonderful things that really transform your workflow. The *Automation tab*, located in the *Input Configuration* panels for all video sources, is one of several places where related features can be found.

Macros, discussed in Chapter 20Macros and Automation, might be viewed as the basic building blocks of automation. Macros can easily be recorded and edited, and equally easily they can be triggered by a keystroke shortcut, control panel button, or similar means; but that isn't really 'automation', is it? It's actually a manual operation.

Obviously, automation should happen automatically based on predetermined criteria. The automatic transmission in your car shifts all by itself when certain conditions are met. In similar fashion, the features of the Automation tab allow you to predetermine what will happen when certain conditions are met. Consider the State Change control group.

STATE CHANGE
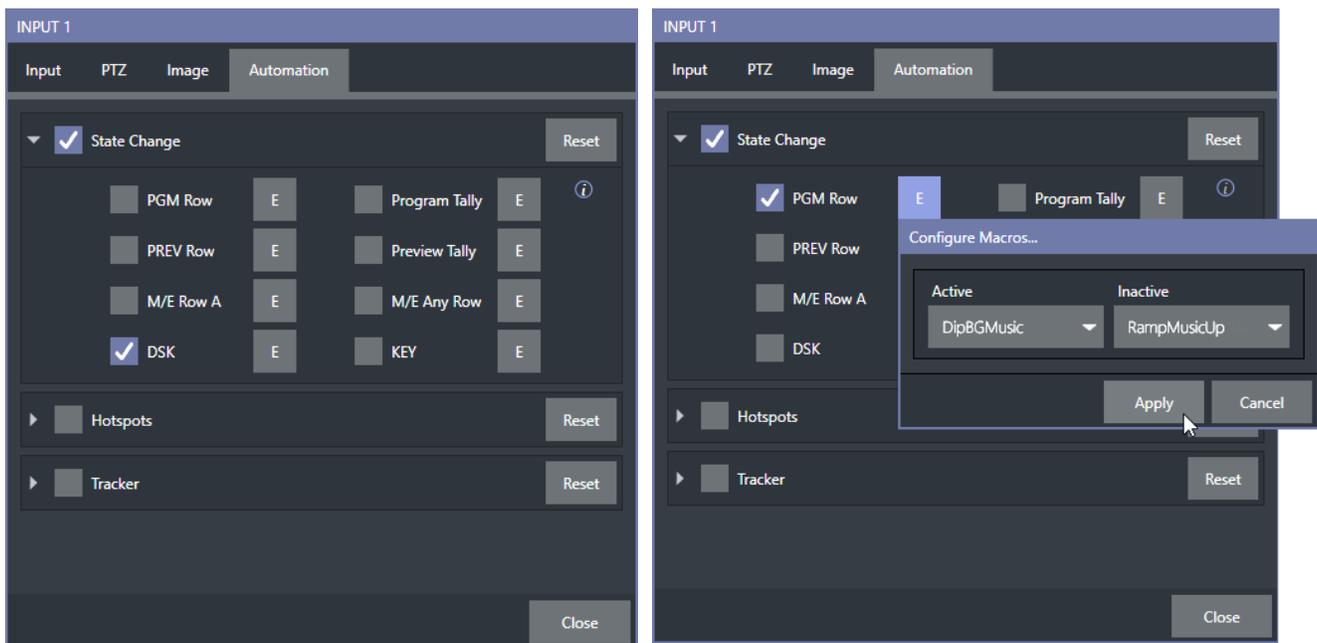
Click the [E] button next to one of the 'state' options to assign macros that will be executed on specific *Switcher* operations that affect the specified state.

For example, the accompanying images depict macros that control the volume level of the *SOUND* player. Whenever *Cam 1* is newly selected on the Switcher's *PGM* row, the *Active* macro will run. Conversely, replacing *Camera 1* with a different *PGM* row selection will execute the *Inactive* macro.

> *Hint: The "E" on the button is short for "Event".*

The *State Change* implementation thus allows you to automate all manners of operations based on such things as the following:

- Program or Preview row selection.
- Displaying/ hiding the source in a DSK or KEY channel.
- Selecting/de-selecting it on an M/E's A row, or any M/E row, or …
- Showing or hiding a source on the Program or Preview output.

This is immensely powerful, and lends itself to endless applications, such as (to suggest just a few):

- Automatically fly in a title as you switch to remote sources and remove it after a specified time.
- Select a different Audio Mixer preset automatically when you switch from viewing a source in the B monitor of a virtual set on Program to displaying it full screen.
- Then change back to the original audio setup when you switch back to the anchor desk.

Hint: More coverage of both macros and the larger topic of automation can be found in the accompanying Automation, Integration & Control Guide.

HOTSPOTS
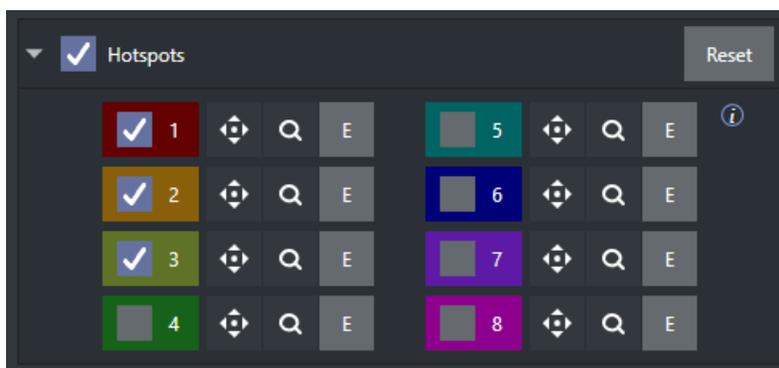
The next control group in the *Automation tab* is devoted to *Hotspots* – another powerful and interactive automation feature. A *Hotspot* is a user-defined region of the screen that (when active) detects opacity changes inside its boundaries (for which reason, *Hotspots* require *LiveMatte* to be enabled to work properly).

With *LiveMatte* properly configured, the *Hotspot* feature can trigger a macro when opaque pixels are newly detected in an active *Hotspot*.

For example, someone in a greenscreen set can trigger a macro by walking into a location in the frame where a hotspot has been defined. A second macro when all opaque pixels – i.e., the talent – moves out of the defined hotspot zone. All manners of creative implementations are possible.

TRACKER

The *Tracker* control group provides real-time motion tracking features. This feature allows you to choose a colored region of the video frame using tools similar to those found in the *LiveMatte* tab (see Chapter 15).

The tracked region is defined by choosing a primary *Color* using the color picker tool. The *Tracker* follows this region as it moves and shifts within the frame over time, and outputs the motion data for downstream application. *Tracker* output from one source can be used to dynamically modify the positioning of other video sources, when configured to do so in their individual *Position* panels.

Click the eyedropper, and, while holding the mouse button down, drag the pointer over top of the monitor for the source you want to track. The *Tracker's* color swatch updates as you drag, until you release the button to finalize your selection.
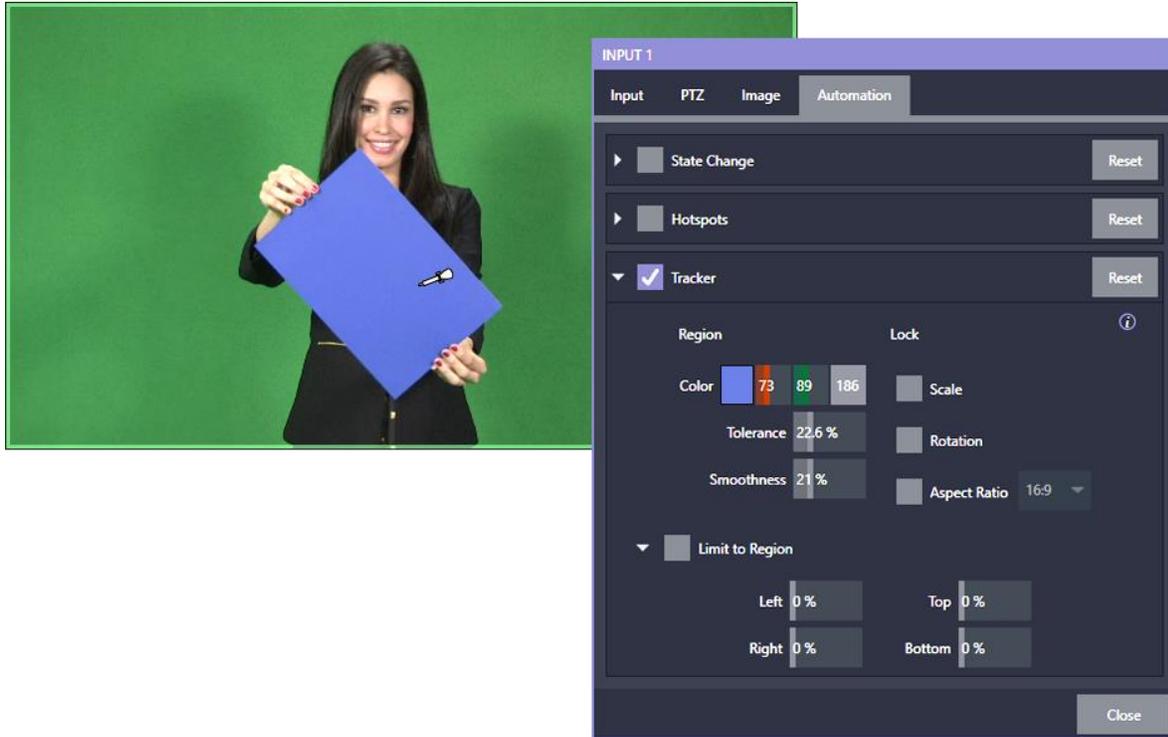
To assist you while making adjustments, a yellow rectangle is overlaid on the video to show the effect of the current *Tracker* settings. Watch how this overlay is affected by adjustments you make to the *Tolerance* value for the *Tracker*. Raise or lower the *Tolerance* value until the result is steady, not jittering or jumping about.

Hint: The yellow overlay disappears when you close the panel (or disable the Tracker), but you can show it full-time if you wish. To do so, right-click the desired viewport, and enable Tracking Markers from the Overlays options group in the menu.

SMOOTHNESS

The *Smoothness* setting works just like the *LiveMatte* feature with the same name. Its impact on tracking data output may seem minimal, but it can be important when used with the *Advanced Tracking* effect in *M/E* panels (see 16.2.2 Effect Mode).

LOCK

At right there are controls that permit you to *Lock* certain *Tracker* attributes, preventing them from changing in the scene.

- Lock *Scale* to prevent the *Tracker* from automatically compensating when the scale of the tracked region grows or shrinks during motion.

- Likewise, when *Rotation* is locked, the orientation of *Tracker* output is constrained.

- The *Aspect Ratio* lock forces the *Tracker* to conform to a square (1:1), or rectangular (4:3 or 16:9) shape.

Hint: Locking channels in this manner makes it easier to obtain a steady motion track; but often your choices will be dictated by creative requirements.

LIMIT TO REGION
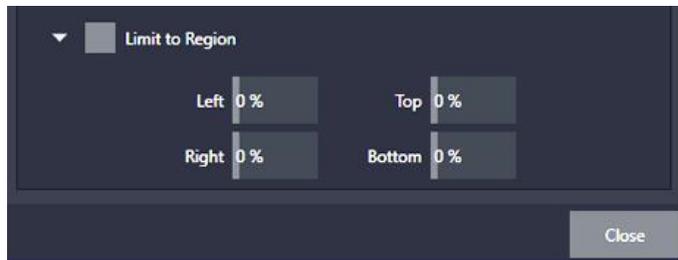
The *Tracker* is designed to follow the largest shape in a frame that meets the defined color criteria. At times, similar colored articles or inclusions in the frame can interfere with *Tracker* output.

The settings in this group allow you to limit the area of the frame the *Tracker* monitors, which can help you sidestep the issue. We'll discuss the application of the *Tracker's* data stream when discussing the *Positioner* tools.

SECTION 8.2 OUTPUT CONFIGURATION

Under the *Setup* pane in the dashboard, click the *Output* tab to open the output configuration panel. The *Output* tab in the panel contains controls governing the system's primary outputs.
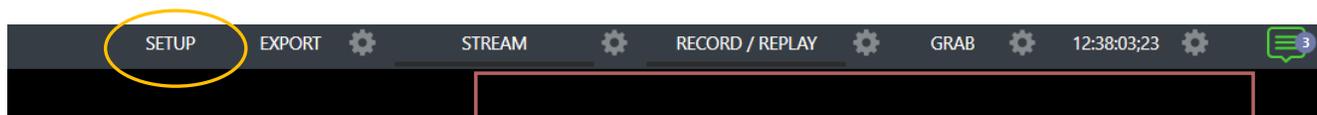
8.2.1 OUTPUT TAB

We discussed *Primary* and *Secondary* outputs back in Section 3.8. The first eight entries (varies by model) in this panel are primary outputs; typically, these are also 'mixed' outputs, hence their default labels – MIX 1, 2, etc. These video sources are sent to the corresponding SDI output connectors (when provided), and as NDI outputs.
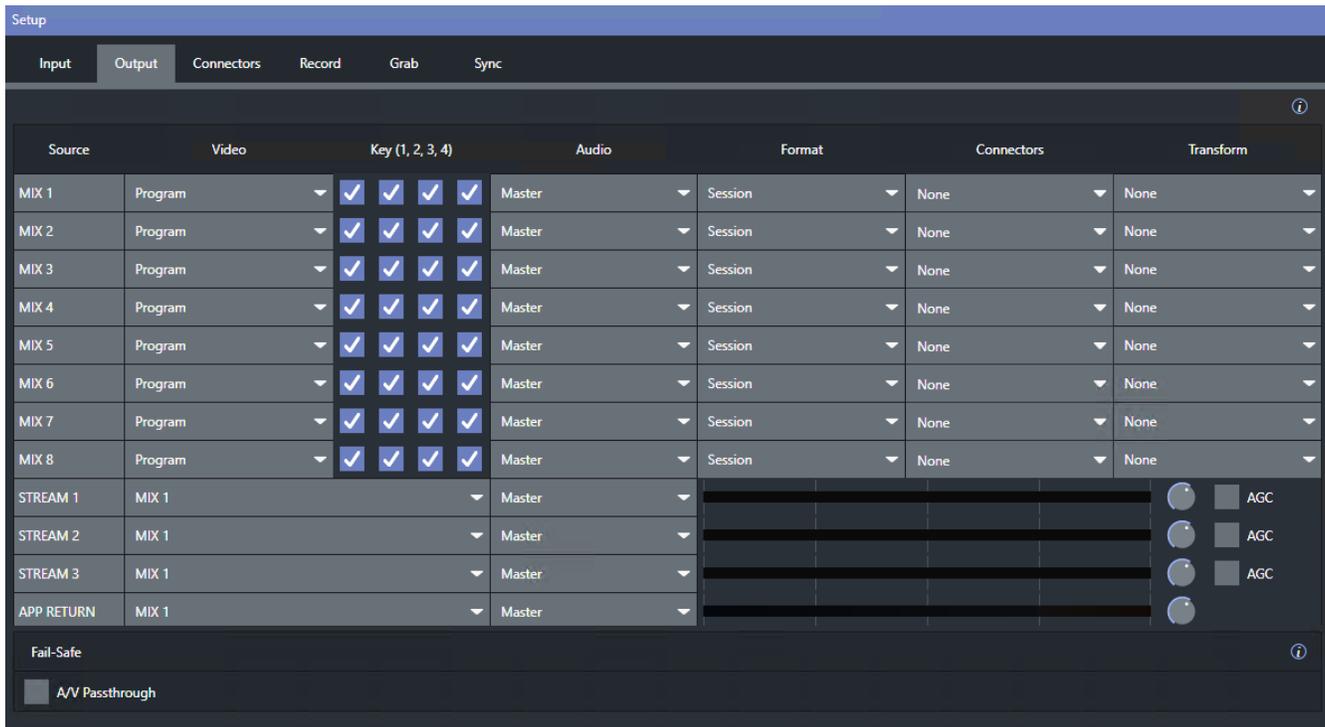
VIDEO

The *primary* outputs support the largest number of optional video sources and, uniquely, can follow a delegated *M/E*, or a *Switcher* color group. All other outputs can be assigned to follow a primary output or show another designated *Switcher* source (excluding M/Es).

KEY (1,2,3,4)

The *Key* Mix Outputs (varies by model) supply an M/E (ranging from Main to M/E 8) to more than one Mix output, each with unique KEY layer visibility. Keys 1 through 4 can be individually toggled for each Mix, and toggle switches are displayed for sources that have Key layers, although these switches are disabled for all other sources.

AUDIO

In similar fashion, you can choose which audio source accompanies any of the primary outputs. Choose any individual audio mixer input, or any of the mixed audio outputs, Master, or Aux (audio mix options vary by model).

FORMAT

The Format menu allows you to choose the video format for each output. Select the video format for downstream devices you intend to connect to the corresponding output here. The formats available are drawn from the list below (modes available vary according to session mode):

- 2160p
- 1080i and/or 1080p
- 720p
- 480p – progressive standard definition NTSC sessions only
- 480i (4:3) – interlaced standard definition NTSC sessions only
- 480i (16:9) – interlaced standard definition interlaced NTSC sessions only
- 576p – progressive standard definition PAL sessions
- 576i (4:3) – interlaced standard definition PAL sessions
- 576i (16:9) – interlaced standard definition PAL sessions

Generally, source formats that are inconsistent with the current output format setting are automatically confirmed when possible. In some cases, such as non-standard format sources, the output format may be modified to provide a suitable display. That said, it's best to avoid non-standard sources if possible.

ALPHA

Last on the source *Format* list is the *Alpha* channel toggle option. When this option is checked, qualified video sources assigned to the associated Mix output will include embedded transparency for easy downstream use.

(Hint: Enabling Alpha for an output increases its GPU and memory consumption. For example, configuring four outputs in this fashion will use the same bandwidth as six 'standard' channels. For this reason, you should use Alpha strategically, rather than indiscriminately applying it to all outputs.)

Video sources that can be handled in this manner include the following:

- Any network video source (including NDI and IP video)
- DDRs (including transitions between clips)
- Buffers (including animated buffers and LiveGraphics)
- SDI sources (when provided)

Hint: Since M/E outputs, Program, Preview and Clean are composited against black, they do not qualify.

The embedded alpha channel will include the combination of all video effects applied to the input, including:

- The source's embedded alpha channel (if any)
- LiveMatte (chroma and luma key) settings
- Cropping and position settings
- Pre-multiplied alpha settings
- Position, Zoom/Scale and Rotation settings

(Hint: If you assign one of TriCaster Vizion's internal Recorders, or an external NDI recorder to capture a source with embedded alpha, files captured by that recorder will include transparency.)

Recordings of these outputs retain the alpha channel and can be used as overlays in DDRs and third-party NLE and compositing applications. Thumbnails or captures of stills also support alpha channel.

CONNECTORS
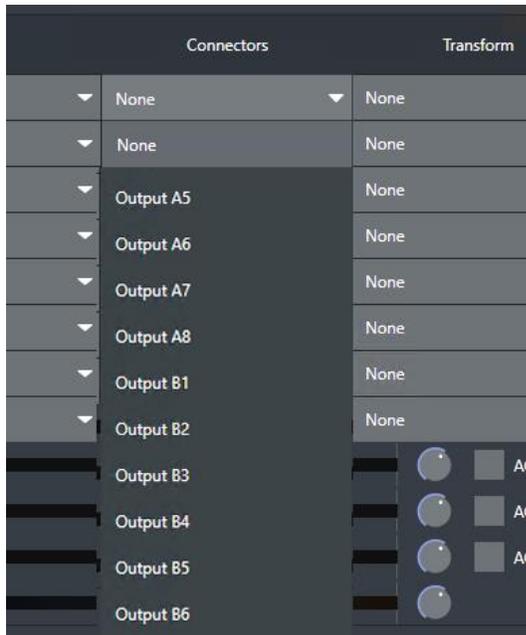
In TriCaster Vizion models the *Connectors* tab offers a pull-down menu listing SDI output connectors suitable for assignment to individual Mix outputs.

TRANSFORM

Under the *Transform* column, video *Mix* also support independent format selection, rotation, and flip control, as well as Section options.
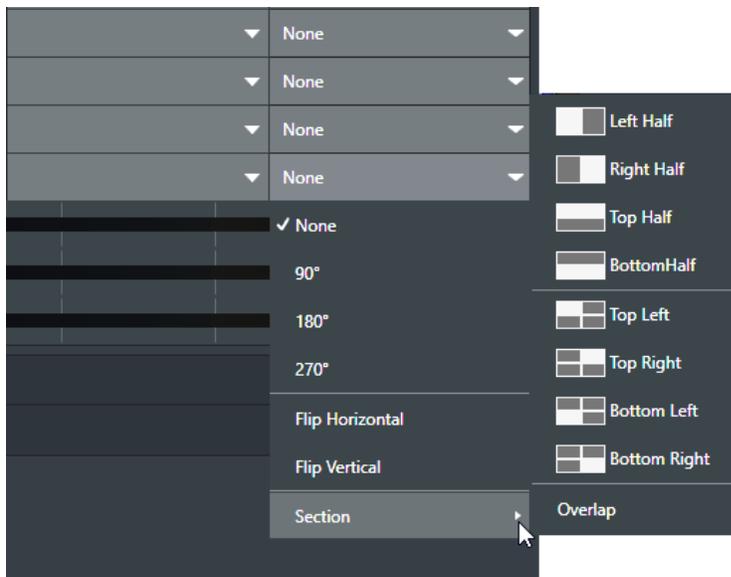
STREAM

The *Stream* controls in the *Output* tab let you independently assign any of the primary mixes to the two streaming encoders. Likewise, with multiple audio busses, you can send audio from the *Master* audio mix or any of the *Aux* busses to one of the two streaming encoders.
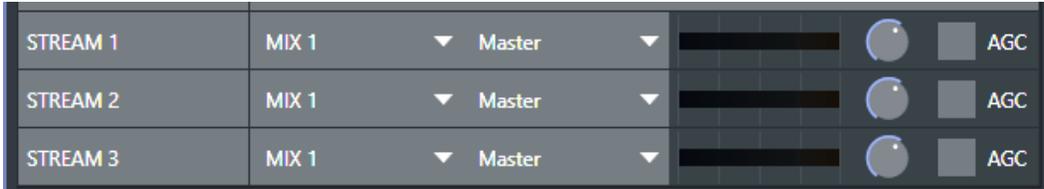
The audio controls also include individual *VU* meters, *Gain* knobs, and an *AGC* (Automatic Gain Control) option. These allow you to modulate audio for the streams separately from your primary audio outputs.

Hint: Streaming output is always de-interlaced.

Streaming Output involves more options, too, since there are so many ways to stream. In this panel, you simply configure the audio and video sources sent to the streaming output. All other options and settings relevant to streaming are discussed in Chapter 21.

APP RETURN
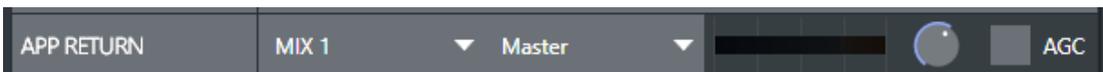
APP RETURN offers a special output source to external route and configure audio & video for supported applications with *Live Call Connect*. Video routing options support MIX 1-8 and audio routing corresponds to a mix minus of the Master and AUX busses, or any input.

FAILSAFE
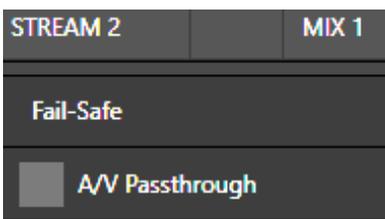
In supporting models, TriCaster's multi-tiered 'Always on Air' hardware and software failsafe systems provide confidence that, short of a complete power failure, the show will go on. Video passthrough ensures that as long as there is power, audio and video from hardware Input 4 is routed to *Output 1* in case of a catastrophic software condition. If at all possible, streaming output and recording also continue even if all else fails.

Note: Powering off, rebooting and/or closing a session will not trigger a passthrough.

In some studio settings, however, more elaborate hardware failsafe systems may be in use. Typically, such systems take over broadcast duties whenever the output signal fails. In this sort of pipeline, the native failsafe video passthrough mechanism can actually *prevent* the external system from engaging.

For this reason, a *Failsafe* control group has been added to the *Output* tab. This lets you disable the A/V passthrough when necessary. (Note that A/V passthrough is off by default and must be deliberately enabled to function.)

Hint: Only use fail-safe when a stable video source is connected to video Input 4.

8.2.2 CONNECTORS TAB
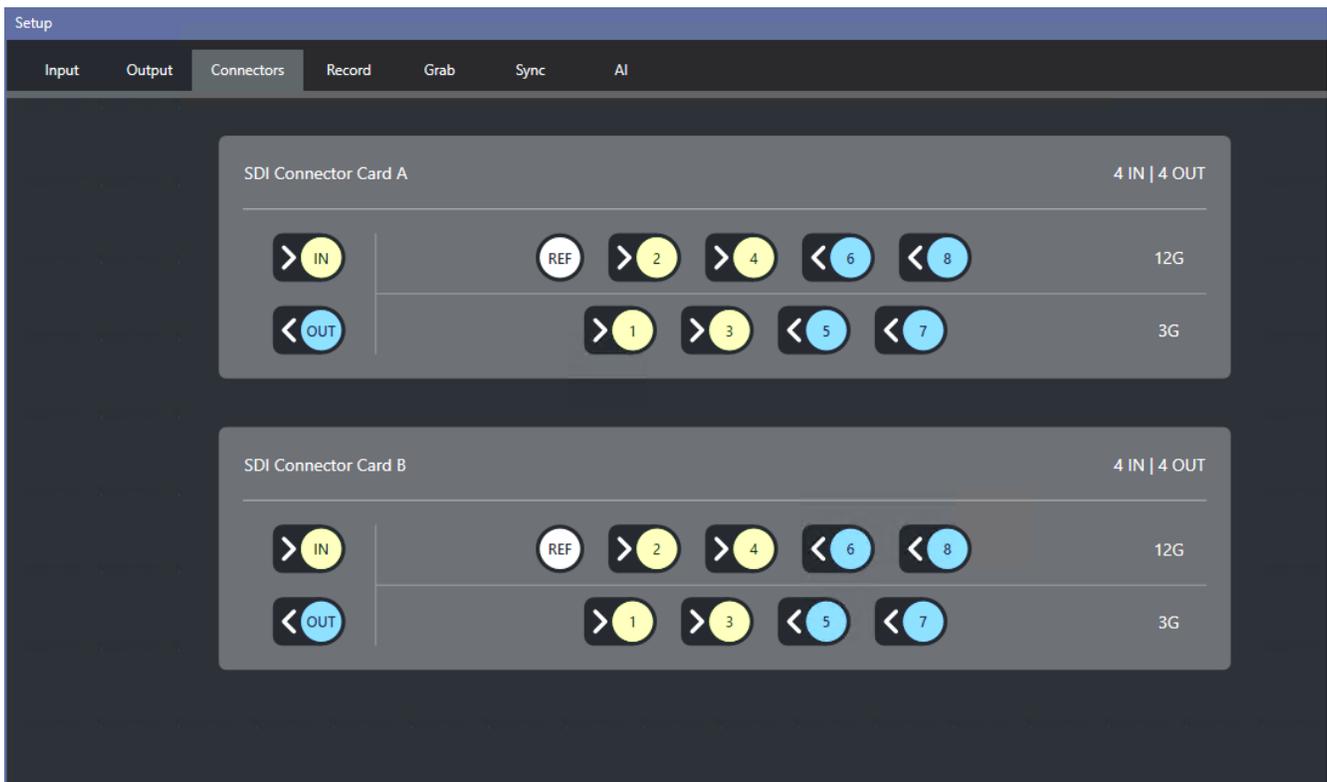
Note: The Connectors Tab is supported by TriCaster Vizion only.

The *Connectors* tab will only be visible if your TriCaster Vizion is connected to SDI. This SDI map depicts the active SDI connector layout for your convenience (the connectors are not interactive).

8.2.3 RECORD & GRAB TAB
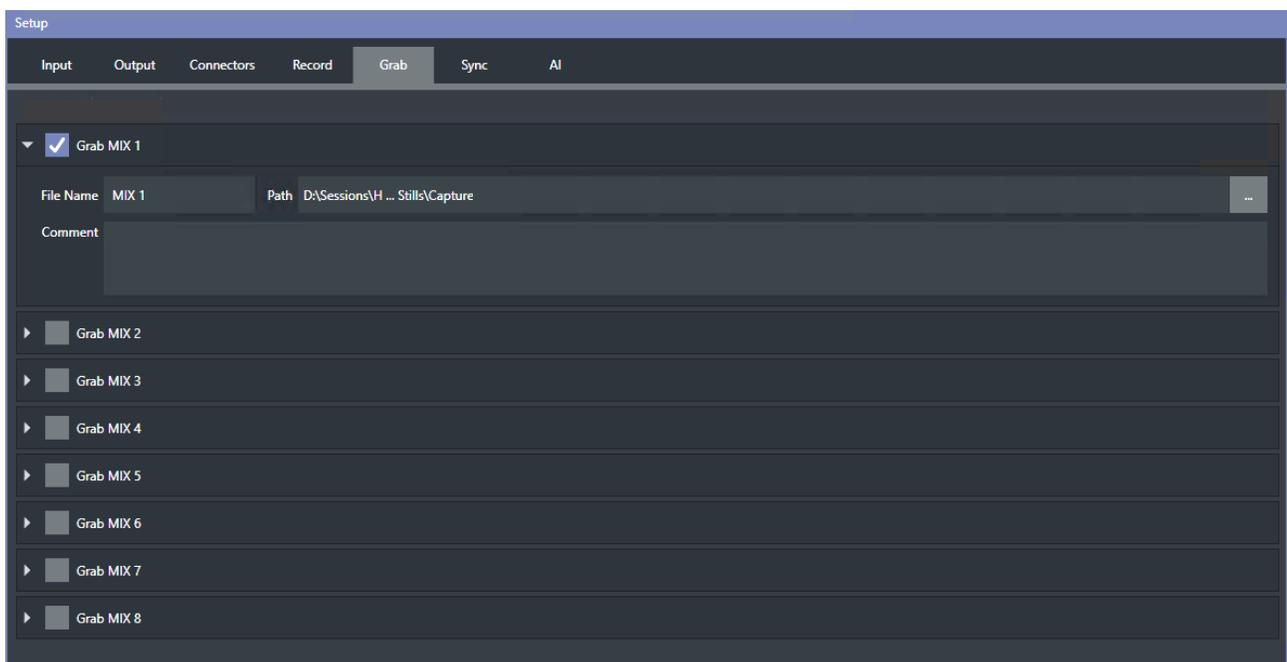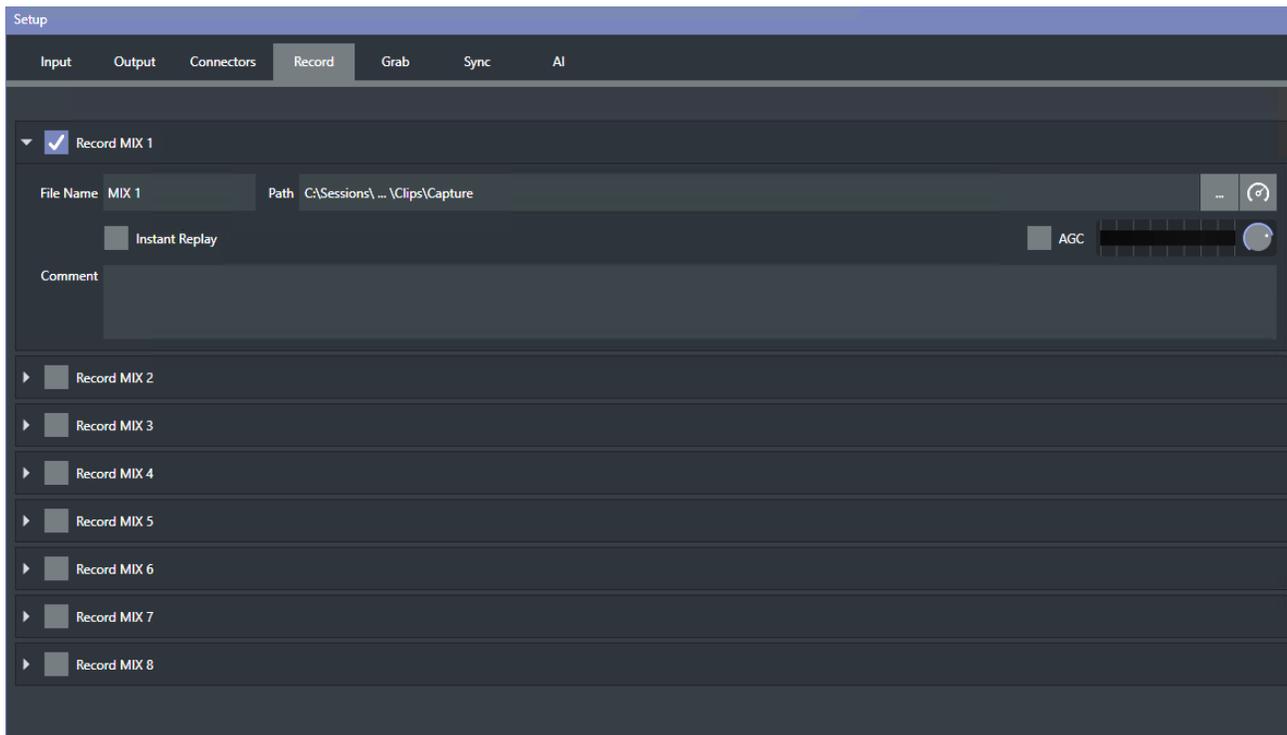
Each MIX output source has corresponding *Record* and *Grab* control groups to provide settings and options for capture. These important capabilities are discussed in full in Chapter 24, Record, Grab, and Replay.

8.2.4 SYNC TAB

The *Sync* feature allows your TriCaster system to 'lock' its video output to a reference video signal supplied to its *Genlock* input connector.
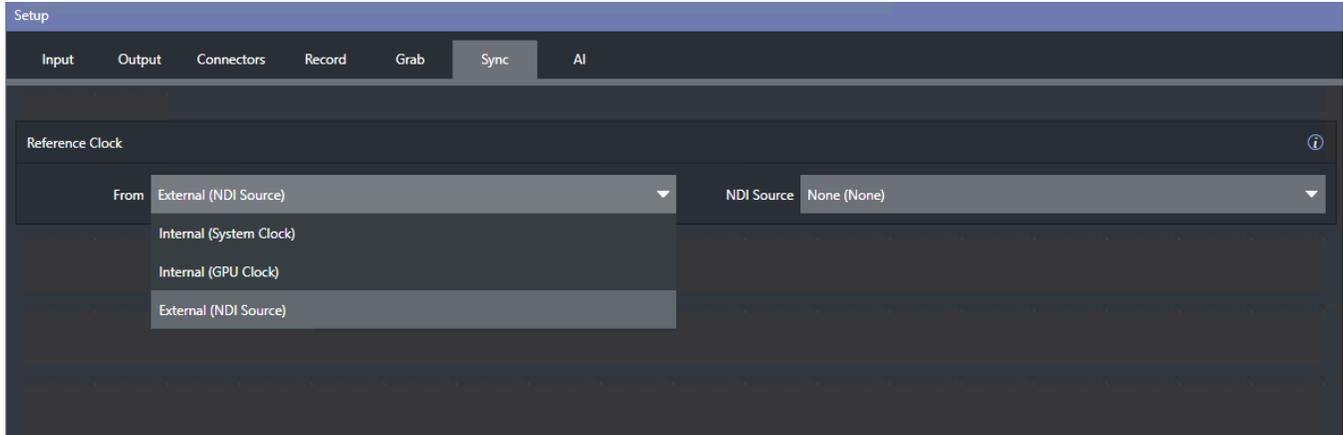
The default 'Internal (System Clock)' setting provides reliable timing, white the 'Internal (GPU Clock)' option can improve output to local displays and projectors. The 'External (NDI Source)' option syncs to a selected network source.

This synchronizes system video output to external equipment locked to the same reference. Genlocking is not a *requirement*, but it is very beneficial, and you should use it if you have the capability.

Miniscule local timing differences between these may force tiny delays during switching operations, which can contribute to throughput latency. Thus, serving i) the *Genlock* input <u>and</u> ii) other video devices in the chain with a single reference is the best approach.

You could think of it this way:

❖ Genlocking your cameras has the effect of locking their output together, ensuring optimal synchronization for live switching. This may result in throughput latency benefits.

❖ Supplying the same sync source to the Genlock input ensures a match between the system's video output and any downstream video devices required to handle both it and other (genlocked) sources.

❖ The output of video devices connected in this manner is synchronized to the reference signal, and they are referred to as 'genlocked'.

Hint: The term "genlock" refers to "generator locking". Professional video devices often provide a "genlock input", which allows an external reference signal (often referred to as 'house sync') to control its video timing.

8.2.5 AI TAB

TriCaster Vizion enhances your live production with AI-powered features such as *Blur Background* or *Remove Background*, enabling you to either soften your background for a professional look or eliminate it entirely for a clean, studio-quality appearance. Additionally, *Gaze Correction* is supported in TriCaster Vizion, which ensures that on-screen talent appears to maintain eye contact with the camera, keeping the audience engaged even when the presenter looks away momentarily.
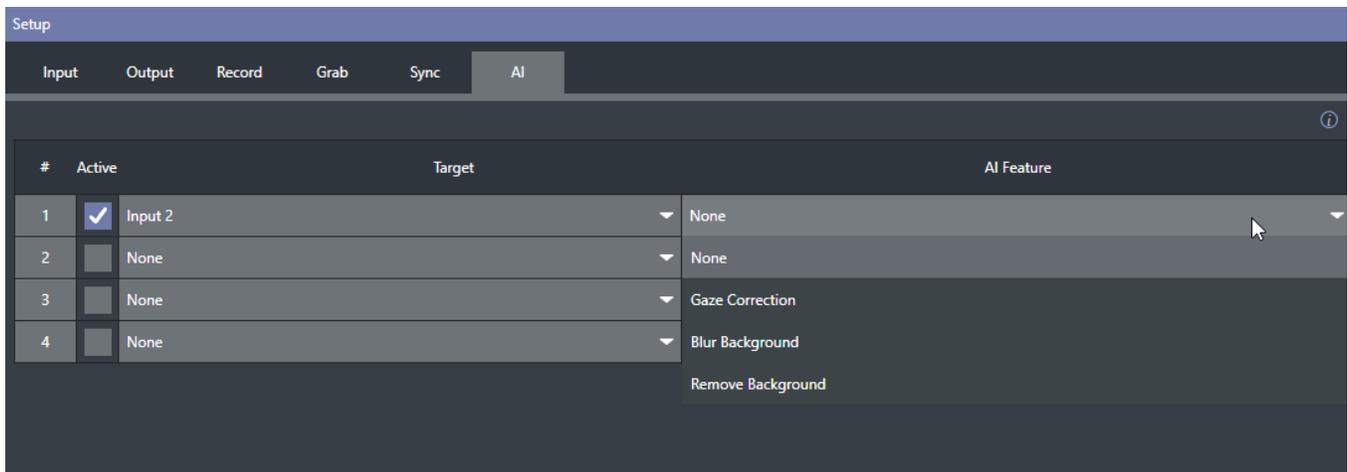
The columns are as follows:

- *#* - an index column to identify rows.
- *Active* – check the box to enable/disable the feature configured on the row.
- *Target* – assign the *AI* feature to a target.
- *AI Feature* – from the pull-down menu choose which AI feature to assign to the target:
  - *None*
  - *Remove Background*
  - *Blur Background*
  - *Gaze Redirection*

Chapter 9 SWITCHER, TRANSITIONS AND OVERLAY

Many Live Desktop features replicate traditional video switcher controls in an easy to comprehend and use fashion. The Live Desktop features powerful transition controls, downstream overlay channels, interactive layer monitors, and powerful automation features. The central part of the *Live Desktop* (between the monitoring section and the tabbed modules) is taken up by the *Switcher* and related controls and features, including *Layer Controls*, which include main and *DSK* (Downstream Keyer) *Transition* controls and configuration features.
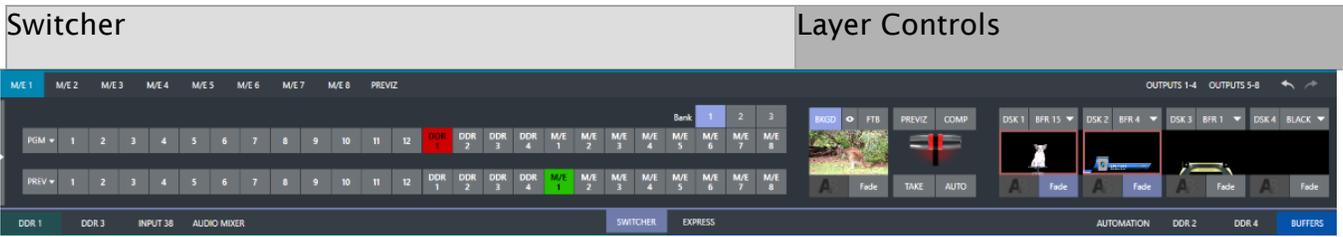
SECTION 9.1 SWITCHER BANKS

In standard *Switcher* mode, two *Switcher* rows labeled *PGM* (Program), and *PREV* (Preview) as shown above. Clicking a button in the *Program* or *Preview* row selects the active video source for that bus (note that audio sources can optionally be affected by *Switcher* activity – see Chapter 18 Audio).

TriCaster's *Program* and *Preview* rows represent all available video source in "banks" of buttons. The number of banks vary according to the number of sources each model supports. *Bank 1* is shown by default. Holding down *Alt* on the keyboard reveals *Bank 2*. On releasing *Alt*, *Bank 1* is re-displayed. Press *ALT + CTRL* to momentarily display *Bank 3* when supported. It's possible to 'latch' *banks*, either by clicking *Bank* buttons on the screen, or by pressing *Tab* to cycle the currently displayed bank.

> Hint: The standard Switcher (and M/Es with transitions assigned) show 'selection hint' tags beneath their rows when the selected source is in another bank. Click a tag to jump to the bank the source is hosted in.

TriCaster supports two different *Switcher* modes, allowing you to choose which one is best suited to your need for a given program and environment.

The standard *Switcher* interface provides control over your main *Program* video output using the familiar *Program/Preview* row method.
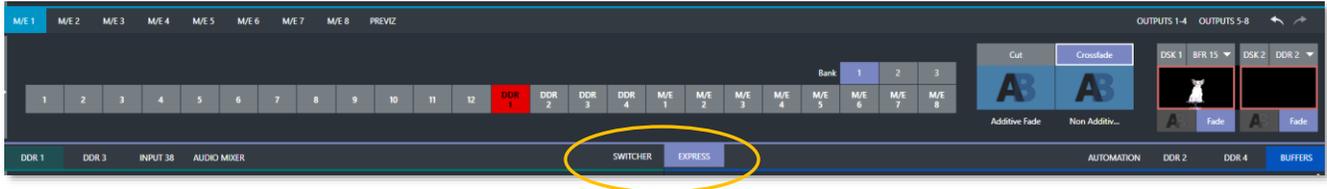
For less complex productions, the *Switcher's* convenient *Express mode* simplifies the process (see Section 9.10). This one-button operating mode will be especially welcome in environments where volunteers or less experienced operators are involved.

To select the current operating mode, simply click either the *SWITCHER* or *EXPRESS* tab provided at right in the horizontal bar immediately above the *Switcher* pane.

SECTION 9.3 PROGRAM/PREVIEW ROWS

The video source selections in the *Switcher* rows include all external inputs, including video router sources, internal sources (*Media Players* and *Buffers*), and the output from all M/Es.

The *PGM* (Program) row selection determines the dominant video stream of the *Background* (BKGD) *video layer* – that is the 'rear-most' layer of the composition sent to *Program* output.

Other sources may be mixed above the *Background* layer at times as you apply *LiveMatte*, or as portions of an incoming *Preview* row video source appear during a transition.

The *Preview row* appears in standard *Switcher* mode. Selections determine which source is queued up for display in the *Background* layer by a subsequent (BKGD) *Take* or *Transition* operation.

The concept of *video layers* is central to understanding how the *Switcher, M/E* and *Transition* controls relate to one another, and how they combine to form the video seen on *Program* output.

- The *Background* layer (often shortened to simply 'BKGD') is always the base for the video composition displayed on *Program* output.
- *DSK* (Down Stream Keyer, or 'overlay') layers may appear above (in front of) the *Background*.

DSK layers are typically used for overlaying graphics, titles, etc., though they may serve other purposes as well. In addition to BKGD, up to five additional 'primary layers' (varies by model) can contribute to the final *Program* output at any given moment:

- Overlay layers (*DSKs*) are composed above the *BKGD* layer on output. *DSK 2* appears 'in front of' *DSK 1* on *Program Output* – that is, closest to the viewer – and so on in order.
- *FTB* (Fade to Black) constitutes a final overlay layer – one that obscures all other layers when applied.

Recall, too, that the *BKGD* layer itself is often a composite of sub-layers:

- It may include mixed video from both the *Program* or *Preview* rows.

- Selecting an *M/E* as source on *Program* or *Preview* can add many sub-layers to the *BKGD* composition, including the *M/E*'s primary *Inputs* and dedicated *KEY* layers (which are similar to *DSK* layers but being upstream of the main *Switcher*, appear composed in the background layer).

Note: On supporting models, M/Es are reentrant, the BKGD layer can at times reach very high numbers of sub-layers.

SECTION 9.5 SELECTING SOURCES

In standard *Switcher* mode, video sources for *PGM* (Program) and *PVW* (Preview) rows are selected individually by pressing buttons on those rows. By contrast, selecting a button on the single row in *Express* mode first places the designated source on the (unseen) *Preview* bus, then immediately switches it to *Program* output.

For *DSK/Key* layers, source selection is made using a drop-down menu above the integrated viewport located in the *DSK/Key* control group.

It can be useful to link two (or more) *Switcher* or *M/E* source rows together, to cause them to operate synchronously. *Program* and *Preview* rows and *M/E* source rows all show a triangle beside the row label at left. Click it to open a menu that lets you set up linking.

As you'd expect, rows assigned to the same color groups are linked. A selection made in any linked row updates the selection of all other rows in the same color group to match. This image shows the *Input A* row for an *M/E* linked to the *PGM* row of the main *Switcher*.

The *Ungroup* menu item removes the current row from a group, while *Clear this group* removes all rows from the current group.

It's easy to understand the *Transition* controls; Let's consider the standard *Switcher* layout first.

9.7.1 STANDARD MODE

On the left of this group are the main *Transition* controls, including the *T-bar*. The control groups, right of the T-Bar provide configuration and control options for the individual *DSK layers.*
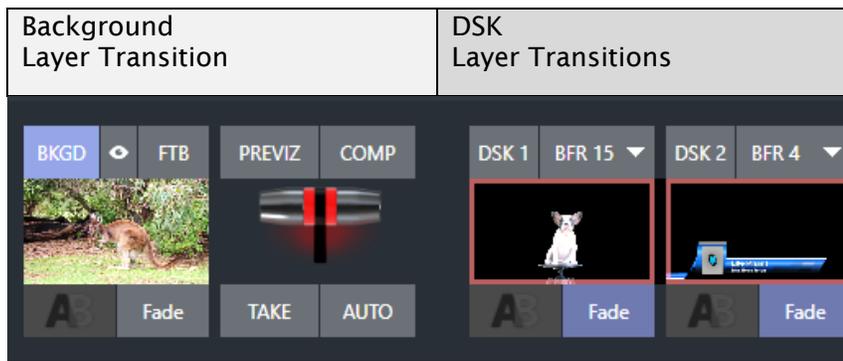
DSK CONTROLS

Each *DSK* layer has a live video viewport showing the current source assigned to it (using the menu right above the viewport) and its own transition effect.

Click the transition icon at lower left below the viewport to reveal a palette of different transition presets provided for quick selection.

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 the *Custom Media Browser.*

> *Hint: The frequently used Cut and Fade effects are always available in the transition palette. As these cannot be replaced, no + sign appears for these icons.*

In the *Media Browser*, you can choose from the hundreds of transition effects, or even *Animation Store* effects that you prepared yourself with the supplied *Animation Store Creator* application. The selected effect will replace the current one in the palette. To display or hide the *DSK* video layer over the *BKGD* layer on *Program* output using the currently selected effect, click (or tap) the viewport or the effect name label just below.

> *Hint: You can halt an unfinished effect in progress by clicking again during the transition. Then click it once more to continue performing the effect.*

TRANSITION DELEGATES
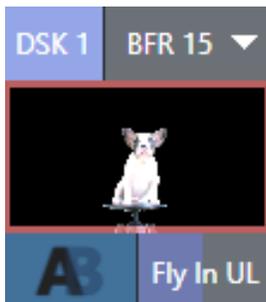
You can also control transition progress using the Switcher's *T-Bar* control, at left. The *T-Bar* operates on all *delegated* video layers. To delegate a *DSK*, click its label at upper left to turn it blue. Clicking it a second time will un-delegate the layer.

The *T-Bar* acts on all delegated layers, including the *Background* video layer. For example, if *DSK 1* is visible, but *DSK 2* is not, when both *DSKs* and *BKGD* are delegated performing a T-Bar (or BKGD AUTO) operation reverses the visibility of the two *DSKs* on *Program* output when the *BKGD* transition occurs.

TRANSITION TIMING

Per transition timing is set and stored in the effect palette, using the numeric duration control beside the effect icon.

Select transition speeds using the menu below the *Transition Palette*. You can also drag the mouse pointer over the numeric display to set a custom time or click it to enable keyboard entry of the effect duration.

> *Hint: The direction of Transitions applied as DSK (and M/E KEY) 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 BKGD (Background) layer transitions.*

You can also choose special transition effects called *Animation Stores*. These powerful effects normally include an embedded full color animated overlay, along with sounds for transitioning in and out (the audio level for *Effects* is controlled in the *Audio M*ixer tab below the *Switcher*).

These special *Animation Store transitions* are loaded into the *Transition Palette* in the same way as their less colorful cousins, using the *Browse* feature. Several *Animation Store transitions* are supplied, but you can generate your own using our *Animation Store Creator* application and custom animation content you have access to or create using art software.

> *Note: For short clips (i.e., less than ten seconds), you can simply Add a clip (using the file browser) or drag a clip from a DDR to a Buffer slot, and then click the (t) gadget on the thumbnail to transcode it - the result will be an 'autorun' type Animation Store effect. (The new effect file will be generated in the original source folder.)*

DSK SOURCE CONFIGURATION

Many more configuration options are available for *DSK*s (and their siblings, *M/E* key layers, too).

To access these settings and features, roll the mouse pointer over the *DSK* viewport, and click the configuration (gear) gadget that appears at lower right.

Doing so will open the *Input Configuration* panel for the source assigned to the *DSK*, but with the addition of a supplemental tab labeled DSK (1-2).

The control groups in this new tab expand to reveal *Position*, *Crop*, *Apply with COMP*, *Borders, Edges and Shadows* settings.

POSITION (AND CROP)

The *Position* control group includes *Position*, *Zoom*, *Rotation*, and *Priority*. *Position* settings can be toggled on and off together using the switch provided in the group header.

Click and drag on the *Position* button (diamond) to relocate the *DSK* layer vertically or horizontally within the frame.

Drag left or right on either of the two nearby numeric controls to adjust a single axis only.

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 just one dimension of the corresponding *DSK* layer – 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:

- Drag left/right to rotate the source about the Y (vertical) axis.
- Drag up/down to rotate about the X (horizontal) axis.
- Drag while holding *Alt* down to rotate about the Z axis.
- 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).

The *Crop DSK/KEY* controls in this group are like those in the *Input tab*, as discussed back in Section 8.1.1. However, these settings are applied to the *DSK/KEY* layer, without any impact on the source itself as it may be displayed elsewhere in the *Switcher*.

Z-PRIORITY

Normally, *KEY* and *DSK* layers appear in numeric order from 'back' (furthest from the viewer) to 'front'. This is if *DSK 1* and *DSK 2* are both displayed and occupy the same position in the frame, the content in *DSK 2* will occlude *DSK 1*.
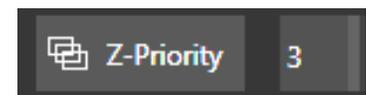
The *Priority* setting in *DSK* and *KEY* layer *Positioning* panels allows you to revise the default layer order on a selective basis. This feature was specially implemented to provide additional flexibility for use with the *Comps* feature.

For example, imagine an *M/E* set up with 4 *KEY*s supplying a quad-box setup for four remote interviewees over a background supplied by the *M/E*. You might want to use *Comps* to zoom the top-left input up to fill the screen while the moderator chats with that person. Normally, *KEY*s 1-3 would always appear *behind* KEY 4 – not what you want at all. The *Priority* feature lets you move any KEY to the front (and the setting is stored in your *Comps*).

The range of *Priority* settings runs from -10 to +10; the default is 0. A layer with a higher index is shown in front of those with lower indices. When two layers have the same layer priority, they are rendered in their natural (*DSK/KEY* layer) order.

DSK and *KEY* layers automatically appear on the *Preview* and (*M/E Preview*) monitors when the *Position* panel is open (regardless of layer display options).

This allows you to modify a layer's position without the result being inadvertently shown on output.

APPLY WITH COMP
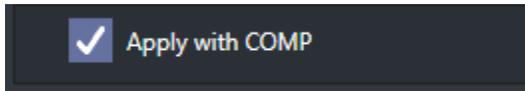
We will discuss the powerful *Comp* system a bit later (Section 9.8), but we'll mention it in passing here to highlight the *Apply with Comp* switch provided in the *Position* control group. At the lowest level, *Comps* can be thought of as presets that store complete *Switcher* or *M/E* setups.

By default, the settings stored in a *Comp* include the *Position*, *Crop,* and visibility state for each *DSK* or *KEY* layer. Disable the *Apply with Comp* feature if you want to exclude a given DSK/KEY channel from *Comp* control, handling it manually instead.

Hint: You might find this useful, for example, to ensure that a station ID 'bug' shown over output is not accidentally removed by application of a Comp.

USE SOURCE TRACKER

The Use Source Tracker feature lets you assign motion data output from the Tracker for any video source to modify the position of the current DSK or KEY layer by selecting it in this menu.

Position settings enabled above in the DSK/KEY tab continue in force but will be applied relative to Tracker output. (For example, X and Y Position settings entered in the upper part of the panel result in an offset from the co-ordinates supplied by the Tracker.)

BORDERS, EDGES AND SHADOWS
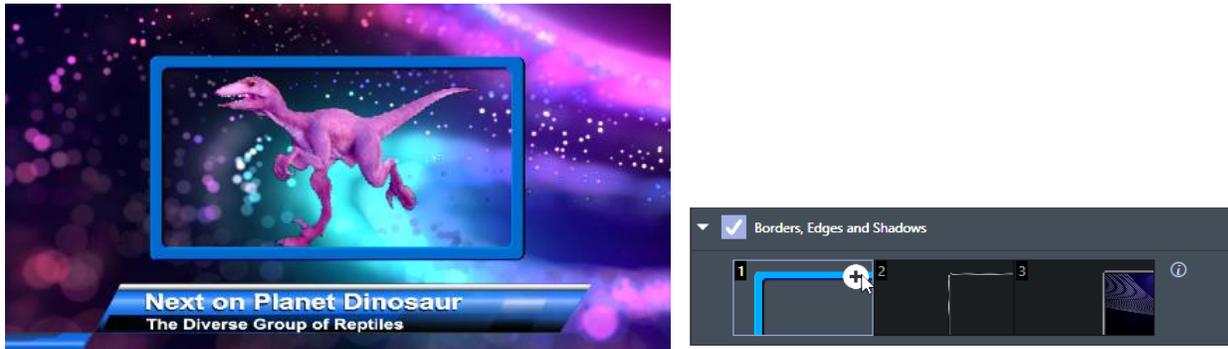
The *Borders, Edges and Shadows group* also provides each *DSK*, *KEY* and *M/E* layer with three quick access *Border* preset slots.

Hint: Since these are per-layer Position effects and can be controlled – even animated – by Comps, you can use the Borders feature to create custom multi-box compositions in M/Es.

These powerful effects can include full color overlays, backgrounds, matte layers for 'keyhole' effects, and shadows.

You can freely scale, position and rotate various Switcher sources, add custom borders, overlays, shadows, and so-on, over custom backgrounds or even live or animated sources – all without special skills or resorting to *Virtual Set Editor*.

In addition to hundreds of supplied borders, you can easily create elaborate custom effects using Adobe® Photoshop. You need merely define a Photoshop format file with three (rasterized) layers. The uppermost layer contains foreground elements (such as a bezel).

The next layer is treated as a mask based on opacity and defines the part of the source image that will appear in the result. The 'bottom' layer supplies a background to appear behind transparent parts of the source (as, for example, when *LiveMatte* is applied to a source).

A template PSD file is supplied to assist you in doing this. You will find the multi-layer Photoshop file in the Borders folder at C:\ProgramData\Vizrt\Effects\Borders.

Hint: Since the opacity of the mask layer can vary between fully opaque and fully transparent, you can easily prepare soft-edged effects such as vignettes. Also, as foreground and background layers can optionally be empty, a simple opaque shape in the mask layer can serve a variety of imaginative purposes.

Once you have configured your Keyer/Layer parameters, you can apply the same settings to additional buffers by clicking Copy (found at the bottom of the DSK/Key configuration panel) and then Paste into additional buffers. When settings have been stored, the Paste Settings option will be enabled.
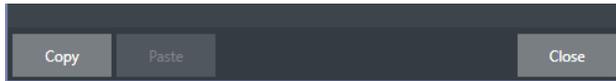
TRANSPARENCY

Sources assigned to *DSKs* are often partially transparent. This might be because they are drawn from a *Media Player* (*DDR*) file that includes an embedded *alpha channel*, or because *LiveMatte* or *Crop* options are enabled for the source, or perhaps because a *Network* source includes an alpha channel, or even all these factors operating together.

In all these cases, *DSK* layers automatically respect transparency when supplied by the source. The *BKGD* layer and all visible content in lower-numbered *DSKs* will appear through or around sources with transparency as appropriate.

> *Important Note: It's best to use files with straight (a.k.a. "non-premultiplied") alpha channels in TriCaster's Media Players. Premultiplied files will generally not yield correct results when overlaid on other imagery.*

DSK layers offer a lot of creative possibilities. You might use *DSK* channels to display a permanent station ID 'bug', superimpose a company logo onto a title page, perhaps to add a 'spinning globe' animation playing in the *DDR* to a lower-third, 'frame' a keyed source composed over a title, or set up many other elaborate effects in this manner.

9.7.2 BACKGROUND CONTROLS

BACKGROUND TRANSITION GROUP

Transition controls in this section apply to the *Background* video layer only. In most respects, these tools are identical to the *DSK* transition controls discussed earlier, but there is one difference worth mentioning.
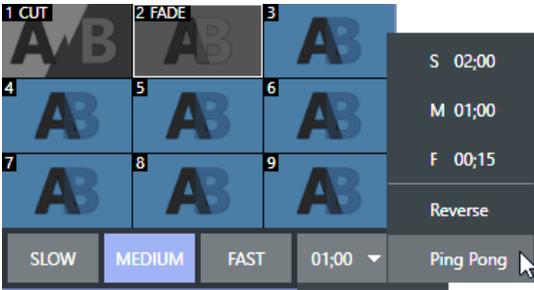
The *Duration* menu for the *Background* transition offers two items not included in the similar *DSK/KEY* controls:

- *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.

FTB

Let's discuss the *FTB* feature next. The acronym stands for *Fade to Black*. The result of clicking the *FTB button* 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 during operation. *FTB*'s fade duration is drawn from the *BKGD* transition setting.
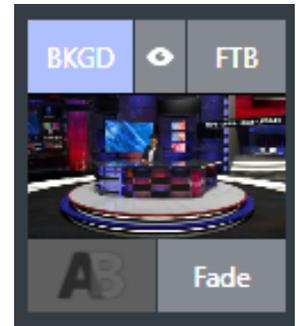
Note: Hold down Shift while pressing the FTB button on a control panel to initiate an FTB operation. Hiding or displaying FTB triggers both Autoplay and Audio Follow Video when enabled for Media Players. It also fades Master Audio to mute when displayed, and back up again when hidden.

TAKE AND AUTO
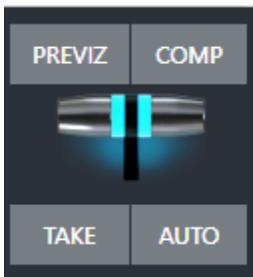
Clicking the *Background* layer's *Take* button (keyboard shortcut *Enter*) performs a straight cut for all video layers that are currently delegated.

Likewise, if you press *Auto* (or the keyboard *Spacebar*), the transitions assigned to all delegated video layers are performed.

Hint: You can halt an Auto operation partway by clicking the button a second time during the transition. The operation will be completed the next time you click the button.

T–BAR

The *T-bar* mimics the similar control on a traditional video switcher and allows you to *manually* transition between selected video layers. To use the *T-bar*, pull it downward by dragging it with the mouse pointer.

Drag it all the way to the bottom and release to complete a transition; the T-bar then pops back to the top. Naturally, when the T-bar is dragged part way, a partial transition occurs. With certain transitions this can be useful for split screen effects.

> Hint: The QuickSelect button (marked with an 'eye' icon to associate it with visibility) is located in between BKGD and FTB. Clicking it updates the Switcher's T-Bar delegate and transition states so that the next TAKE or AUTO operation will remove all visible DSK or KEY layers from output. (On supporting control surfaces, press ALT & BKGD to trigger the QuickSelect feature.)

<div align="center">SECTION 9.8 PREVIZ</div>
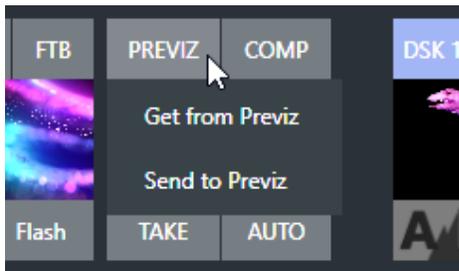
The *Look Ahead Preview* viewport above the *Switcher* shows the *outcome* of the currently configured transition before it is performed. *Previz* takes this capability further, allowing you to pre-visualize effects in motion, including T-bar operations.

You can preview any *Switcher* and *M/E* effects (including *DSK/KEY* layers) without fear of disrupting *Switcher* (or *M/E*) output. Create complex compositions in this mode and copy them back to the original M/E (or Switcher) or a different one.

You might use *Previz* to test your currently delegated transitions and sources before applying them. Alternatively, though, you can experiment to your heart's content. Freely change layer sources, modify *Positioner* settings, transitions or effects, layer delegates, test the result of *Take/Auto*, use *T-Bar* or *Zoom* controls with impunity.

Use the *PREVIZ* menu to copy the current settings of the source (*Switcher* or *M/E*) into the dedicated *Previz* pane, located with the M/Es, since it can be thought of as a specialized M/E – one *never* visible on output.

> Hint: Use the "M/E Follow" Workspace to monitor your experiments in the Previz pane.

When you arrive at a composition you like, simply select the *Paste Previz* menu item in the desired destination (*Switcher* or *M/E* tab) to send it to the target.

> Hint: This allows you to transfer all of the settings very easily for an M/E – say, the left camera angle for a virtual set complete with carefully positioned M/E and KEY layers – to one or more additional M/Es. Then you can simply swap the effect for the new M/Es to add different angles that match the original perfectly.

SECTION 9.9 COMPS AND MEMS

You'll also notice a button labeled *COMP* immediately above the *T-Bar* (Main Switcher comps are included on select models). Clicking it opens the *Comp Bin*, which provides powerful layer and effect control features.

We're going to discuss the *Comp Bin* in full soon (Section 16.8), but at this point we want to distinguish *Comps* from *Switcher* MEMs. Bumping the cursor at the left edge of the screen adjacent to the *Switcher* or an *M/E* reveals a *MEM bin* with features that are quite similar. The primary difference between *MEMs* and *Comps* is that the former retains (and apply) all settings in the *Switcher* – including source selection.

SECTION 9.10 EXPRESS MODE

As mentioned earlier in this chapter, the *Switcher's* convenient *Express mode* simplifies the process for less complex productions. To open the *Express* mode *Switcher* view, click or tap the *EXPRESS* tab right above the *Switcher*.

9.10.1 BACKGROUND TRANSITION

Note the quad-selector located between the single *Switcher* row, and the *DSK* controls at right. *Cut* and *Crossfade* mode selectors top this control group. Simply click or tap the *Cut* or *Crossfade* buttons to activate the corresponding *Background transition*.

Just below you will see two selectable transition controls. Tap or click these to activate the effect represented by the icon as the current *Background transition* instead. To open a transition selector to choose a different transition for either of these slots, click the gear that appears at lower right when your mouse pointer is over the icon.

9.10.2 SWITCHING

Having selected the *Background transition*, simply click, or tap the button for the source you wish to send to *Program* output. There is no need to make a Preview row selection first, as you would need to do in the standard (2-row) *Switcher*. The *Background transition* you chose will be applied to display the new source.

9.10.3 DSKS

The two *DSK* control groups at right work just like their siblings in the standard Switcher, but it is particularly handy that you need simply click their viewport to show or hide the associated *DSK* layer.

Chapter 10 MONITORING YOUR VIDEO

The word "monitor" comes from the Latin "monēre", meaning 'to warn', but has taken on additional meaning since Roman times. As a verb, these include such connotations as 'keeping an eye' on something, and 'checking continually'. As a noun, we understand it to mean devices that permit one to do just that.

As you would expect, your TriCaster provides extensive and versatile monitoring – just what is needed to control your live productions. Monitoring features can also warn you of conditions that might affect output quality, as well as providing access to adjustments providing quality control and creative alternatives.

Among others you will find *Proc Amp*, *LiveMatte,* and *Edge* controls. (To give some of these the attention they deserve, they are treated individually in Section 7.5 and elsewhere.)

SECTION 10.1 INTERFACE AND MULTIVIEW

The *Live Desktop* provides several multiview monitor displays – one on the *Live Desktop* (a.k.a., the "Interface"), normally comprising its upper third, and the others consisting of fully independent displays presented on secondary monitor outputs on the rear connector panel (multiview count varies by model).

Because the *Live Desktop* provides various control features along with a multiview pane, and controls can consume a greater or lesser amount of the screen, the multiview on the *Live Desktop* is adaptive.

To put this another way, the viewport layout of the *Live Desktop's* multiview pane re-arranges itself as required to make optimal use of the space available.

For example, when tabbed modules (such as the *DDRs*) at the bottom of the *Live Desktop* are fully expanded, the *Program* and *Preview* viewports above are stacked one above the other. On the other hand, if the tabbed modules are minimized, these viewports are side by side.

> *Note: To learn how to use NDI KVM with multiviews, see Section 5.2 The Home Page*

SECTION 10.3 WORKSPACE PRESETS

The basic layout of all multiview monitoring areas is established by assigning a *Workspace* preset to the screen. To access these presets, move the mouse pointer over the left-hand end of the *Dashboard* at the top of the *Live Desktop* to reveal the *Workspaces* menu.

Four presets, labeled *A-D*, are normally provided for each connected *Multiview* screen. Select a preset and assign a layout to it using the *Load Default* menu point. Continue to customize the display options for the viewports and recall the entire setup at a moment's notice by reselecting it.

To reset a preset, select it again and reload the default layout.

Each viewport in any layout offers diverse input or output source options, as discussed in Section 10.5 Viewport Options. The settings you select for individual monitors will be retained in the current *Workspace* preset.

> *Note: The Display Settings option in the Workspaces menu lets you choose the Resolution of connected monitors and apply Proc Amp settings to them. Select the native resolution of external display devices for best results. Changing Resolution can cause frames to be dropped, so modifications during live production are discouraged.*
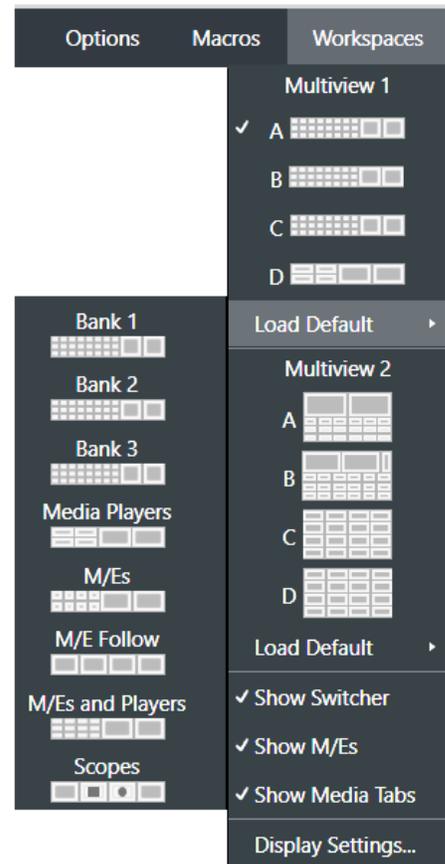
10.3.1 DISPLAY SETTINGS
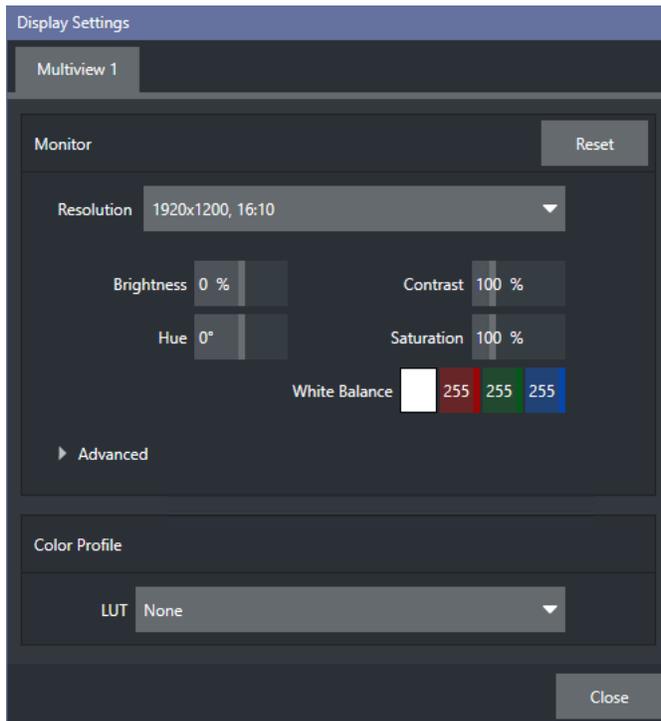
The Display Settings option in the Workspaces menu lets you choose the Resolution of connected monitors and apply Proc Amp settings to them. Select the native resolution of external display devices for best results. Changing Resolution can cause frames to be dropped, so modifications during live production are discouraged.

COLOR PROFILE (LUT)

The Color Profile section provides the option to load custom Look Up Tables (LUTs) imported from disk (10-Bit), or 'None' as a (default) option for no conversion. This option is HDR related only and will not appear in an SDR session.

SECTION 10.4 SCOPES

Scopes represent a very useful monitoring option, providing *Waveform* and *Vectorscope* displays.

Among other things, these help you to judge *Proc Amp* and *LiveMatte* settings (see Appendix E: Video Calibration). To display the *Scopes* view, select that entry from the *Load Default* options for a *Workspace*.
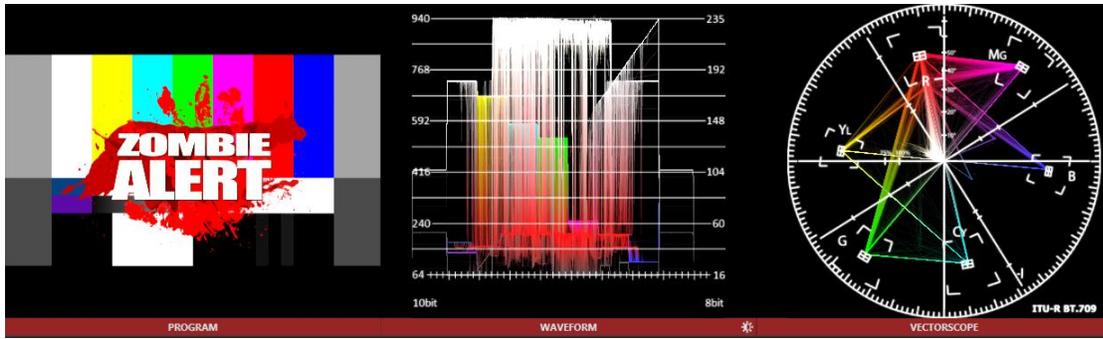
By default, scopes and the associated monitor refer to the *Look Ahead Preview* composition (including delegated *DSK* channels, or *FTB*), shown at left for reference. Right-click a scope to change the monitored source to the source you wish to view. Adjust the *Brightness* controls in the scope footers, and the trace overlay in full or solid colors using the context menu.

> *Hint: To use Scopes to calibrate a DSK source independently, first select it as the Preview row source.*

Double-click a monitor in this *Workspace* to access *Proc Amp* and *LiveMatte* controls for the current source.

SECTION 10.5 VIEWPORT OPTIONS
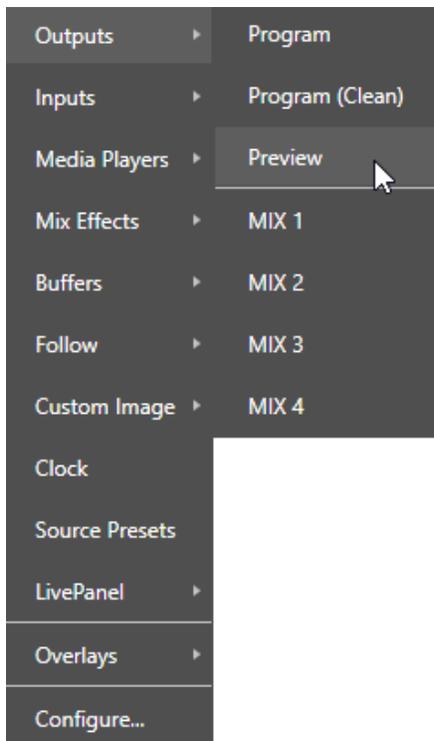
Right clicking an individual monitor viewport also opens a context menu. The first option group governs the monitor's source.

In addition to external video inputs (including *Network* sources), you can assign the output of *Media Players*; *M/Es*; main *Program* output (including *DSK* channels and effects); *Program (Clean)* without; the main *Switcher*'s look ahead *Preview;* another *Preview* showing *M/E source B* output (*Mix mode* only); or any *Output*.

Several special displays are also available. Selecting the *Clock* item replaces the video display with *Event Clocks* showing current time along with countdown style *Start* and *End* clocks. The *Custom Image* feature lets you display a network logo.

A further display you may find useful is the *Timecode Only* option that appears at the bottom of the *Media Players* sub-menu. This displays a time counter showing the current position of the playhead in the *Media Player* (respecting the specified Player's *Warning Colors* option, too).
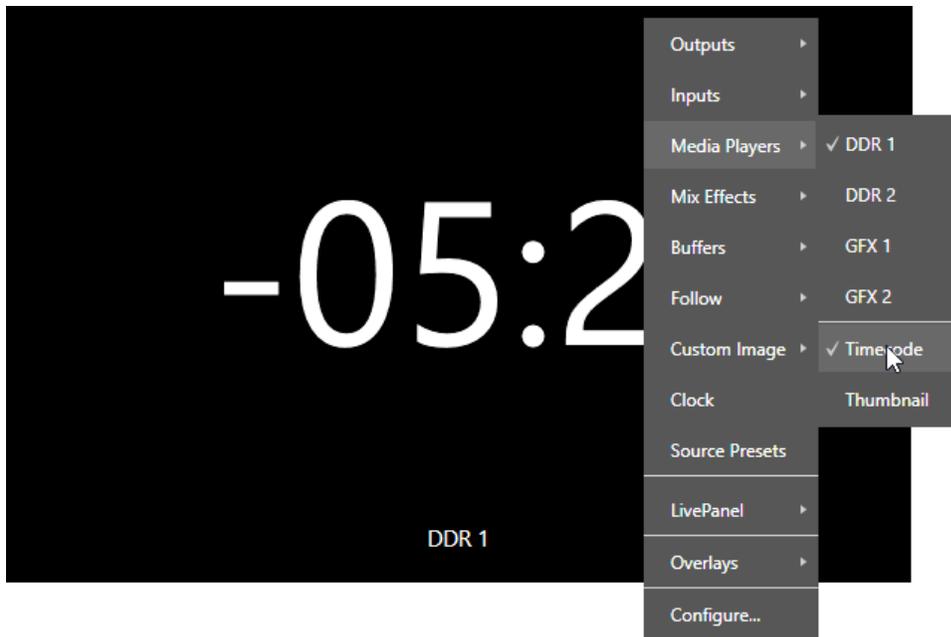
Below the basic source selection options in the menu, you'll find another group that provides access to optional *Overlays* for the monitor port.

Available overlays include *Checkerboard* (shows a checked pattern wherever transparency exists in the source); *Title Safe* (note this is a 4:3 format safe margin); *4:3 Safe* (a true 4:3 frame edge boundary), *Center Cross* to help with alignment, and *Show Illegal* and *Show Alpha*.

In addition, you may choose to display *VU Meters* with the source.

Long-standing practice when using color bars to calibrate video signal color attributes requires special video monitors with 'blue only' (or 'blue-gun') displays. The *Blue Only* viewport option means you can now use any color monitor for this purpose.

The final *Overlay* option flips the images horizontally, useful for a variety of studio requirements such as talent orientation in greenscreen applications.
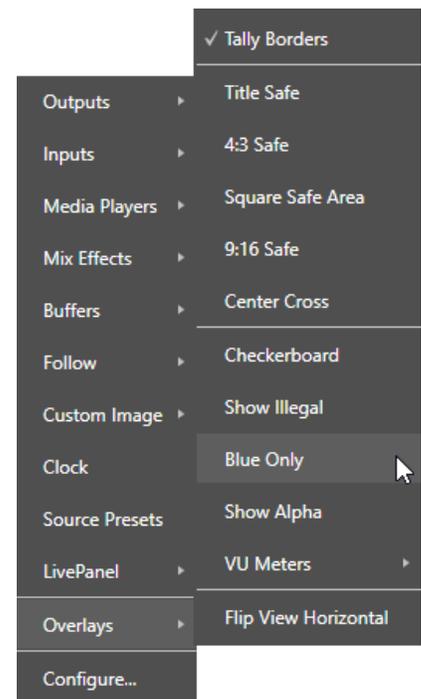
> Note: Certain Overlay menu options are not suitable for all monitor sources, hence may not appear on all models or be omitted when inappropriate.

From corporate video to reality TV, PTZ cameras are playing an expanded role in modern production. TriCaster gives top billing to your PTZ presets right in its Live Desktop or any connected Multiview (support varies by model).

The viewport context menu option *Source Presets* lets you assign preset controls to any viewport. Large, colorful thumbnail icons represent PTZ presets for robotic cameras, *Pan and Scan* presets (a.k.a. 'virtual PTZ'), and M/E *Comps* (or zoom presets on systems lacking Comp support.)

With a click, or better yet a tap on a touchscreen, your source will gracefully move to its new position (*Pan and Scan* sources can also be set to Cut). Using TriCaster's Multiview workspace options you can create custom layouts providing one-click access to presets for multiple sources of different types.

Hint: Double-click a viewport to quickly open Input Configuration without using the gear or menu.

10.5.2 LIVEPANEL PRESET BUTTONS

In addition to *Source Presets,* another option in supporting TriCaster models, is to assign macros with *LivePanel*, which allows you to preset and edit macro buttons within any viewport with *LivePanel Buttons*.

The configure panel allows you to change the size and color of the preset buttons, the font style, macro selection and the option of initiating a *Two-State Toggle Button* (creating a turn on/off option). See the sub-heading *LivePanel Buttons* in 20.2.3 LivePanel Buttons for more information.

One final item completes the monitor viewport options, *configure* opens the *Input Configuration* panel for the corresponding source.
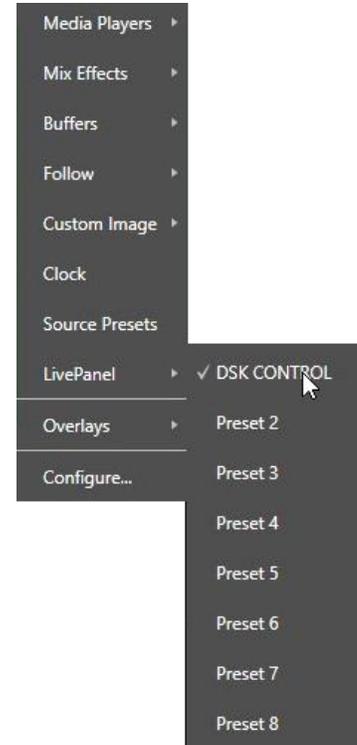
SECTION 10.6 VIEWPORT TOOLS

Viewports provide additional features when you move your mouse pointer over them.
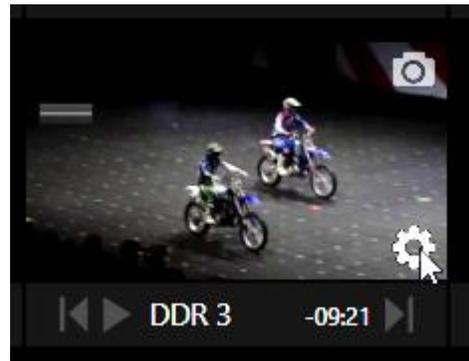
When the *VU meter* overlay option is enabled, a volume knob (similar to those in the *Audio Mixer*) is shown. Drag this knob up or down to modify the audio source associated with this input.

> *Hint: When using a touchscreen with the Click Viewports to Show on PGM option enabled, swiping the monitor horizontally (rather than tapping it) will temporarily display viewport overlays.*

Clicking the *Configuration (gear) icon* for a *Switcher* input, a *Preview* monitor, or *Program*, opens the corresponding *Configuration panel*. Notice, too, that a *snapshot* icon appears in the label below most viewports (varies by model). Click this to quickly grab a still image (images grabbed in this manner will obey the *Add grabs to* option in the *Grab Configuration* panel; see Section 24.3).

The viewports for *Media Players* show handy transport control in the label area – from left to right *Previous*, *Play/Stop*, and *Next.* In addition, a progress gauge is shown in the background to show the playhead position and warning colors as playback nears its end.

Hint: When LiveMatte, Proc Amp, or Crop settings are active for a source, the configuration gear gadget for a viewport is color coded and shown full-time.

SECTION 10.7 PROGRAM MONITOR

The *Program Output* monitor could hardly be more important; hence it's prominent default location at upper-right on the *Desktop.*

Normally, this viewport shows what the *Switcher* is sending to *Program* output at any moment. The display includes the *BKGD* video layer as well as any other video layers (such as one or more *DSKs,* or *FTB*) displayed above it.

Note: By default, Program output is sent to the MIX 1 output, subject to assignments made in the Output Configuration pane. Click on the Setup tab in the Dashboard, then the Output tab to open the Output Configuration pane.

SECTION 10.8 LOOK AHEAD PREVIEW

Again, by default, the *Live Desktop* also prominently displays the *Look Ahead Preview* monitor (labeled simply *Preview*).

The *Look Ahead Preview* is versatile and powerful. Instead of showing just one video source (the *Preview* row selection), it displays what the outcome of a *Take* operation applied to all currently delegated video layers would be

- Delegating the *BKGD* layer indicates you intend the next transition to swap the *Program* and *Preview* layers. The *Preview monitor* will show the *Preview row* selection as its background.

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

- Delegated *DSK layers* are shown above the background on *Preview* according to their current state. That is, if a delegated *DSK layer* is currently displayed on *Program* output it does not appear on *Preview* – since the next transition would remove it.

In other words, 'what you see is what you *will* get' – after performing the next *Take* or *Auto* operation as currently configured. This lets you set up the next shot, check its composition (including titles and overlay positioning), and switch to it with sublime confidence.

Chapter 11 MEDIA PLAYERS & BUFFERS

Media Players permit you to integrate video, stills and title pages into your live presentation. Media Players can play, stop, and advance automatically in response to Switcher operations. Animated buffer effects are perfect for many similar purposes, freeing up Media Players to be used for long form playback.

SECTION 11.1 MEDIA PLAYERS

TriCaster live production systems include a bevy of integrated *Media Players*, providing savings, convenience, and opportunities for automation. *Media Player* controls can be accessed in large, tabbed panes found in the bottom third of the *Live Desktop*, or by in tabs with similar features that appear in the *Input Configuration* panels of *Media Players*.

TriCaster provides multiple *DDRs* (clip players) or a combination of *DDR* and *GFX* (graphics) players in addition to Sound and Audio Mixer (varies by model).

Media Players can handle numerous media types:

- *DDRs* can display:
    - *Video clips* – including effects, motion titles such as scrolls, transitions, LiveGFX support and longer format movies.
    - *Titles and still images* – editable title pages prepared for use in TriCaster's native titling system, CG pages prepared as image files, or other still imagery – photos, graphics, etc. (See also Chapter 25, Title Templates, for information on creating custom title pages.)
    - Both *Sound* players and *DDRs* can play standard .wav or .mp3 format audio files.

11.1.1 PLAYLISTS

The dominant feature of all *Media Players* is a storyboard-style playlist, used to organize content for use during live productions.

This arrangement offers easily visible thumbnail icons for each entry. A scrollbar on the right accommodates long playlists when necessary. Icons in the playlist can be re-ordered quickly and easily using the familiar drag and drop workflow. 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, along with the item's duration.

Clicking an item selects it. The play position is automatically set to the *In Point* on selection. Standard *Shift + click* and *Ctrl + click* multi-selection operations are supported, and all selected items are denoted by a white border around their icon.

When a Media Player is stopped, its output to video monitors tracks selection and trimming operations. The current item is the Media Player's output, and in consequence appears on monitors dedicated to the player, if any. Of course, only one item can be displayed on output at a time; the frame surrounding the thumbnail icon for the currently displayed item is illuminated. Double-clicking a thumbnail (or clicking the Play button) begins playback from the In Point of the current file.

Note that even still images and static title pages added to the playlist are given a play duration. The default duration for these items is five seconds. Duration can be adjusted on an item-by-item basis (or as noted earlier, en masse for multi-selected stills or title pages).

During playback, the footer of playlist items illuminates 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 beneath the currently playing thumbnail, and the *Scrub-Bar* knob also tracks playback progress.

> *Hint: Selection status is independent of which clip is playing. Selected items have a white border in the Playlist pane.*

11.1.2 FILE OPERATIONS

- Click the large + (*Add Media*) button on the left beneath the playlist pane to open a custom *Media Browser* (see Section 11.1.7). Alternatively, double-click in an empty part of the *Playlist* pane.

> *Note: Add Media also supports compatible third-party asset management systems. Hold down the keyboard Ctrl key when clicking the + sign to access these tools.*

- Newly added files become selected items in the *Playlist* pane.
- Drag (appropriate type) file(s) from one module's playlist to another module.
- 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 Split at Current Frame

    - o *Audio Level* (clips with sound and audio icons) – note that the default 'per-clip' audio level applied to imported media files can be set in the Dashboard *Options* menu.
    - o Speed
    - o Use Current Frame as Icon
    - o Macros (varies by model)
    - o Properties

    - o Transcode
    - o *Add to Export Media* – see Section 23.3.
    - o *Send to > Buffer n* (Still image and title icons – see Section 11.3)

Automatic Clip Trimming

Clips (but, for reasons that will become apparent, not still images or titles) in a playlist are automatically trimmed to accommodate the addition of transitions between clips when necessary.

(Otherwise, i.e., if there are no 'un-used' frames to display during a transition, motion will appear 'frozen' during the transition, which is usually undesirable.)

To reset a clip to its full file-length boundaries, press the 'g' key (multi-selection is supported, too).

- Standard *Cut, Copy, Paste* and *Delete* keystrokes are supported for playlist entries.
- Un-playable (missing, corrupt, or unsupported) file icons are dimmed.

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

11.1.3 SPEED

The playlist context menu item *Speed* permits you to give each clip a custom playback speed. It's important to realize that this *Speed* setting is separate from the Media Player's primary *Speed* control, located in the footer, below the *scrub bar*. The latter setting applies to all playlist items.

Both Speed settings are applied during playback. So, for example, if you play a clip with both Speed values set to 50%, the actual playback rate will be just 25%.

11.1.4 MACRO TRIGGERS

We've discussed elsewhere in this Guide how you can assign macros to any *Switcher* source, including a *Media Player*. Beyond this, though, the playlist context menu item *Macros* allows every item in a playlist – every clip, still image, audio file or title page – to control its own unique macros.

- Any macro you can record or create can be triggered automatically on either playback or end of play for any and every individual playlist item.

- Multi-selection support in the playlist makes it a breeze to assign macros to multiple items.

11.1.5 TRANSCODE

When clips are added to the *DDR* playlist, their suitability for real-time playback is evaluated. When appropriate, a small (T) icon is added to the entry's label, indicating that the item can be transcoded into a more suitable format.

To transcode the clip, select the *Transcode* option in the clip's context menu. The process will proceed in the background, and the DDR's link to the original file will automatically be replaced when it is complete. Note that transcoding operations support multi-selection.

> *Note: Any time a clip is Transcoded, a new 'Transcoded' folder is added beside the original file. If you move a folder with the original clips and the Transcoded files to a new location, you will not need to transcode them again*

11.1.6 PROPERTIES

DISPLAY NAME

The *Properties panel* allows you to edit the *Display Name* of a file in the playlist.

The *Display Name* fields default to the filename, but is a local alias, or 'nickname'.

Thus, editing the name does not change the name of the file on your hard drive. Roll the mouse over the icon *display name* to see the true filename and its path.

COMMENT

The *Comment* permits you to supply metadata 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 or supplied along with the file to the Publish module.*

Trimming Clips and the Scrub Bar

Just beneath the *playlist* pane is a full-width *Scrub-Bar*. The width of the *scrub-bar* represents the full run time of the current clip or other media file. Drag the knob to change time position.

In and *Out Points* for newly added Media are automatically adjusted when necessary to accommodate motion when transitions you add require it.

- To reset the file to its full length, press the 'g' key
- To trim a clip manually, move the knob to the desired frame and press 'i' or 'o' on the keyboard (to set the *In Point* or *Out Point*, respectively).

During playback, the Scrub-Bar knob traverses the span between the In and Out Points. The duration (taking into account trimming operations) is displayed as a countdown in the upper of two timecode fields at left. The lower time display shows embedded clip timecode.

Drag the knob to move quickly backward or forward in the clip. Audio is normally muted during scrubbing; hold down CTRL to un-mute it. Also note that holding SHIFT while dragging the scrub bar knob increases precision.

It's useful to note that (Quicktime only) clips that are still being captured continue to 'grow' even after addition to a DDR playlist (see Section 11.1.7).

These growing clips, featuring the red 'recording' overlay can be freely extended beyond the bounds of the 'in' and 'out' points they were given when initially added.

It can be very useful to recall that you can easily split clips using either the corresponding context menu item, or the "/" key.

Time-Shifting

By the way, it's possible to use growing clips to 'time shift' your program:

- Initiate Recording.
- Add the captured clip to a DDR
- Press "g" on the keyboard to clear its *Out Point*.
- Trim the *In Point* to taste.
- Assign the *DDR* to an o*utput*.
- Wait some length of time and then begin playing the clip.
- (Of course, all of this could easily be performed by a macro, too.)

ALPHA CHANNEL SUPPORT

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

> Hint: Monitors can optionally show a checkerboard pattern behind transparent content.
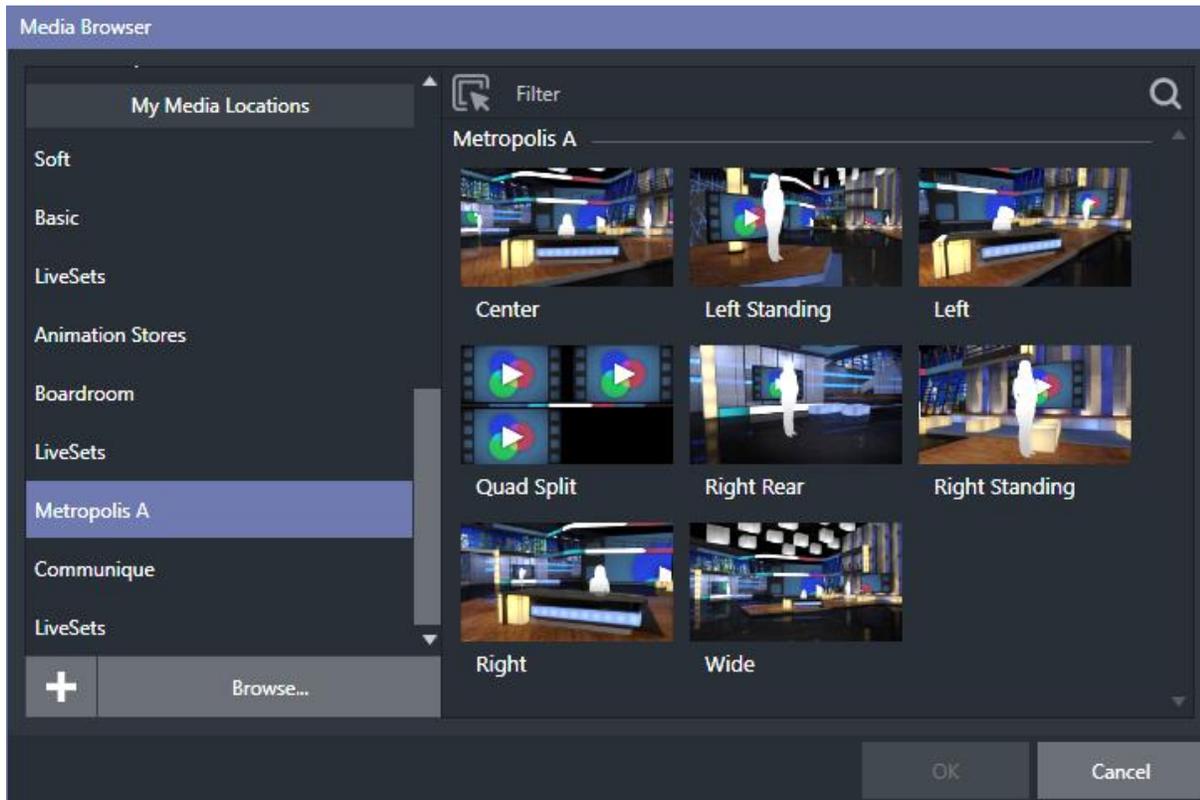
The custom *Media Browser* provides easy navigation and selection of content on your live production system or on the local network.

The *Media Browser* appears anywhere in the *Live Desktop* that you might wish to select content, transitions, or effects for use in your project (such as the *Media Players*, *LiveSet* and *Transitions* sections).

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

LOCATION LIST

The *Location List* is a column of favorite "locations", grouped under headings such as LiveSets, Clips, Titles, Stills, and so on.

SESSION AND RECENT LOCATIONS

The *Media Browser* is context sensitive, so the headings shown are generally appropriate for the purpose for which they were opened.

A list of sub-headings appears under these main headings in the *Location List*. These may correspond to named sessions, or groups of content. When you select a sub-heading, the right-hand pane – the *File Pane* – is populated.

In addition to locations named for your stored sessions, the *Location List* includes two notable special entries. The *Recent* location provides quick access to newly captured or imported files, saving you time hunting through a hierarchy to find them. The *Session* location (named for the current session) shows you all files captured in the current session.

> *Hint: Clips that are being actively captured are marked with a red 'record' overlay. These clips continue to 'grow' and can be re-trimmed after their addition to DDR playlists or the Publish Queue.*

ADD MEDIA LOCATION & 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 sub-folders, which allows related content to be organized conveniently.

FILE FILTERS

The *File Pane* view is filtered to show only relevant content. For example, when selecting *LiveSets*, the browser only shows *LiveSet* files (.vsfx).
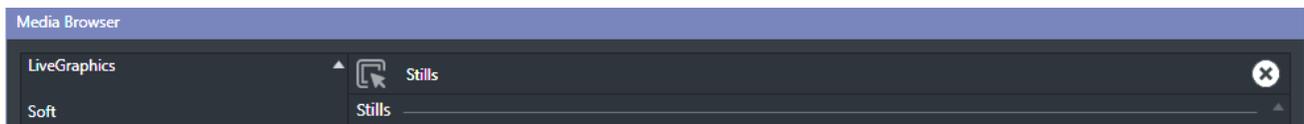
An additional filter appears above the *File Pane.* This filter quickly locates files matching criteria you enter, doing so even as you type. For example, if you enter "wav" into the filter field, the *File Pane* displays all content at the current location with that string as part of its filename. This would include any file with the extension ".wav" (WAVE audio file format), but also "wavingman.jpg" or "lightwave_render.avi".

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 clicked is write-protected.

Transport controls and playback settings are located directly below the *Playlist* and *Scrub-Bar*.

TIME DISPLAY

During playback, the uppermost timecode field beside the transport controls displays the current countdown time for active playlist item or for the entire playlist when the *Playlist* mode button is enabled. (As mentioned earlier, the time show below is the embedded clip timecode.) Left click the field to type in a timecode, then press *Enter* to jump to that point in the file (*or* playlist).

> *Hint: The time display and scrub bar color provide visual indication that the playback is nearing its end. Ten seconds before the end of play for the current item, the digits in the time display and the scrub bar background turn amber.   With only five seconds left, the color changes to red.*

PLAYLIST MODE

Normally, *Media Player* playback *stops* when the *Out Point* of the current playlist item is reached (unless *Loop* is also enabled, in which case playback of the current item repeats until manually interrupted).
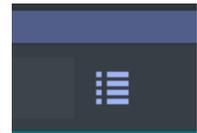
Clicking the *Playlist* mode button tells the *Media Player* to operate in continuous play mode, advancing through the playlist items until the last one has played.

TRANSPORT CONTROLS

A simple set of controls beneath the playlist pane provides <u>all</u> 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

PREVIOUS, NEXT AND PRESENTATIONS

It's extremely useful to realize that, since transitions can be added between playlist items, pressing *Previous* or *Next* likewise employs transitions. Whether playback is underway or stopped, and whether the items are clips or stills, you can use *Previous* and *Next* to transition backward and forward between items.

This provides a perfect way to manage presentations using *Media Players*, hence our inclination to refer to this as the "Presentation workflow'. With macros (and perhaps MIDI buttons) driving the presentation, this makes it easy to handle control graphics and video for seminars, to update weather graphics, and more.

> *Hint: In addition, since transitions support transparency, you can queue up a series of titles in a playlist, display it in a DSK, and transition backward and forward between titles interactively simply using Previous and Next.*

SPEED
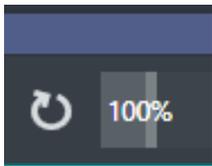
The *DDR* supports variable speed playback between 25% and 400% of the normal rate (100%). Speed can even be adjusted *during* playback.

> *Note: Certain highly compressed video file formats cannot successfully be played back at rates beyond 200%, even though Speed value is set to a higher value.*

As is common for numeric input controls in the interface, drag left or right to adjust the *Speed* value, or click the slider to access a direct entry field allowing you to type a value using the keyboard.

> *Hint: Press Shift while double-clicking Speed to quickly reset to 100% default.*

LOOP

Enabling *Loop* repeats playback continuously (respecting the *Single* switch state).

AUTOPLAY
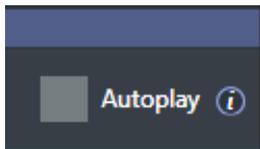
When enabled, the *Autoplay* switch has several important effects. First, it initiates playback automatically when the associated *Media Player* is placed on *Program Out* by a (Switcher) *Take* or *Transition* operation either directly (as a *Switcher* row selection) or *indirectly* – such as by being displayed via an *M/E* channel or *DSK* operation.

Second, if player output is displayed on *Program* the reverse *Switcher transition* occurs automatically as the end of play approaches, whether the *Out Point* of the current item for *Single* play or the end of the playlist. (This behavior is optional for M/Es – see Options in Section 16.2 and Section 7.1.)

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

In either case, when the *Media Player* is in standard operating mode (as opposed to *Playlist* mode), the current play position advances to the next item after playback is automatically stopped.

11.1.9 SHOW ON (…)

Another extremely powerful feature is nestled just to the left of *Autoplay* in the footer of each *Media Player.*

Labeled ▶ *PGM* by default this feature can target *M/Es* as well as the *Program* row of the main *Switcher*. It provides unique playback and display abilities that make instant replay a thing of joy, as well as serving other purposes. Click the configuration button (gear) beside the *SHOW ON* button to display the panel.

The largest part of this panel contains transition bins for custom *In* and *Out* transitions which will be used to display the current clip. Select *Custom* from the *Transition In/Out* menus to activate these bins. Otherwise, you can select *Cut* or *Current* options.

Note that the bin content displayed is synced with the *Background* transition bin for the target video bus, be it *PGM* or a designated *M/E*. Selecting *Current* uses the current selection in the *Background* transition bin of the target bus.

Hint: Unlike other transition bins, these icons do not show a "+" sign gadget on rolling the mouse over them. To replace the effect in slot, modify the content of the Background transition bin of the target you have selected for SHOW ON.

Once configured, clicking the *SHOW ON (…)* button will do the following:

- Swap the current *BG* transition for the main *Switcher* or a designated *M/E* for a custom *Animation Store* (such as "Replay!") or other specified transition.
- Transition the current *DDR* selection in on the main Switcher's *PGM* row, or the *A* row of an *M/E*
- Play the clip (overriding the *DDR's* own *Autoplay* setting, if necessary)
- Transition back to the original program using a custom transition (such as "Live!) when done
- Swap the background transition back to the original selection

M/E ON PGM

In a variation on this operation, the *On PGM* switch, which is available whenever the target is an *M/E*, provides a different mode of operation.

In this case, the output of the Media Player is immediately selected as the top row source of the target *M/E*, and the M/E is transitioned in on the main Switcher's PGM (Program) row.

This unique feature allows you to use the main *Switcher* to display the *Media Player* output – including instant replays – with *KEY* layers (such as 'scorebugs') composed above it.

11.1.10 MEMS

Another very useful feature of *Media Players* is the *MEM Bin*, which provides quick and convenient access to stored playlists. *MEM slots* also store the state of various *Media Player* controls.

To display the bin, roll the mouse pointer to the (nearest) side of the screen in a tabbed *Media Player* or the *Audio Mixer* tab (for *Sound* and *Audio*, *MEM slots* are presented on the left side of the screen only).

When you change playlists by selecting another *MEM slot*, it's almost as though you are accessing another *Media Player*. Use *MEM slots* for quick access to different categories of content for use during a live presentation, playlists prepared for different clients, or for completely different programs you produce.

MEM slots can be named and can also display a small representative image (taken from the first entry in the playlist). As you move the mouse over a *MEM slot* icon it expands, providing an enlarged view of that playlist item's first frame. To populate a new *MEM slot*, simply click a blank icon.

To name a *MEM slot*, right-click it to open a context menu, and select *Rename*. Other menu options include *Delete*, *Export* and *Import* (the file will be saved with the extension '.pst').

PREVIEWING MEM SLOTS

At times you may wish to preview the contents of a different Media Player *MEM slot* without disrupting playback of the current playlist. When a clip is playing, a small white 'play indicator' is shown over the icon for the currently selected entry in the fly-out *MEM slot bin*.

If you select a different *MEM slot* while the current clip continues to play, the playlist bin view updates, but the original item continues to play. The transport controls (*Play*, *Stop*, etc.) at the bottom of the tab remain *dedicated to the *active* playlist – that is, the one playing, rather than the one currently being *previewed* in the tab.

To change to the *previewed* MEM slot immediately – ending playback and display of the current item – you can do so by any of the following means:

- Double-click an icon in the *previewed* playlist.
- Or press **Stop* twice and then *Play* (playback of the active item ends with the first *Stop* command; the second sets the playhead to the start of the current item in the new playlist).

* Normally, pressing *Stop* a second time when a clip is playing resets the playhead to the start frame in the *same clip*. The exception above occurs only when you are previewing the content of a different *MEM slot* during playback.

11.1.11 NETWORK SHARING

Default media file folders (*Clips*, *Stills*, etc.) are maintained for each session. This approach makes it easy to locate items using the *Custom File Browser* and is also convenient for other file management purposes.

The default media locations for the *active* session can be made accessible across your local network. *Share Media Folders and Buffers* in the *File menu* is on by default and allows network clients to update media in the active session, even while live. The following session media locations are dynamically shared:

- Audio
- Clips
- Stills
- Titles
- Buffers

Note: Several 'non-session dependent' locations in the main application folder are also shared. This allows applications such as Virtual Set Editor, etc., running on external systems to export directly to the local system. These network shares are unaffected by the Share Media Folders and Buffers setting.

When suitable content is added to these shared folders, the *Media Browser* provides immediate access to it. Simply select the session name (under *Clips*, *Stills*, etc.) in the *Location List* at left to reveal the updated files in the *File Pane* at right.

Transferring very large files across a network can time-consuming and impacts both disk access and network resources.

When these resources are already heavily taxed, dropped frames on streaming or video outputs, or sluggish response to controls may result.

We strongly urge you to gather media assets before starting your live productions whenever possible.

This is wonderfully convenient but should be approached with a measure of common sense. Network bandwidth has fixed limits. Be judicious when transferring large files while 'live'. You may be using the network for many purposes – including streaming, or NDI video feeds from a Viz 3Play, as well as any unrelated traffic on the network.

SECTION 11.2 EDITING TITLE PAGES

On mouse-over, title page icons display a text edit gadget in their lower-left corner.

Click this button (or select *Edit Title* in the icon context menu) to open the pop-up *Title Page Editor*.

Opening the *Title Page Editor* during playback is permitted, so that *Title Page* content can be edited even during display (changes are detected and shown immediately).

> *Hint: The panel can be re-sized by dragging its lower-right corner and re-positioned by dragging its titlebar.*

When you move the mouse over text in the *Title Page Editor's* preview pane, a white bounding-box appears. If you click once inside the box, it turns yellow, indicating the text object is selected, and a text edit field opens.

> *Hint: When the box is yellow the text can be nudged either a pixel at a time using ALT + the arrow keys or five pixels at a time using SHIFT+ALT+ the arrow keys.*

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).
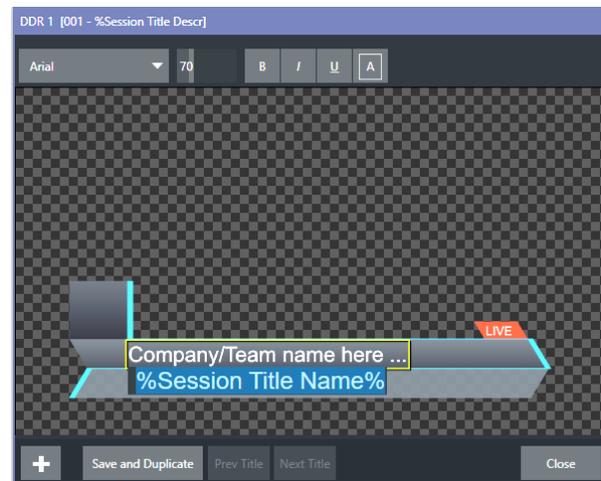
Note that the cursor keys – that is, the left/right and up/down arrows – allow you to navigate between text fields on the current title page. (If the text edit box is open, left/right arrows change the edit point as usual, but up/down closes the edit box, and subsequent cursor key actions move to the next object.)

> *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.*

11.2.1 HEADER TOOLS

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

11.2.2 FOOTER TOOLS
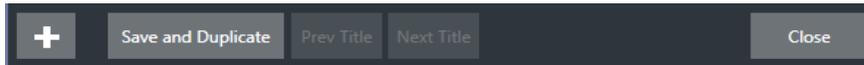
You can click *Close* when finished with the current edit, but often you'll find the *Save and Duplicate* feature handy. Click it to store your edits to the current title page, create a clone of item in the playlist, and load the new page for editing. This is a great way to quickly produce a number of matching pages.

> *Hint: Press Ctrl + s on the keyboard to perform this 'save and duplicate' operation without using the mouse. Similarly, PageUp and PageDown keys perform Previous and Next operations.*

The *Prev* and *Next Title* buttons let you store your changes and move to another title page in the playlist without the tedium of closing the *Title Edit* pane.

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 a replacement image file (hold Shift while clicking to use the system file explorer instead).
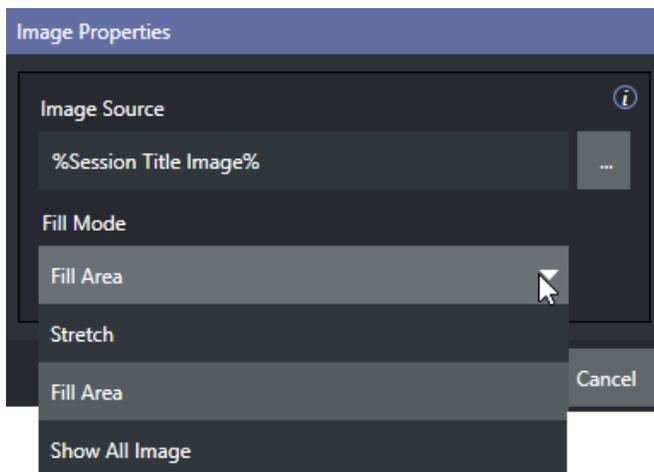
If, instead, you right-click a stand-in image, a context menu lets you select one of several optional methods of fitting the source image to its frame. Choosing *Stretch* causes the image to completely fill the frame. *Fill Area* retains the interested image's original aspect, cropping if necessary to fit inside the frame.

Show All Image also retains the original image aspect but fits the entire source image inside the frame (which may result in 'pillar-boxing' or 'letter-boxing'). This menu also allows you to open the *Image Properties* panel. It provides the same set of *Fill Mode* options but adds an *Image Source* box supporting direct entry. The *Image Source* box comes into play in connection with the next (extremely important) topic – *DataLink*.
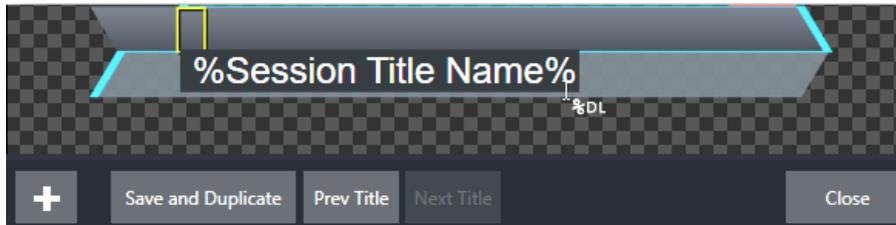
Since *DataLink* falls into the general realm of automation and has access to external sources, complete coverage of its features and capabilities is found in the companion *Automation , Integration Control Guide* included with this product. We'll mention here, though, that both text and images on title pages accept *DataLink keys* as input.
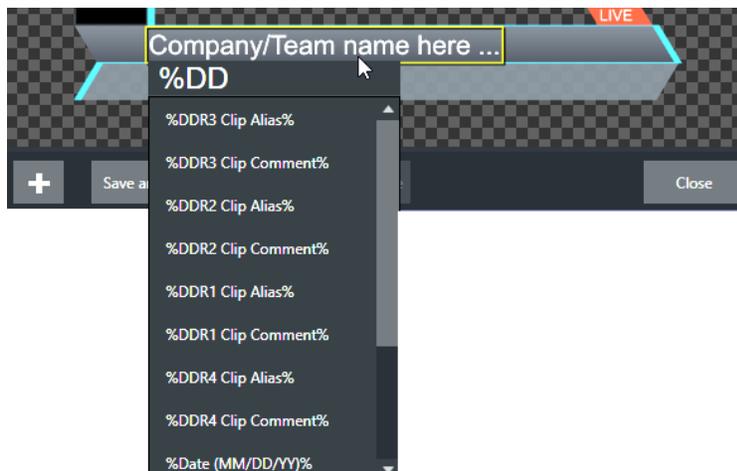
The Title Editor tells you which entry boxes accept *DataLink* keys by showing a custom mouse pointer, in the form %DL.

Making key entry even faster and easier to use, all available *DataLink keys* are shown in the drop-down menu as soon as you enter a % sign into an 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 *DataLink*, and many ways to supply and update values assigned to *DataLink keys*.

Do not fail to take advantage of the power and convenience of the DataLink web browser extension, which makes it easy to populate your title pages over the network from a web browser running on virtually any platform.

The system's powerful *Buffer* implementation provides many alternative graphics and animation sources for *M/Es* (including their associated *KEY* channels), the main *Switcher* and its *DSK* channels. *Buffers* are sometimes even more useful than similar imagery supplied from *Media Players*. The tabbed *Buffers* module shows icons and controls for fifteen *Buffers*.
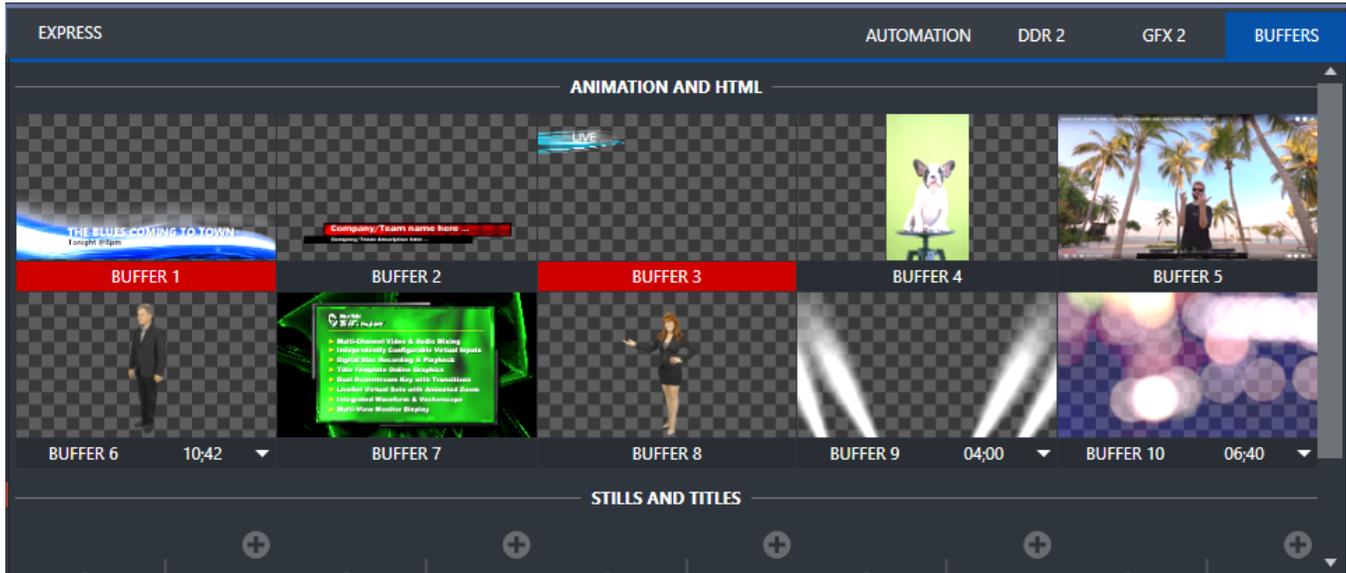
Buffers are retained in *Switcher Memory* for immediate recall and display. Using a buffer for a specific *DSK* or *M/E* channel (rather than a *Media Player*) eliminates the risk of accidentally displaying the wrong graphic, as might otherwise happen if the current *Media Player* item selection was not the one intended.

11.3.1 BUFFER TYPES

Buffers support the following media types:

ANIMATION EFFECTS

These are short duration full-motion video effects created in your favorite graphics or video applications and compiled using the add-on *Animation Store Creator* application.

- *Looping* effects – these animations play repeating endlessly, making them ideal for station ID 'bugs' and the like.
- *Auto-run* effects – these effects auto-run on display following a *Take* or *Auto*. Playback runs once and then holds the last frame.

- *Images* – 24-bit or 32-bit (with embedded alpha channel) images.
- *Title pages* – editable *title pages*, identical to those served up by the various *Media Players.*
- *LiveGraphics* – animated graphics and titles (on supporting models).

HTML BUFFERS

Display live webpages in a *Buffer,* including online services that output HTML graphics.

- Scaling and cropping are supported using the standard input and key layer configuration tools.
- Control within the webpage over mouse movement/clicks, back, forward, refresh, scrolling and keyboard input.
- Support for web output from CG providers.
- Supports audio, macros, and alpha transparency.

Note: To learn how to pull in any web page elements without a third-party application see Section 11.3.5, Live Link.

Selection and display of *Buffers* is controlled by buttons on main *Switcher* source rows, *M/E* rows, and similar options in *DSK* and *M/E KEY* source menus. The top ten buffer slots support all animated effect types, titles, graphics, and HTML web pages. The remaining buffer slots are restricted to graphics content, including popular image formats along with *title pages* (i.e., .cgxml files).

11.3.2 SELECTING CONTENT

An *Add Media* [+] button appears at upper-right when you move the mouse over a *Buffer* icon. Click this button to display the *Media Browser* and then pick a suitable file to populate a *Buffer*. Alternatively, drag an item from a Media Player onto a Buffer slot.

Or right-click a still image or title page icon in a *Media Player* and choose *Send to* from the context menu (select a specific buffer slot using the hierarchical menu). Note that this *Media Player* menu item only appears for *still image* formats and *title pages*. *Animation effects* must be complied using the *Animation Store Creator™* add-on application before they can be loaded into buffers.

Note: Generally, Buffers are linked to the original source file on disk. Having added a file to a buffer using the "Send to (Buffer x)" menu, the item can be removed from the Media Player. The buffer link will only fail if the original file is moved or deleted from the hard drive, with one exception: editable title page buffers are fully independent of their original source files.

11.3.3 BUFFERS MENU

Right-click a thumbnail icon in the *Buffers* pane to open a menu offering two items:

- *Configure* opens the standard configuration options, including cropping, color processing, and even *LiveMatte* keying.
- *The Unload* option clears the effect, freeing *Switcher Memory* reserved for effects.
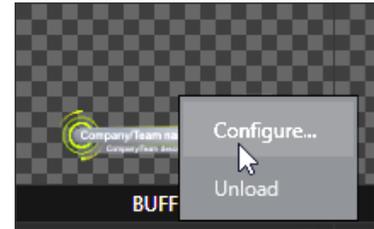
When the mouse pointer is over a *Buffer* icon, the small [x] gadget shown in the upper-left corner provides another method of unloading an effect. Likewise, the *Configuration* (gear) icon that appears at lower right opens the *Input Configuration* panel for the *Buffer*.

11.3.4 ANIMATION FEATURES

The thumbnail icon for a buffer with an animated effect created in the *Animation Store Creator* application assigned to it provides several additional features. As mentioned earlier, *animation effects* can be of either *looping* or *auto-run* type (the type of determination is made in the *Animation Store Creator* utility when the effect is generated).

Loading either class of effect into a buffer result in a time control being displayed at right in the buffer label.

> *Hint: Select a Slow, Medium or Fast preset value from the drop-down menu, drag the mouse left or right over the time to change the current value, or click to enter a number directly using the keyboard.*

For *auto-run* animation effects, further control is added to the thumbnail icon when you move the cursor over it. The *Rehearse* button appears at the top-center. Clicking it plays the animation from its first frame through to the last and holds that image.

> *Hint: In addition to providing a way to preview the effect (by displaying it on the Preview monitor, for example), Rehearse offers a handy way to re-run animated alerts and similar overlays at will. Remember, too, that the Macros feature provides a great deal of useful functionality in connection with Buffers and their display.*

> *Hint: For short clips (i.e., less than ten seconds), you can simply Add a clip (using the file browser) or drag a clip from a DDR to a Buffer slot, and then click the (t) gadget on the thumbnail to transcode it - the result will be an 'autorun' type Animation Store effect. (The new effect file will be generated in the original source folder.)*

Still image *Buffers* have another very valuable ability, discussed next.

11.3.5 LIVE LINK

The *Live Link* feature brings the power of the internet directly into a video switcher. Web page elements can be pulled into any production without a third-party application.

HTML CEF WEB BUFFERS

The first 10 animation buffers support HTML/WEB Buffers supporting macros, alpha transparency for HTML5 and audio. To begin, click the Buffer's + (add) icon to add or replace a *Buffer* slot source.

This opens the *Media Browser*, click the *Web Browser* button to open an integrated browser. Enter the webpage (URL) to assign to the specified *Buffer* slot and click ok. It may take a few seconds for the thumbnail to update.
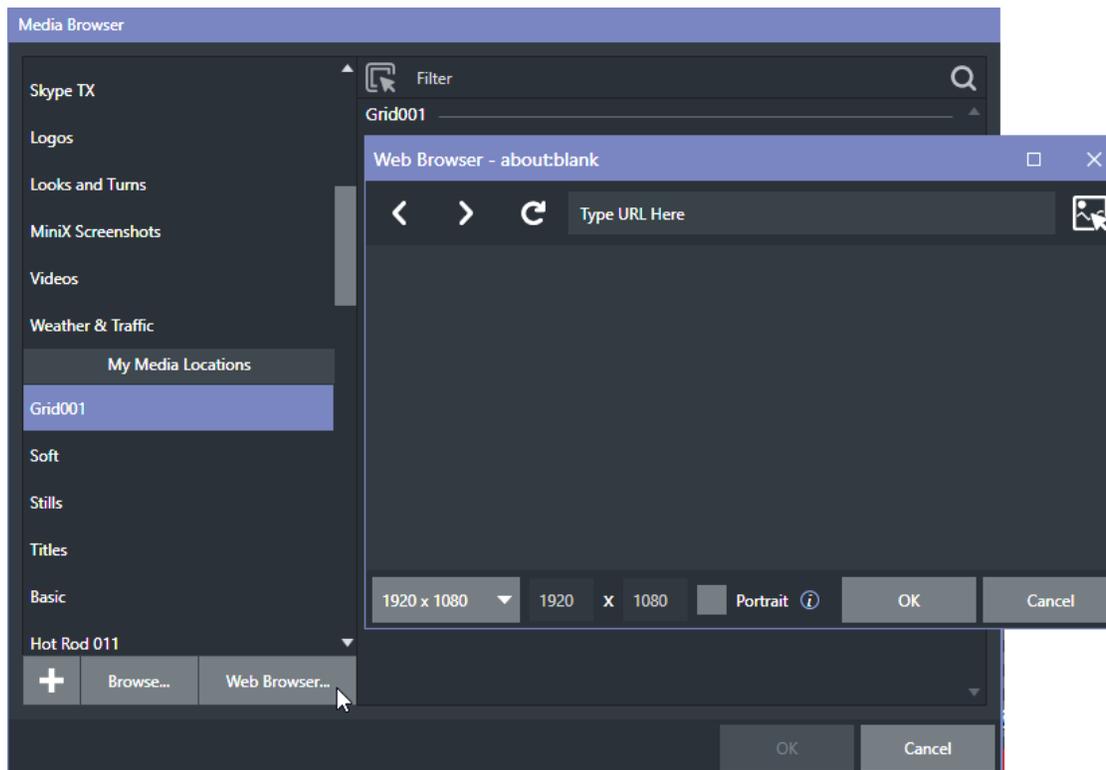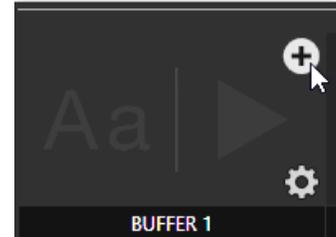
Note: You can simply type the name of the webpage, and the browser will automatically enter the protocol of the URL.

Another option to assign a web page to a *Buffer* is to create an 'internet shortcut' url file by dragging a link from a web browser onto a file folder, much like a shortcut a browser creates. Open the *Media Browser*, select *Browse...* and find your internet shortcut file, click open.

When the web page is displaying in your buffer, hover over the lower left of the buffer's thumbnail and the *Web Icon* will appear.

The *Web Browser* can be used to preview the web page. Clicking the web icon will open the *Web Browser* window allowing you to make changes to the web page. Interaction includes mouse movement/clicks, back/forward, scrolling and keyboard input. The URL being viewed can also be changed via the address field. Once changes are made, clicking OK will close the *Web Browser* window and apply the URL to the *Buffer*.
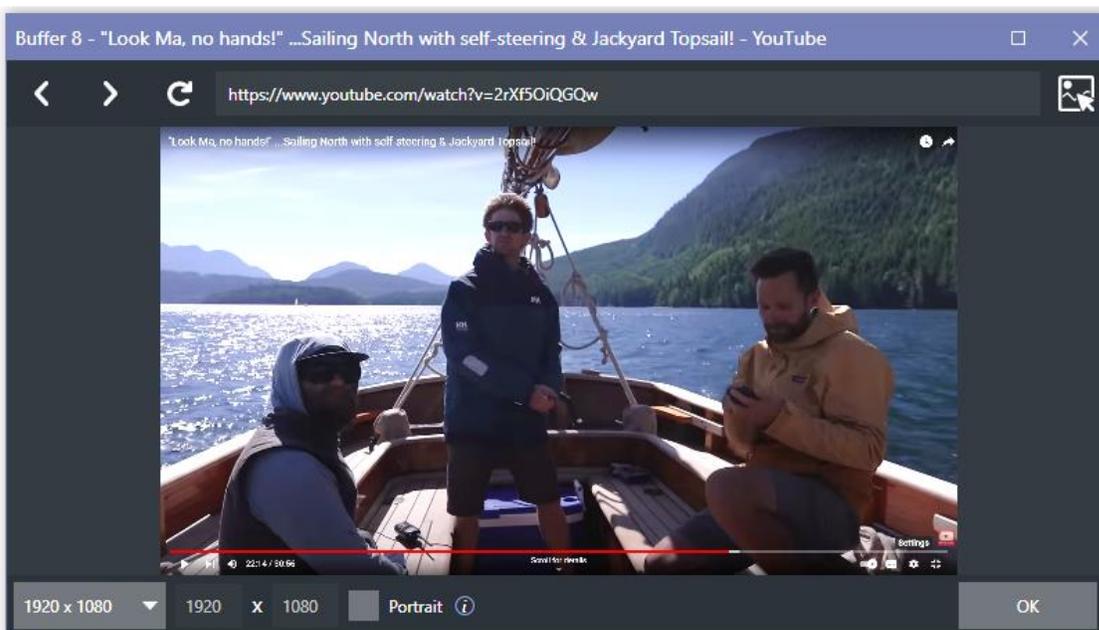
Once you have delegated the buffer to *Preview* or *Program,* you may want to adjust the appearance of the webpage.

Many configuration options are available, simply hover over the buffer thumbnail in the DSK channel and a gear will appear on the lower right of the buffer click to open the *Buffer Configuration* panel and click on the DSK tab.

The *Position* control group includes *Position*, *Zoom, Rotation*, and *Priority*. *Position* settings can be toggled on and off together using the switch provided in the group header.

The *Crop* controls are similar to those found in the *Input Tab*. For a deeper dive into all of the configuration options, see DSK Source Configuration in Section 9.7 Transitions and Effects.

> *Note: When scrolling in the Web Browser you may notice it doesn't move as smoothly as the output of the switcher, this is due to prioritizing the image on the switcher.*

PAGE SIZE OPTIONS

TriCaster offers a *Format Preset* menu that expands to offer several preset options including *Custom* and *Portrait* mode.
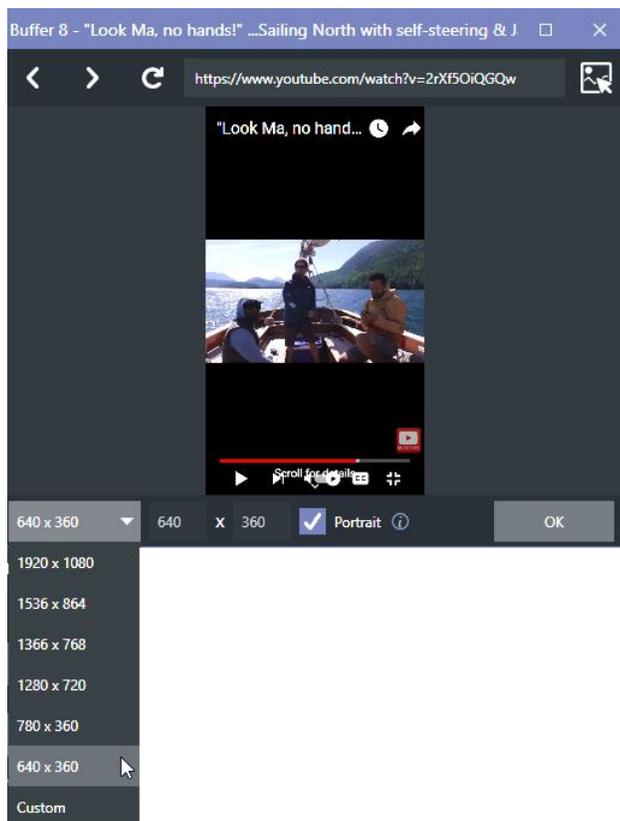
IMAGE SELECTOR
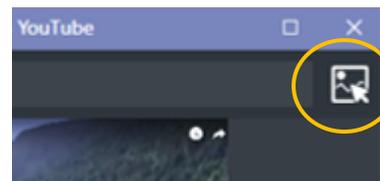
When working with still images, clicking to copy/paste from a URL is inactive. Once you have selected your image, click on the *Image Selector* and your image will appear in the buffer.

When a *Buffer* is assigned to a webpage a thumbnail is created, however it may not always be representative of the webpage. The *Update Icon* feature (found by right clicking on an HTML buffer thumbnail) will create a new 'persistent' thumbnail for the buffer. The thumbnail can be updated repeatedly using this feature.

Clearing a *Buffer* or changing it to another type of content will delete the persistent thumbnail file. If the *Update Icon* feature is not used, the existing post-page dynamic thumbnail will be displayed.
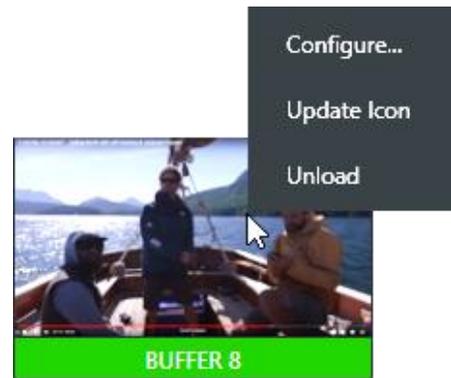
11.3.6 CG BUFFERS

Bring in professional live graphics into your production with an HTML outputting graphic renders-based platform from a CG website. By running the CG site on a separate system, simply copy the URL into an HTML buffer Web Browser URL. We are using Viz Flowics in this example, but you can find multiple CG websites online.

Changes made on the CG webpage (on a separate machine) will appear on the TriCaster in real time. Transparent files are easy to bring into the TriCaster as it sends over the alpha to the render-based platform.

VIZ FLOWICS IN TRICASTER VIZION

TriCaster Vizion supports Tricaster Graphics powered by Viz Flowics, which offers a plethora of customization options right from your browser. Its unique no-code Data Connectors allow for the integration of real-time data, enhancing the dynamism of your content. Changes made via the Viz Flowics web editor on another machine will update in real-time on your TriCaster, ensuring your visuals are always up-to-date. The platform's handling of transparent files, including alpha channels, is straightforward, making it easy to incorporate these into your TriCaster setup.

Note: Upon activating your TriCaster Vizion, you will receive an email from Viz Flowics with information regarding accessing your account. Viz Flowics is a cloud-provided service, an internet connection is required for access and use.

For those who would like to learn more about Viz Flowics or access a free trial, visit www.flowics.com

Viz Flowics is not just a platform; it's a no-code HTML5 cloud graphics solution that comes with native data connectors, social media integration, and second-screen mechanics. For those seeking advanced features, an upgraded version is available for purchase, promising even more control and creativity in your live graphics production. Learn more at www.flowics.com.
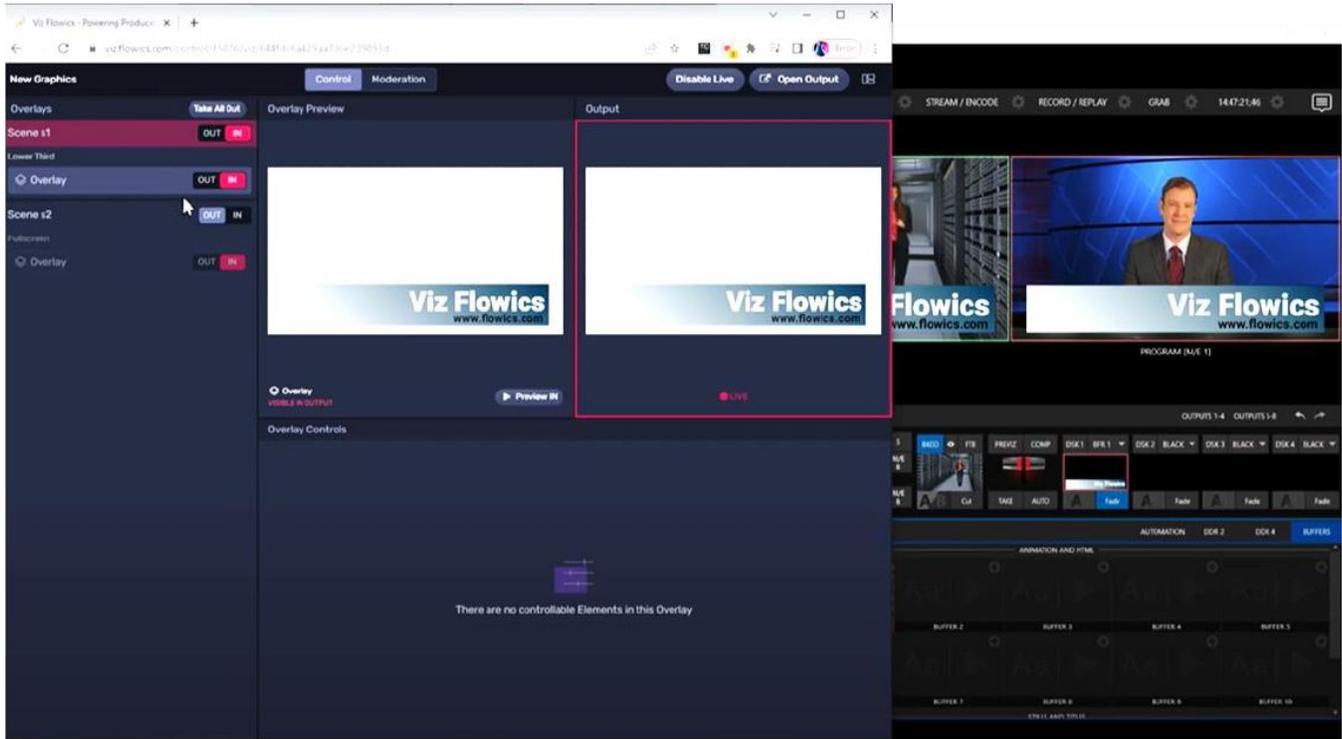
11.3.7 BUFFER WATCH FOLDERS

If you wish, you can share the *Frame Buffer* folder, which contains any *still images* used in *Buffers*, across a network. The *Share Media Folders and Buffers* is easily enabled even during a live production using the *File* menu at the left-hand end of the *Dashboard*.

The files which serve individual *still image* buffers are located in clearly named sub-folders of the *Frame Buffer* folder for each session. These folders are arranged as follows:

Sessiondrive:\Sessions*sessionname*\Frame Buffer\Buffer (#)

e.g., D:\Sessions\MySession\Frame Buffer\Buffer 3

The *Frame Buffer* folder for the current session is accessible on the network when sharing is enabled. This allows *still image* buffers to be updated across a network using suitable graphics applications (such as Photoshop).

> *Note: This special share name assignment is dynamic. Network sharing is activated, and the current Buffer path is automatically updated whenever you enter a session with the option enabled. This ensures that applications on networked systems can remotely access and update buffer graphics for the current production session.*

The *Frame Buffer* folder is a "watch folder". When you save an image for a given buffer, the buffer updates even if it is currently displayed, allowing you to refresh overlays instantly across the network.

- Still image *Buffers* are normally stored using the popular 32-bit PNG (Portable Network Graphics) format, but other formats are also supported.
- Specific filenames are not important in the buffer workflow. Multiple media files with different names can reside in buffer folders.
- The *Buffer* always shows the 'newest' file – that is, the one with the most recent modification date.

11.3.8 USING BUFFERS

Creative uses for buffers abound. You'll notice that the sample media content supplied with your system includes several different styles of animated buffers – some full screen, suitable for looping backgrounds or similar applications, and others that are suited to overlay, bug, or alert tasks.

Buffers of all sorts can be displayed in the following locations:

- Main Switcher
  - *Program/Preview*) rows – all 15 buffers are directly accessible in the *Switcher*
  - *DSK* channels – choose a specific *buffer* using the *DSK's* drop-down source menu.
- M/E 1-(number varies by model)
  - Select a *Buffer* on an *M/E* row just as you would for the main *Switcher*.
  - *KEY* channels – choose a *buffer* for any *KEY* channel using its drop-down source menu.

Buffers allow abundant use of animation throughout your productions – as virtual set elements, layered graphics overlays, etc., all without tying up precious *Media Players*. (Consider that in addition to the *Buffer* cross-points in the main *Switcher*, *M/Es* also support *Buffers)*. Given that M/Es are re-entrant (on supporting models), layering possibilities are nearly endless.

11.3.9 KEYING, PROC AMPS AND MORE

It's worth noting that you can apply *LiveMatte, Proc Amp* and *Edge* (cropping and feathering, when supported) settings to individual *Buffers* by opening its *Input Configuration* panel. Of course, you can also apply *Position* settings, including *Rotation* and *Scale,* in *DSK, M/E* and *KEY* channels.

11.3.10 EDITING TITLES

When a title page (.cgxml file) is loaded into a buffer, the *Edit Title* panel (see Section 11.2) can be opened by clicking the *Edit* gadget (A_A) that appears at lower-left when you move the mouse over the icon. Changes made in the *Edit* Title pane take effect immediately.
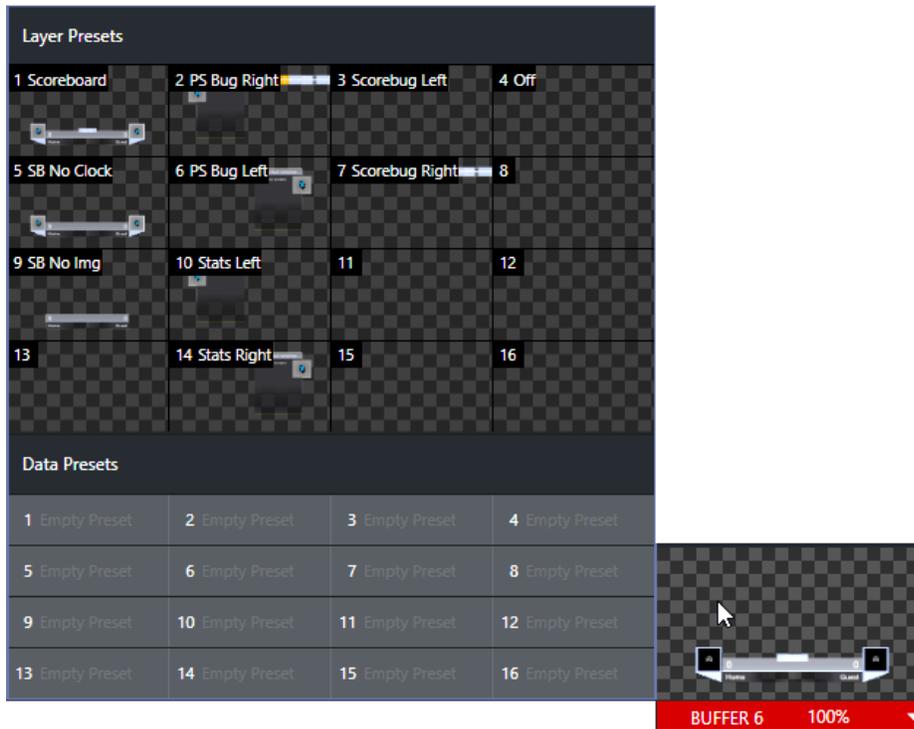
When a standard title page is loaded into a *Buffer*, clicking its thumbnail icon reveals a list of *Data Preset* slots. Each preset stores the text data and (replaceable) image content link for the title page. A single click recalls a complete data set and immediately updates the page.

This is incredibly useful, of course, because you can (for example) store the names, player numbers, images, and the like for the members of a sports team and recall these immediately with a click (or by executing a macro). And because the text values can include DataLink key names, it's even possible for statistics on a title page for a given player to be updated in real-time from external sources or text, xml, or CSV files in a watch folder.

Hint: If the Buffer contains a LiveGraphics effect (varies by model), a set of thumbnail icons depicting Layer Presets is also shown. Selecting a preset allows you to dynamically change from the current animated state to another. More information about LiveGraphics usage is provided in Chapter 12 LiveGraphics.

LiveGraphics® represents a revolutionary approach to title and CG page creation, combining the power of the most complete production systems on the planet and the world's leading creative platform—Adobe Creative Cloud®. LiveGraphics is a feature most likely to dramatically elevate your productions in ways that grab the attention of your viewers (varies by model).

LiveGraphics comprises several key elements: It includes an extensive set of professionally prepared animated title templates and the interface to control and update these in your live production system, but this is just the beginning.

Imagine designing animated titles, motion graphics, and looping effects using popular Adobe Creative Cloud tools—then importing them directly into your TriCaster, which will then allow you to both animate and update them dynamically.

With the LiveGraphics Creator plugin to simplify authoring in After Effects CC for users of all experience levels, enhanced real-time system functionality allowing powerful customization, playback, and even automation options, LiveGraphics lets you produce and present spectacular live graphics faster and easier than ever before.
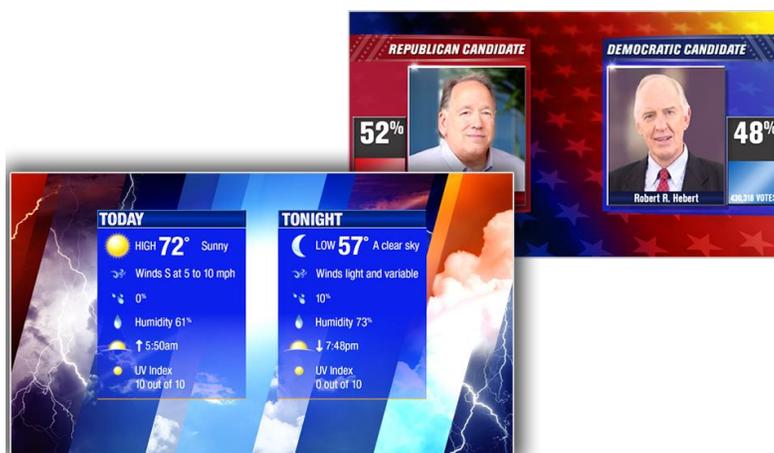
Note: Please download and install the After Effects plugin "LiveGFX Creator Plugin Installer" located on the Vizrt Download page.

Create individual graphics or an entire package in Adobe Photoshop CC, then bring the PSD files directly into your TriCaster live production system.

LiveGraphics recognizes the layers automatically, allowing you to manage elements independently and store up 16 macro-ready variations per system buffer.

Animate graphics faster and easier than ever before with the included LiveGraphics Creator plugin for Adobe After Effects CC.
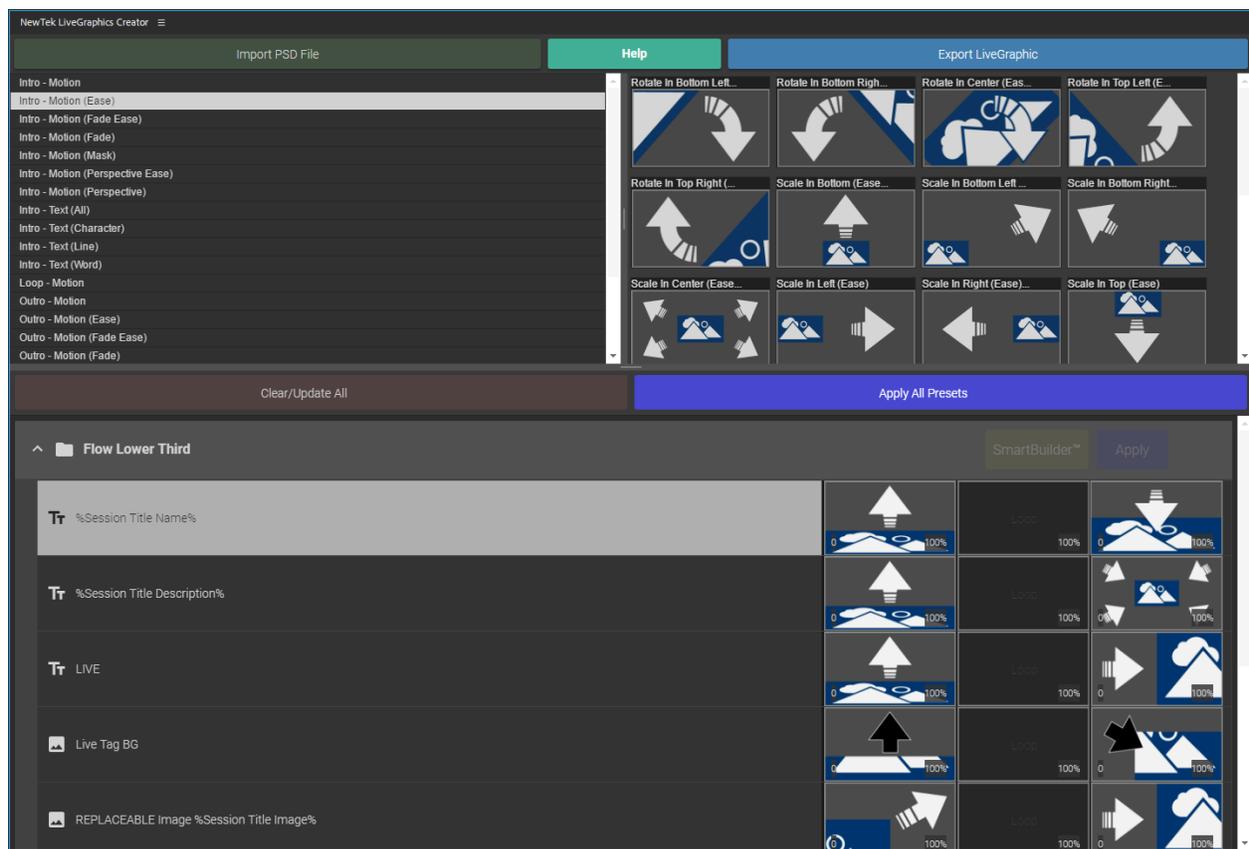
With LiveGraphics Creator, AE novices can simply import a layered Photoshop PSD file, drag and drop presets to apply motion to its different layers, then export the result ready for live use.

Or use the included SmartBuilder to have LiveGraphics analyze your content and add animations for you with a single click! Of course, more advanced users can refine their creations using standard methods right in After Effects.

Hint: The use of LiveGraphics Creator is documented in its own manual, installed with the plugin.
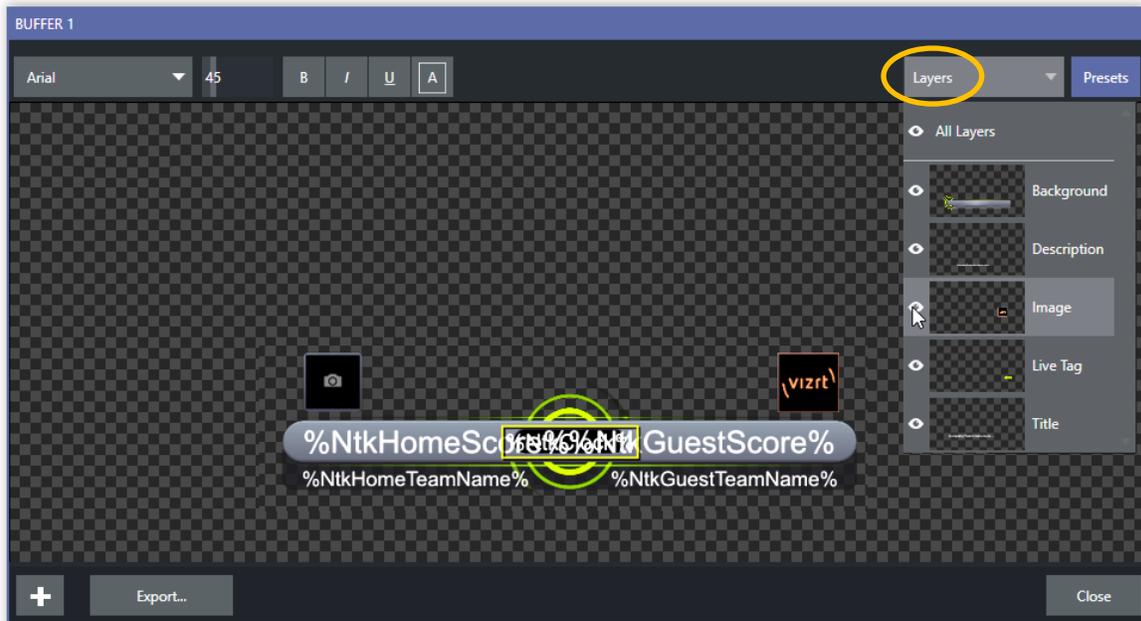
You can also simply load any of the 100+ production ready LiveGraphics templates supplied into your system's Buffer slots and get started right away. The Title Editor lets you change text and images on the title pages and hide or show layers using the Layers menu. Layers animate into place as you do so. Then, store the results as presets – display the *Layer* preset bin by clicking the *Preset* button at upper left.

To preserve the *Layer* and *Data* presets you generate for your LiveGraphics pages outside of the current live session, you can use the *Export* button at left in the *Title Editor*'s footer. Afterward, load your creation into a *Buffer* slot, and use its preset bin to animate from one state to another at will – see Section 11.3.11, Buffer Presets for more detail.

SECTION 12.4 LIVEGRAPHICS AND DATALINK

Naturally, LiveGraphics supports DataLink system for dynamically updating title page details even during live display (information about DataLink appears in several places in this manual, but you might start your exploration at Section 11.2.3).

DataLink technology lets you use external hardware scoreboards, spreadsheets, and other remote data sources to populate and update your graphics automatically.

LiveGraphics templates even support text and images direct from the Web when combined with the DataLink Web Browser extension.

In addition, the next feature we will discuss (LivePanel) provides several powerful ways to update *DataLink* key value (such as its integrated *Scoreboard* control pages for various sports). And thanks to the included *Builder* web app, you can even build custom control pages capable of driving your motion graphics from any device on your network with a web browser.

Chapter 13   LIVEPANEL

On supporting models, LivePanel makes it easier for more people to control the live production process. Providing the ability to create a custom user interface that delivers exactly the tools and functions you need, LivePanel is easily accessible through Web browsers on network-connected hosts for most common operating systems.

Among other features, LivePanel lets you create custom control panels for your TriCaster system accessible in web browser of a device on your network. LivePanel also provides several production-ready tools for remote video mixing, media playback, and audio mixing.

See the *Automation, Integration & Control Guide* which includes a Chapter on all Vizrt Control Panels located in *LivePanel > Resources* under *Documentation*.

SECTION 13.1 NETWORK ACCESS TO LIVEPANEL

To access LivePanel, click the *Notification icon* (see Section 7.6) at upper-right on TriCaster's *Live Desktop* and open the *Notification Panel*. Note the URL shown beside the *Web Browser* button, enter this into the address bar of a web browser on another device on the same network.
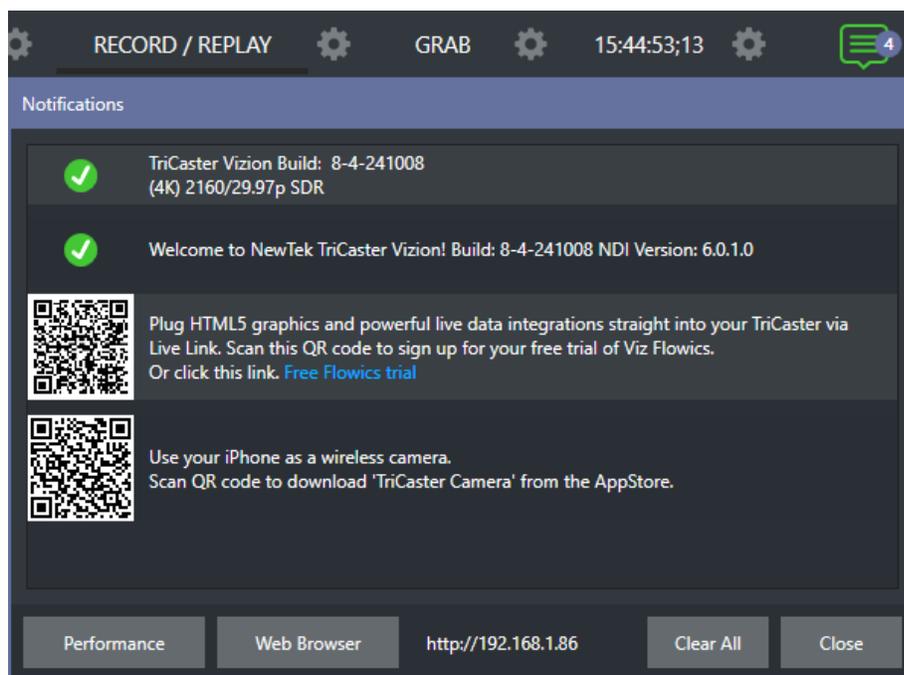
Note: You may be asked for a username and password to access LivePanel – see Section 4.1.

SECTION 13.2 HOME PAGE

After entering security credentials (if necessary), Live Panel's *Home* page is displayed in your web browser.

All the existing LivePanel tools can be accessed from the *Home* page, either by using the 'hamburger' menu at left in the titlebar, or by clicking the large icons on the page.
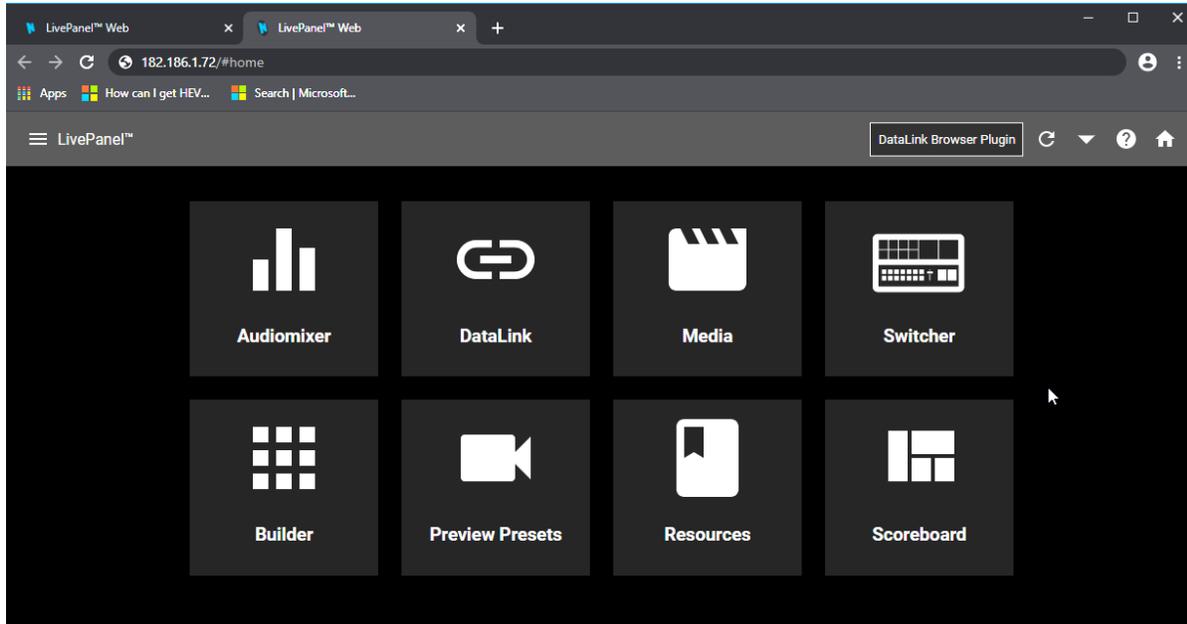
SECTION 13.3 AUDIO MIXER

Monitor and manipulate live sound with LivePanel's *Audio Mixer* applet, including level controls, configuration settings and presets. In many cases the controls mimic similar items in the main interface for your system.
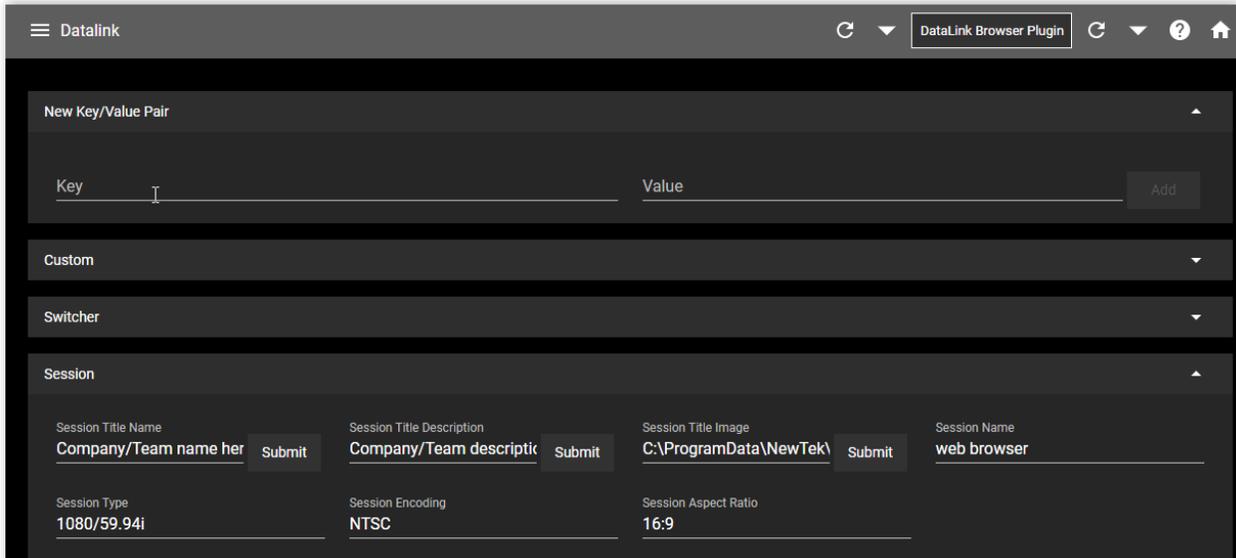
The *DataLink* page lets you selectively review the values for all current DataLink keys, edit these, and even generate entirely new key-value pairs.
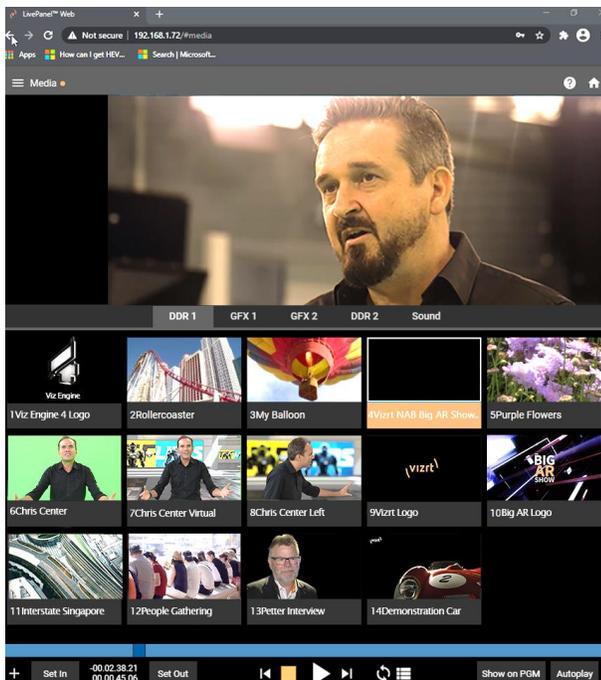
Likewise, LivePanel's *Media* page provides you with remote access to the system's *Media Players*, allowing you to play, trim, add and remove media files in the playlist.

Toggle the Media Player's *Autoplay* and *List/Single* playback modes, and trigger the *Show On* feature to push *Media Player* output to display on *Program* output or in a designated *M/E.*

You can even upload images from a local host device (such as a tablet or smart phone) to the playlist on your TriCaster system.

The LivePanel Switch applet is designed to make it easy to switch less demanding productions without a complex interface. Simply tap a viewport for a video input to *Take* it to Program output or swipe it horizontally to do so with a transition.

Select transition effects for the *Switcher*, an *M/E*, *DSK*, or *KEY* layer, and – most powerful of all – select a *Comp* to change your composition entirely with a single tap.
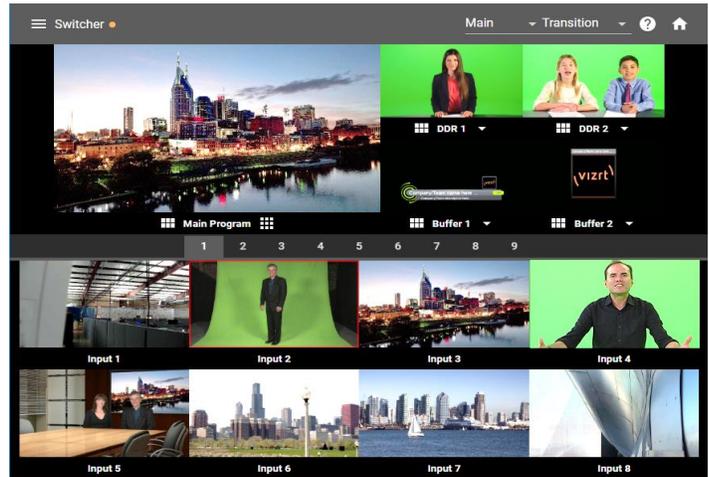
13.6.1 BUILDER

Unquestionably the icing on the LivePanel cake, the *Builder Applet* allows you to easily create custom control panels to meet a virtually limitless number of needs.
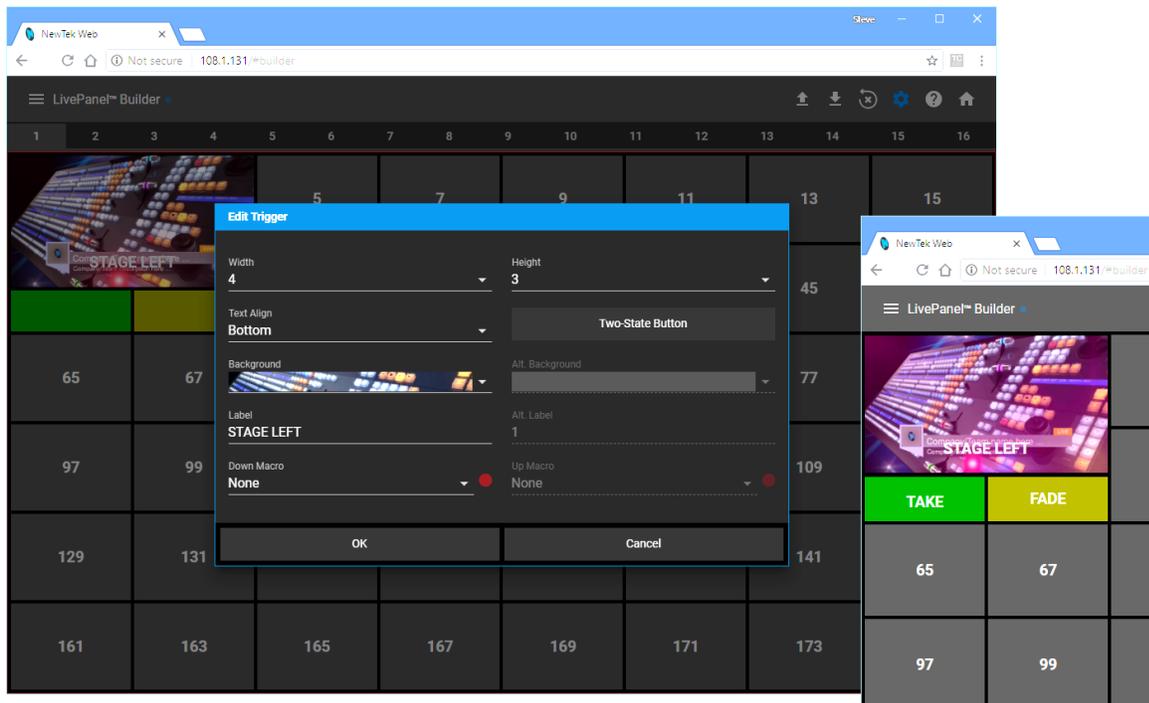
Flexibly assign a macro to a button, or perhaps two – one to operate when the button is pressed, and another to be applied when you click it a second time. Give the button a color or fill it with a still image of your choice.

The Builder applet lets you gang buttons together to give them more prominence, and you can even assign moving video from an external *Switcher* input, *Media Player*, or output to a button (effectively turning it into a monitor) and creating your own custom *Switcher* interface.

Hint: Each TriCaster hosts its own LivePanel instance, so Builder pages can be exported for use on additional systems.

SECTION 13.7 SCOREBOARD

As discussed elsewhere, DataLink can be directly connected to several popular scoreboard systems.

With the *Scoreboard* applet included in LivePanel, however, you can be your own scorekeeper using the web browser in virtually any laptop or tablet.
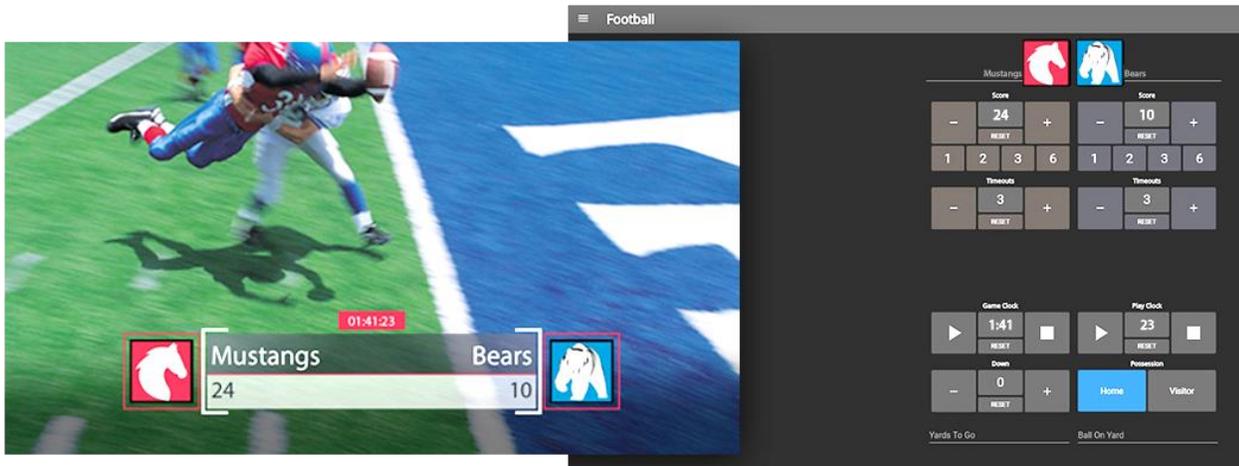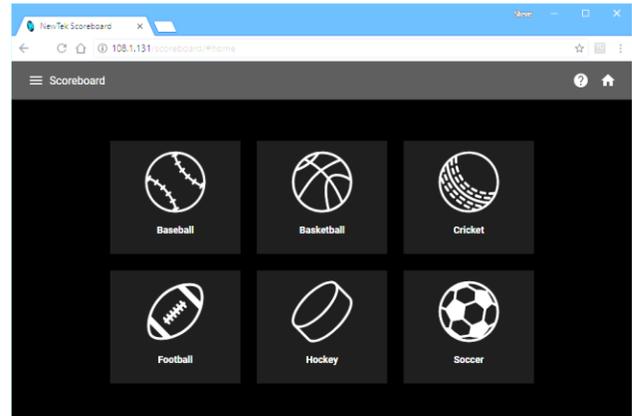
Better yet, the *LivePanel* includes full motion *LiveGraphics* scoreboard title pages already configured to work with the *Scoreboard* applet.

Having chosen the *Scoreboard* for your sport, and a matching scoreboard title page, the applet lets you set the team names, supply individual team logos, and track The *Channel* menu controls just one of two related channel settings – this one (on the local host), and another channel used by the control surface itself. These combine to let you connect to and control alternate live production systems.

Hint: You can open the Switcher applet or a custom Builder page in another browser tab (or on another device) to display and removed the various elements of your animated LiveGraphics scoreboard, too

Chapter 14   PTZ CONTROL

Once primarily used in security applications, robotic or 'PTZ' (pan, tilt, zoom) cameras are appearing on the video production scene in ever-increasing numbers. TriCaster's PTZ implementation makes it easy to operate multiple (supported) cameras from the Live Desktop or a hardware control surface.

Any external *Switcher* input can be configured as a PTZ cam, controlled directly from the *Live Desktop,* or using a Viz control surface. In addition to pan, tilt, and zoom control, you can adjust *White Balance* settings, *Focus*, *Iris* (or 'brightness'), and *Animation Speed* ('travel speed') settings for your PTZ cameras. A convenient visual *PTZ preset* system is included, too, allowing you to 'lock in' shots and access them quickly.

SECTION 14.1 INPUT CONFIGURATION, PTZ TAB

Connection and configuration settings for PTZ cameras are in the *Input Configuration* panel, specifically its first tab, labeled simply *Input* as shown below.

14.1.1 CONNECTING

A few steps are required before you can control a PTZ camera.

1. First, connect the camera's output to a *Switcher* input – see Section 8.1.

2. Next you must configure the control connection to the camera by selecting its type.

   o Since the default *Connection* type in this group is *NDI*, you can skip this step for an NDI camera, which eliminates all the settings you would otherwise need to configure.

   o For non-*NDI* sources, use the *Connection* menu to choose the correct PTZ protocol for your device, and enter other data as required for that protocol.

Having performed these steps, you are ready to expand and use the *PTZ Presets* control group in the next tab, labeled *PTZ*.
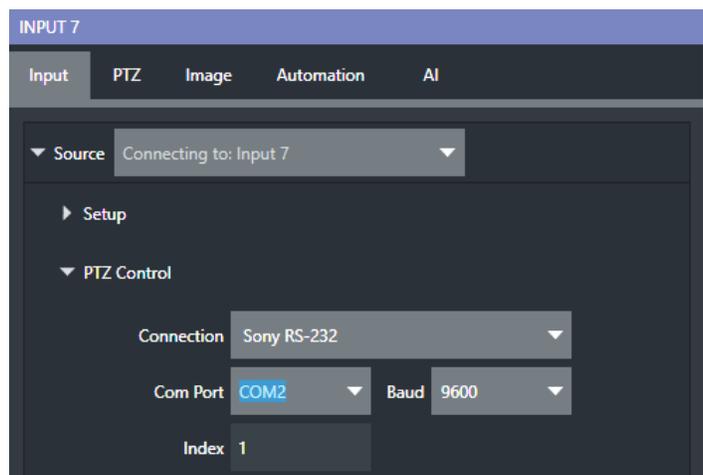
14.1.2 PTZ OPERATIONS

In the *PTZ* or *Pan and Scan* tab, a set of manual *Pan/Tilt, Zoom, Focus* and *Iris* controls sits just beneath a large *Presets* bin. Drag the mouse on these controls to make manual adjustments.

Speed controls, including *SLOW*, *MEDIUM,* and *FAST* presets along with a numeric speed control allow you to modify the speed with which presets are applied.
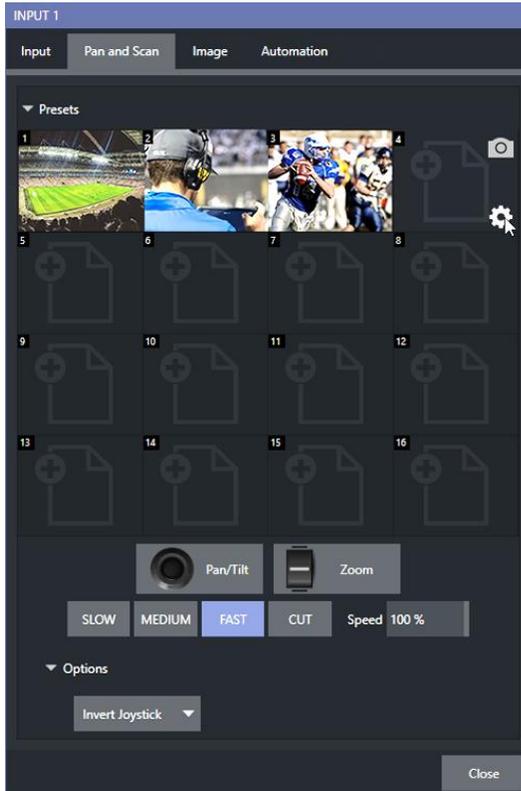
OPTIONS
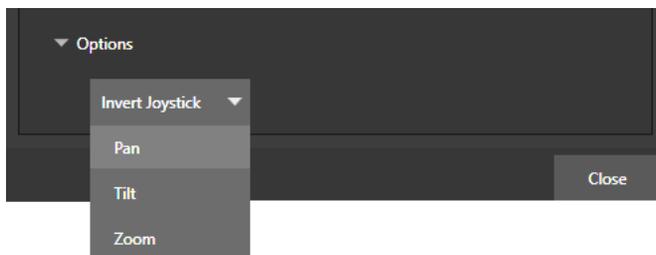
Expand the *Options* control below the PTZ speed group to access an Invert menu that lets you reverse the effect of joystick operations.

Note: Invert settings affect the related controls both in the Live Desktop and on hardware control panels.

14.1.3 PRESETS

The *Preset Bin* shows sixteen thumbnail icons for the current *PTZ camera*. Click a preset to select it, and the camera automatically begins moving to the new position.
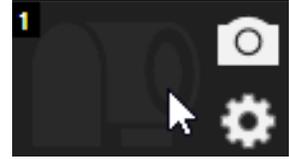
To configure and store a preset:

1. Use the *Position, Zoom* and *Focus* controls mentioned in the previous section 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 at upper-right corner of the icon.

Hint: Hold Shift when clicking the Snapshot icon to update the representative thumbnail image without modifying the preset already stored in that slot.

3. (Optional) Click the *Configuration gadget* (gear) to open a properties dialog that lets you assign a different *Alias* and *Comment* to each preset. (These entries also provide values for *DataLink* keys that can be used in the usual ways.)

Hint: See also Section 10.5.1, Viewport Presets, to learn how to display and use presets in your multiviews.

14.1.4 PTZ AND THE CONTROL PANEL

Pan, tilt, zoom control, and preset selection for connected robotic cameras are also directly supported on some Vizrt hardware control panels.

For a deep dive into Vizrt Control Panels, see the *Automation, Integration & Control Guide* which includes a Chapter on all Vizrt Control Panels located in *LivePanel > Resources* under *Documentation*.

Chapter 15 LIVEMATTE

Although its controls are deceptively simple, the LiveMatte feature employs powerful chromakeying technology capable of extremely high-quality results. Used alone or in conjunction with DSKs, M/E Overlays and LiveSet features, you will find LiveMatte can play a 'key' role in your live productions.

As we mentioned earlier, chromakeying – or simply "keying" – is used to combine images by eliminating a portion of a foreground image (effectively cutting a digital 'keyhole' in it) to reveal another background. This method is also used to insert talent seamlessly into virtual sets via *LiveSet*.

LiveMatte controls are in an expandable group in the *Image* tab of the *Input Configuration* panel for each *Switcher* source. To access them, click the *Configure* button (gear) that appears above an onscreen monitor in the *All Monitors* tab.
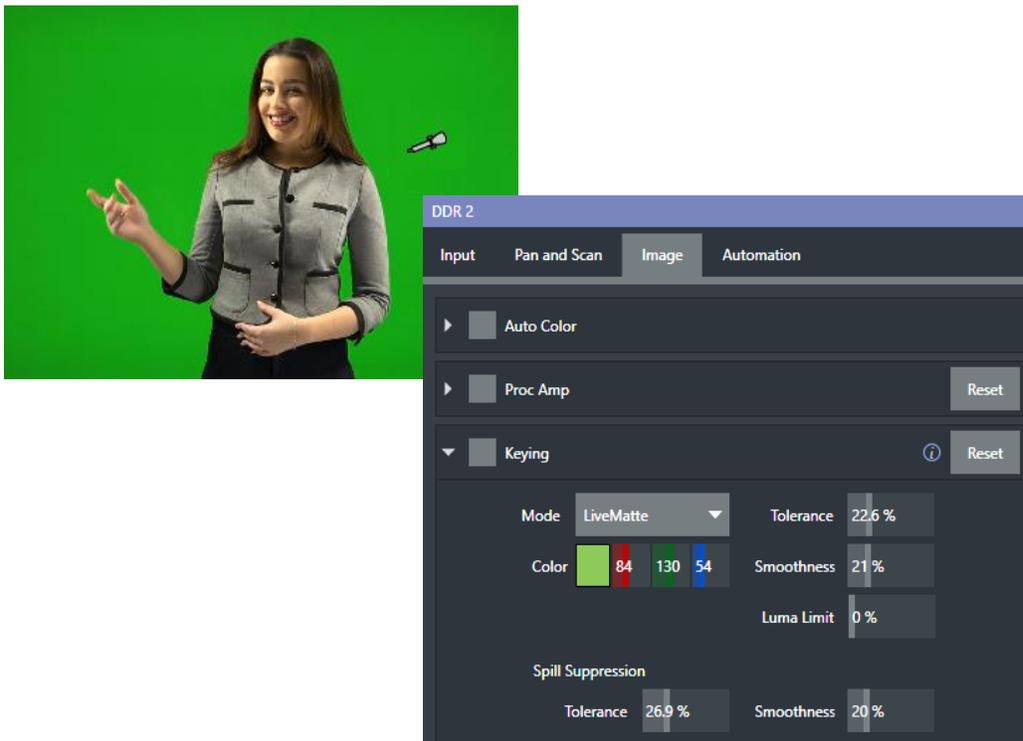
The method by which part of the image is defined as transparent is generically referred to as chromakeying, for its dependence on the color values (chrominance) of the video stream. (LiveMatte's mature algorithms far exceed typical chromakeying techniques to provide real-time results, but for our discussion it's not necessary to get into all the details; suffice to say it works very well and is easy to configure.)

Hint: Crop controls in the Input Settings tab can serve as a 'garbage matte' tool for chromakey sources.

Chromakeying has become an essential tool in video and film production. Typically, foreground footage is shot in front of a blue or green screen, and then that background color – the *key* color – is treated as transparent, allowing another image to be inserted.

For example, when you see a tv meteorologist in front of a weather map, that person is almost certainly posed in front of a green screen. The background is 'keyed out', to be replaced by computer generated imagery.

Of course, if you choose poor settings, foreground areas may inadvertently be cut away as well. Or some areas that should be transparent may be only partially keyed. Good keying often requires judicious balance between 'too much' and 'too little'. Let's consider the tools provided to help you achieve a great result.

SECTION 15.2 MATTE

The term *Matte* refers to a black and white representation defining the transparent (background) and opaque (foreground) parts of an image during compositing.

Portions of the matte that are grey are treated as semi-transparent, which is very useful in progressively smoothing edges between foreground source material and inserted background imagery.

LiveMatte supplies a digital version of this traditional tool. As you would expect, controls in this group allow you to define and adjust the matte for the corresponding video input.

15.2.1 LIVEMATTE MODES

The *Mode* menu in the Keying control group lists several optional keying methods. Each has its advantages, and their controls differ as we will discuss next.
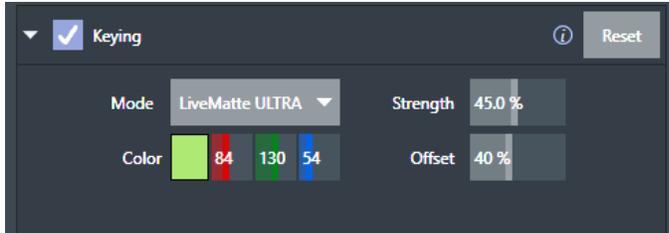
15.2.2 COLOR

All LiveMatte modes provide this control. Basically, you can think of *LiveMatte* as removing a specific color from the foreground image. The base color removed is chosen using the *Color* button. Click on the *Color* sample box and keep the mouse button depressed. Then drag the *eyedropper* tool (mouse pointer) over one video monitor to choose the color you wish to *remove* and release it. The neighboring 'color well' is updated to show the color selected.

15.2.3 TOLERANCE

No physical greenscreen is *perfectly* comprised of one color. Wrinkles, folds, and shadows along with the seemingly inevitable uneven lighting result in difference. For this reason, when you choose the classic *LiveMatte* mode, a numeric slider labeled *Tolerance* is provided.

The *Tolerance* setting allows you to broaden the range considered as the key color, including more 'near-neighbor' colors to be included in the matte. A low tolerance removes only color values close to the primary or key color. As you raise the tolerance, you extend the range of values on either side of the primary color that will be treated as transparent. This allows you to deal with those imperfections we mentioned. On the other hand, it may be that there is (usually unplanned for) detail in the foreground that is somewhat similar to the key color. Reducing *Tolerance* may allow you to prevent unwanted holes appearing when the subject opts to wear his St. Patrick's Day tie.

15.2.4 SMOOTHNESS

In the classic LiveMatte mode, *Smoothness* defines a further tolerance factor (LiveMatte ULTRA handles this automatically on supporting models). We want our keyed foreground to blend smoothly into the background – rather than to stand out in hard relief like a postage stamp or decal. *Smoothness* serves this purpose, by defining a falloff zone of partial transparency. Don't overdo it though, as aggressive settings can cause the foreground to become unnecessarily 'muddy'.

15.2.5 LUMA LIMIT

When working with poorly lit backgrounds (or poor-quality footage), the color *Tolerance* range separating the foreground (talent) from the background can be extremely narrow. This problem can be aggravated by the subject's choice of clothing, or when there are harsh shadows. There is often a strong chroma component (and associated chroma noise) in dark foreground areas. The 'noise' may be partially or completely transparent when tolerances are critical. Because the noise varies over time, 'holes' in the foreground can result, and even worse these may flicker on and off from one frame to another.

Classic LiveMatte's *Luma Limit* control makes it possible to overcome this issue. In essence, it restricts the chromakey operation based on luminance (brightness) values. Dark foreground areas which typically cause the problems just described normally have quite different luminance values from the background color, which is usually brightly illuminated.

In simplest terms, problem areas of this type can be decisively 'pulled' back into the foreground by pre-filtering the chromakey effect around a luminance threshold.

Generally, try to set up the best key you can *before* raising the *Luma Limit* from its default value of zero (no effect). Then gradually raise the limit until you are pleased with the result.

15.2.6 STRENGTH

LiveMatte ULTRA (support varies by model) uses a different method to define its matte, basically discriminating between background and foreground regions. Raising the *Strength* value can loosely be thought of as more aggressively defining imagery as background. As with 'tolerance' in the classic LiveMatte, the lowest effective value is what you're after with this setting.

15.2.7 OFFSET

The *Offset* setting is unique to LiveMatte Ultra (support varies by model) and can be thought of as boosting the opacity level of partially transparent areas in your scene. Raise this value judiciously to solve problems with transparency in 'borderline' foreground regions.

SECTION 15.3 SPILL SUPPRESSION

The term 'Spill' refers to key color unintentionally reflected or 'spilled' onto the foreground subject. For example, a little green spill often appears on the shoulders of someone in a greenscreen shot.

The *Spill Suppression* controls let you remove key color spill in your scene by reducing the amount of that color in the foreground, where it doesn't belong. The net result is that the impression of spill color is eliminated or at least reduced to the point where it is not objectionable.

Use the *Tolerance* and *Smoothness* controls (or, for LiveMatte Ultra, the *Strength* setting) in the *Spill Suppression* group in similar fashion to the controls by the same name discussed earlier.

Endeavor to subdue spill without *overdoing* it, which can sometimes produce an unwanted gray fringe around foreground edges.

<div align="center">SECTION 15.4 COMPOSITING</div>

When you enable (and configure) *LiveMatte* for an input, the onscreen monitor for that input shows the source keyed over a checkerboard pattern (when the Checkerboard option is selected in *Overlays* for the monitor.)

If you select the (*LiveMatte*-enabled) input as *Input A* in an *M/E* tab in *LiveMatte mode*, the keyed source is overlaid on sources in lower input rows. You will see the composite result when the output is assigned to either the *PGM* or *Preview* row.

<div align="center">SECTION 15.5 FINE TUNING</div>

You'll find *LiveMatte* easy to configure with a little experimentation – but a few handy workflow tips follow below. You may find it useful initially to turn *Smoothness* off or nearly so. Likewise begin with a low value for *Tolerance* – perhaps just 5-10, or so. Put the video source on *Preview* or *Program Output* before you do so, to provide a larger view to help you assess your settings.

Pick your primary *Color*, but – before releasing the mouse button – slide the eyedropper around to different parts the background. Watch the monitor as you do so to see how the area of transparency is affected by different Color choices. Release the mouse when you find the color that produces maximum results.

It's often preferable to pick an 'average' color from a location close to the boundary between the background and foreground regions. Now you can start to ramp up *Tolerance*. Bring it up slowly until most of the background color has been eliminated, cutting away most of the background to within a few pixels of the foreground/background boundary. Now raise *Smoothness* to fine tune that edge region, and you're nearly done.

Before considering your settings final, make sure to test the result using a moving source. This will sometimes reveal that overly aggressive settings cause small 'blocks' of pixels in the edge region to appear to snap on and off during motion - as they either qualify or disqualify for inclusion in the resulting matte. (A little reduction in *Tolerance* and increase in *Smoothness* will usually resolve this problem.)

Hint: It can be useful to zoom in using Position controls when fine tuning LiveMatte.

<div align="center">SECTION 15.6 LIGHTING FOR LIVEMATTE</div>

We'd like to offer a few suggestions here to guide you in preparing your set. The single most important aspect of 'pulling a clean key' is lighting. The lighting should be even and diffused. Bright 'hotspots' and shadows create different shades on the wall, and overexposed areas lack sufficient color for clean keying. (It is not how *much* light you have on the key wall, but how

evenly lit that wall is.) Naturally, you want to keep your green (or blue) screen clean and free of wrinkles, ripples, folds, tears, or other blemishes, as well.

The distance from your talent to the wall behind them can make a big difference. When the subject stands too close to the key-colored background, the key color reflects onto the subject, creating a green or blue fringe that is difficult to remove. If you have available space, move your subject farther away from the wall.

When good distance is out of the question, you can improve things somewhat by placing lights above and behind the talent, lighting them from behind with a complimentary color filter over the light to 'cancel out' unwanted reflection (for green use a magenta filter; for blue, orange, or amber. Don't overdo back (or top) lighting, however. The limited dynamic range of the camera means there will be little useful color data in badly over-exposed highlights. This can make it next to impossible to separate fringe zones (such as hair detail) from the background (especially when this is also overexposed).

SECTION 15.7 CROP SOURCE

We discussed this feature earlier but wanted to bring it up again in our discussion of *LiveMatte.* It is common for unwanted items to remain after chromakeying. Common examples include microphones or lighting fixtures dangling from above, or perhaps a harsh crease, blemish, or tear in the background screen. *Crop Source*, located in the *Image* tab just below *LiveMatte*, can serve as a 'garbage matte' to remove this sort of intrusion.

Chapter 16   MIX/EFFECT (M/E) TOOLS

Mix/Effect (M/E) banks provide truly awesome production power and convenience. Pre-configure multi-layered compositions and switch them as easily as you would to any single input or use an M/E to control a special purpose sub-mix. This is also where real-time virtual set technology, called LiveSet, is located.

We introduced *M/Es* (Mix/Effect banks) earlier, but it's time for us to look at these extremely powerful tools in greater depth.

SECTION 16.1 OVERVIEW

The *Mix Effects*, labeled *M/E 1, 2,* and so on, sit just above the main *Switcher* on the *Live Desktop*. Click an *M/*E tab (label) to expand or collapse the corresponding *M/E.* When expanded, *M/Es* occupy the area of the *Live Desktop* between the monitors and the main *Switcher*.
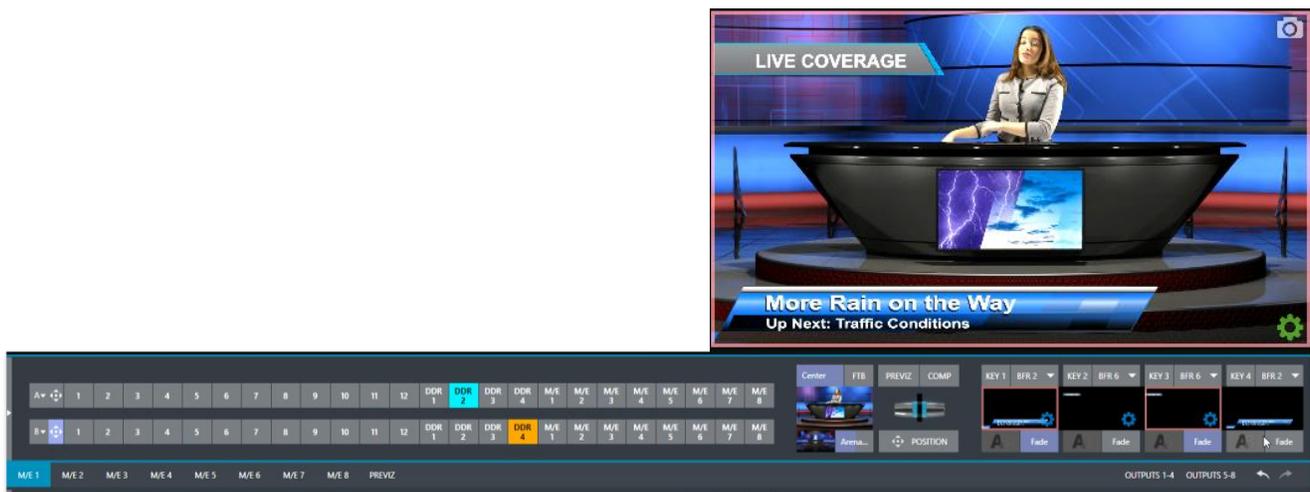
*M/E*s are presented individually in tabbed panes, each corresponding to a button in the main *Switcher*. Up to four M/Es (varies by model) are available to fulfill your diverse requirements.

As you would expect, selecting an *M/E* button on the (main *Switcher*) *Program* row displays the output from the corresponding *M/E* on *Program Output*. Likewise, punching an *M/E button* on the *Preview* row cues up that *M/E* bank's output for an upcoming *Take* or *Auto* operation. This makes it easy to *Take* or *Auto* directly to, from, or even between *M/Es* with a single click.

In some TriCaster models *M/Es* are re-entrant, meaning *M/E* buttons also appear on source selection rows and *KEY* channel source menus inside the *M/E* panels themselves. This is an exceptionally powerful feature, and one offering endless creative possibilities.

Note: Self-referential reentrancy (i.e., re-assigning a given M/E as one of its own sources) is not supported. However, you can often mimic effects of this sort by using multiple channels in another M/E .

At first glance, an *M/E* panel in its default operating mode ('mix', or transition) is scarcely distinguishable from the main *Switcher*. However, each *M/E* offers two *different* operating modes:

1. *Mix* (the default mode): A secondary switcher layout, with controls and options that are very similar to the main *Switcher*.
2. *Effect* mode: The *M/E* is configured for effects, including virtual set operations.

The *M/E* mode applied is automatically established based on the type of effect you load as its *Background* effect.

Effect selection is done in the usual way using the *Media Browser*.

Click the + sign gadget that appears at upper right when the mouse is over the thumbnail icon for the *Background* effect.

For the most part, you will initially see very little difference in the *M/E* panel when you change modes.

- In either mode, source button rows labeled *A* and *B* are arranged at left. The number of layers shown varies according to the effect selection you make, from two effect layers to four.
- On the right there are two *KEY* control groups. In most respects these are identical in appearance and practice to the *DSK* controls located in the main *Switcher*.
- Even the central control group mimics the main *Switcher*, with its *Transition* controls and options, *T-bar* and so on.
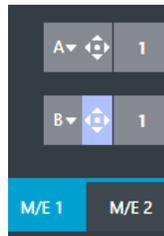
Autoplay and the M/E

One notable difference from an *M/E* in *Mix* mode and the main *Switcher* involves the *Autoplay* feature (see Section 11.1.8).

To avoid undesirable consequences for *Media Player* content aired on the all-important main *Program* output, *M/E's* in *Mix* mode trigger *Autoplay* operations within the same *M/E* only.

As well, a switch in the Dashboard *Options menu* toggles *AutoPlay*'s triggering of 'A*uto* out' transitions.

16.2.1 MIX MODE

Really, an *M/E* in *Mix* mode *is* a switcher:

- Input rows labeled *A* and *B* behave just like the main Switcher's *Program* and *Preview* rows
- *Transition* controls work in the usual manner
- *KEY* channels stand-in for *DSK*s and behave similarly
- *M/E* output can be routed to primary outputs and *Record* module

16.2.2 EFFECT MODE

Even casual scrutiny reveals some (outwardly) subtle differences in the *M/E* control configuration when a *LiveSet* is loaded as the *Background* effect selection as follows:

- The *Take/Auto* buttons located beneath the *T-bar* and *Transition icon* are replaced by a *Position* button.
- Two input rows (*A & B*) may be shown in *Effect* mode.
- *Positioner* controls appear for these input layers.

Let's consider the reasons behind these changes in the interface. An *M/E* in *Effect* mode allows preparation of a composite of two or more video sources, whether for direct output, or as a source for the main *Switcher*, or as an input for other downstream channels (including other *M/E*s).

Even in *Mix* mode, an *M/E* provides access to effects – including *Position* and transition effects (including *Animation Stores*) and animating *KEY* layers via the *Comps* feature. In *Effect* mode, however, an *M/E* asserts its real-time compositing and effects prowess more aggressively.

SECTION 16.3 THE T-BAR

In a mix effect, the *T-Bar* and associated controls match the main *Switcher*. It's different in an *M/E* displaying a *LiveSet* effect, however. In this mode, dragging *the T-bar* vertically adjusts the virtual 'camera distance' for the active *LiveSet* between 0% and 100%.

The *Duration* control works like similar numeric fields elsewhere in the *Live Desktop*: drag to adjust the value, click to type directly into the field using the keyboard, or press (keyboard) Shift and double-click to restore the default value. The drop-down *Duration* menu offers several convenient presets as well as a *Cut* option.

SECTION 16.4 INPUT POSITION CONTROLS
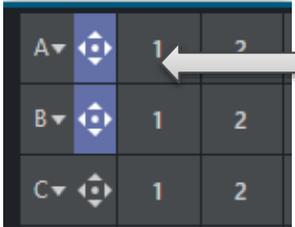
Position controls for all appear to the left of all input rows. Click this button to open the input's *Position* panel. These controls replicate those discussed previously, under the sub-heading DSK Controls in Section 9.7.1.

SECTION 16.5 DEFAULT EFFECTS

As mentioned, in *Effect* mode an M/E may support up to four input layers. The *M/E* doesn't *transition* between *A* and *B* in *Effect* mode. Instead, effects of various types are applied to the selected video inputs.

Let's consider the effects in the *Default* group as examples:

Click the + sign shown when you move the mouse to the effect icon located beside the effect duration. This opens the *Media Browser*. Select the effect group labeled *Default* under the *LiveSet* location on the left. These effects are straightforward compositing effects involving multiple video layers. *Effect* output (i.e., the *background* prior to *KEY* overlays) is the sum of all input layers.

If the source assigned to input *A* is fully opaque, any content in the layers below is hidden. When input *A* is partially transparent, the source assigned to input *B* is blended into the *M/E* background layer, and so on.

The output of active *KEY* layers is then added to the effect output before passing the combined result onward as the final *M/E* output.

UTILITIES

Effects can take other forms as well. We've looked at the *Default* effects group; now let's consider *Utility* effects.

If you were following along in the previous section, replace the current effect in *M/E 1* with the *Show Alpha* effect from the *Utilities* group.

Applying this effect immediately causes the display on the *Program* monitor to update, showing the content of the alpha channel for input *A* (Input *B* is ignored).

Show Alpha

The current input *A* source is keyed, so the effect displays black on *Program* out wherever transparency exists in the foreground, white for full opacity, and shades of gray for in-between blends.
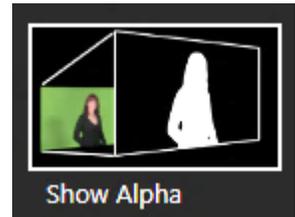
With this in mind, it won't be hard to guess what *Show Inverse Alpha* does.

In contrast, the *Show Color* effect in this group passes the full color output of *LiveMatte prior* to being multiplied by the alpha channel. (It might seem as though this would be identical to the original source, but you may notice subtle differences. This is because of the *Spill Suppression* processing.)

Let's look at another of the effects in the *Utilities* group, *Color Correction*. Replace the current effect with the *Color Correction* effect. You'll notice that M/E 1's output on the *Program* monitor is now rendered in monochromatic grayscale. Drag the T-Bar down to affect the *M/E's* color saturation. Click the mouse on the *Position button* below the T-Bar and drag to modify *Hue*.

Finally, the *Make Legal* effect ensures the output of an M/E is within broadcast signal tolerances.

3D

The *Anaglyph (Red, Cyan)* effect found in the *3D* category is a special purpose tool.

The anaglyph method of displaying 3D imagery depends on stereo video inputs that are filtered and composited into a single output stream.

In turn, this combined stream resolves into 3D when viewed through special glasses with red and cyan (blue-green) filters for left and right eyes respectively.

TriCaster provides easy access to anaglyphic technology by means of the *Anaglyph* effect. The effect combines 2 video inputs selected in an M/E. 3D output can then be switched easily like any other source. No complex configuration steps or tricky control panel operations are required.

The effects in the Photoshop Blend folder apply well-known blending modes to the A layer in the M/E as these are blended with the B layer. The resulting compositions can serve many purposes, such as adding animated 'bokeh' style overlays using DDR clips or adding interest to still overlays such as vignettes or titles.

SECTION 16.6 VIRTUAL SETS

We've considered the *Default* and *Utility* effects. Let's move on to a more glamorous species, the *virtual set*, presented as *LiveSet* effects.

LiveSet is a powerful tool and can dramatically enhance production. With it you can achieve the look of a large, sophisticated studio setting within a very small studio space, all without the need for external equipment.

Broadly speaking, setup of a *LiveSet* effect is much like the *Default* effects previously considered (see Default Effects, Section 16.5). A typical *LiveSet* consists of a greenscreen shot (usually input *A*) with *LiveMatte* applied composited into a virtual set. *LiveSet* adds the foreground and background for the scene, and additional video inputs may add to the effect in various ways.

> *Hint: Most virtual sets require LiveMatte settings to be applied to Input A. Other inputs may also require keying, depending on the design of the virtual set.*

To select a *LiveSet*, click the effect icon in the M/E's *BKGD* at lower-left control group to open the *Media Browser* (Section 11.1.7)*.*

The Location List of the Media Browser lists any installed LiveSet groups under the heading "LiveSets". Select an entry beneath to show thumbnail icons in the Browser's File Pane.

We discussed *Positioning* controls for *M/E* video inputs previously (Section 16.4). It's worth adding here that *Position* options do affect the scale, rotation, and position for *LiveSet* video inputs. You can often use *Positioning* controls to achieve a 'good fit' and natural appearance of talent or another source appearing in your virtual sets (greatly reducing the need to fuss with physical camera positions).

Hint: The Align group of LiveSet effects is specially provided to make it easier for you to adjust cameras and position talent on your physical set to suit the design of typical virtual sets.

16.6.1 HOLOGRAPHIC LIVESETS

A special variant of LiveSet effects are referred to as 'holographic'. These effects can be amazingly lifelike and convincing, and are relatively easy to create.

Holographic LiveSet effects are loaded into an *M/E* in the same manner as any other effect. Simply move the cursor over the effect icon and click the + sign (*Add Media* button) that appears to open a *Media Browser*, then choose the effect you wish to load (several examples are included with your system). Adjust the current view for holographic *LiveSets* in similar fashion to standard effects using the *T-Bar* (*Zoom*) and associated *Positioner* controls.

The *Comp Bin*, discussed shortly, allows you to store and apply your favorite compositions.

Preset adjustments made using the mouse vary slightly for holographic effects. For a standard LiveSet effect, dragging the mouse left, right, up, or down changes the camera position in the frame. The right-mouse button zooms in or out. In a holographic LiveSet, right-mouse operations are the same. However, dragging the mouse on the canvas modifies camera *rotation,* rather than position.

Selected TriCaster models offer an additional collection of LiveSet virtual sets, covering an array of useful broadcast, business, and industrial applications. A sampling from this collection is shown below.

At the time of writing, the collection includes thirteen professionally designed multi-camera virtual set environments ready-to-use for your productions.

Note: You can also purchase this collection outright in Vizrt's online store, which has added benefit for Virtual Set Editor owners who will receive the corresponding customizable VSE projects with their purchase.
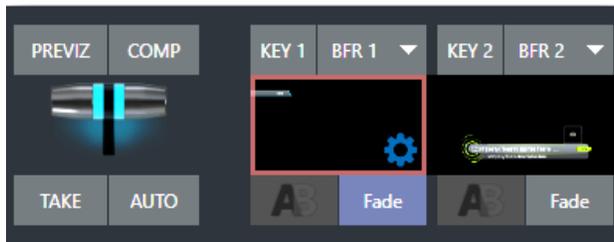
In *almost* all respects, the *KEY* channels in *M/E* panes match the *DSK* channels found in the *Switcher's* main *Transition* section. Unlike the *DSKs*, though, they constitute a 'pre-main *Switcher'* sub-layer. This means that *KEY* channels are applied *before* the composition is sent to the *Switcher* (or another *M/E)*. Thus, content in a *KEY* channel appears beneath anything displayed via the (*Switcher*) *DSK* channels.

Likewise*,* *KEY* channel selection and *Position* controls largely work just like their *DSK* cousins, discussed earlier, with two notable exceptions. We'll consider these exceptions next.

16.7.1 KEY LAYERS AND AUTOPLAY

It's worth noting that the behavior of *Autoplay* for *Media Players* selected as sources for *KEY* channels conforms to the way it works for other *M/E* sources. That is, newly displaying a *Media Player* with *Autoplay* enabled in the *A layer* or a *KEY* layer for an *M/E* will trigger playback, but – by default – at the end of play the 'out' transition (and subsequent advance to the next playlist item) does not occur.

This default behavior can be overridden by checking the *Options* menu item *Enable Autoplay Out on M/Es*.

16.7.2 AUGMENTED REALITY
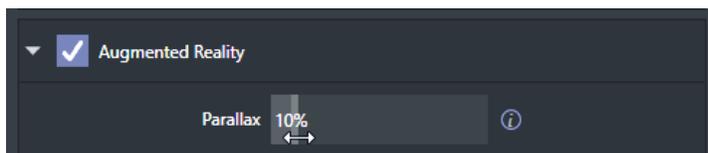
In one other unique and powerful departure from *DSK* features, the *Positioner* for *KEY* layers has an added feature labeled *Augmented Reality.*

Note: The Augmented Reality feature is for use in M/Es that are assigned to effects (such as LiveSets), and has no effect when a Mix effect (transition) is loaded as the Background effect for the M/E.

Any *KEY* layer with the *Augmented Reality* switch enabled is treated differently from a normal KEY layer in several respects:

- First, it does not merely appear *above* the main *M/E* layer composition you configure at left, as a typical *KEY* channel would. Instead, it is treated like another main layer added above the standard M/E layer rows.

- Thus, when you zoom or pan the *M/E*, the *KEY* layer zooms and pans right along with it, making its content appear as though it were embedded in the scene.
  (This lets you effectively add one or more virtual layers to a *LiveSet* composition at any time, with complete control over positioning within the composition.)

- With the associated *Parallax* setting at 0%, the *KEY* source is locked to the background formed by the layers below it in a 1:1 relationship. When the 'camera viewpoint' changes, the *KEY* layer moves in the same amount and direction as the background.

Hint: You can use this ability to 'pin' a graphic element into a LiveSet.

- Raising the *Parallax* value modifies the motion of the *Augmented Reality KEY* layer during panning and zooming, making it appear closer to the camera than subject matter behind it. This enhances the impression of three-dimensional depth.

Different 'virtual camera' positions, along with other *M/E* attributes, can be stored in the *Comp Bin* associated with each *M/E*. In particular, *T-Bar* and most *Positioner* attributes for all layers in the module are stored in a *Comp* and are re-applied when you click the *Comp* icon later.

This includes such things as cropping and edge-feathering performed using *Positioner* settings (layer source selections are not stored, nor are *Border* or *Tracking* settings.
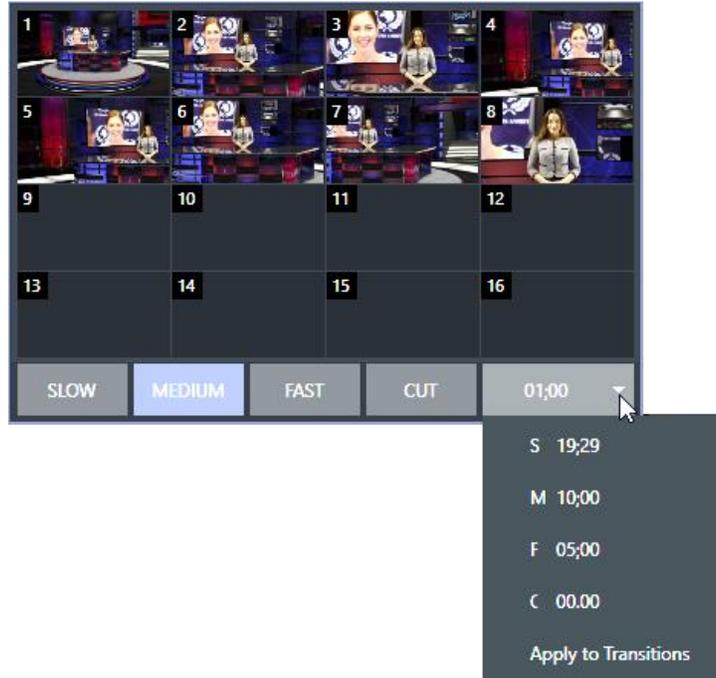
16.8.1 APPLY TO TRANSITIONS

Apply to transitions overrides the set for the individual Keys to match the *COMP* speed. For example:

- COMP mem1 takes Key1 and Key2 on
- Key1 has manually set speed of 1:00
- Key2 has manually set speed of 2:00

If you have COMP set to Med (1:00) and switch to COMP mem1 - Key1 will take 1sec to transition and Key2 will take 2sec to transition on.

If you do the same thing but have *Apply to Transitions* enabled, both keys.

16.8.2 MANAGING COMPS

Having prepared a composition you wish to keep, storing a corresponding *Comp* is simply a matter of clicking the *COMP* button above the *T-Bar* to open the *Comp Bin*, and clicking an empty position. An image grabbed from output of the module is displayed to represent the *Comp*.

If you later wish to revise a *Comp*, you can do so either by rolling the mouse over it and clicking the 'snapshot' icon shown at upper-right or by right-clicking the icon and selecting *Update* in the context menu.

The context menu also allows you to *Rename* a *Comp*, update it, or clear it entirely.
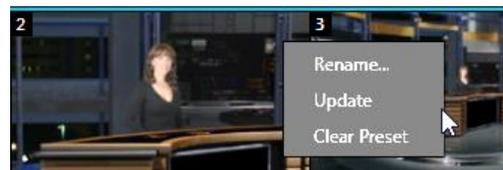
Selecting in a *Comp Bin* changes the current composition of layers displayed by the module to the new one. Changes can be immediate or animated over time. The timing controls in the footer of the *Comp Bin* determine the duration of the move from one position to another, while transition effects for layers are governed by their individual effect durations.

Hint: The main Switcher also hosts a Comp Bin. However, LiveSet effects are not supported in this case.

It's worth noting that, since *T-Bar* states are stored and applied by *Comps*, transition effects can be applied by selecting a *Comp*.

Let's discuss an example:

- Suppose *KEY 1* is a lower third type title overlay and has a 'fly on' type transition assigned to it.
- *Comp 1* was stored with *KEY 1* not visible.
- *Comp 2* was stored with *KEY 1* hidden.
- Click *Comp 1*, then – a moment later - *Comp 2*.

The result is that *KEY 1* will animate in and out according to the state stored in each *Comp*.

Comps can apply transitions to multiple layers at one time with a single click. Animation between the current layer states and settings is not limited to the effects provided by transitions, however. Let's consider a different example.

- Select *Comp 2*, ensuring that KEY 1 is visible.
- Use the *Positioner* controls for *KEY 1* to slide the lower third title off the page, completely hiding it from view.
- Store a new *Comp*.

Switch back and forth between these two *Comps* and you'll notice that animating the layer's position of the layer has effectively allowed you to create a custom transition. Experiment with other settings, such a Z or Y axis rotation, and you'll begin to see just how much power *Comps* give you.

Using these and other settings to animate the various video layers, very complex compositions can be introduced into your production with a single click in the *Comp Bin*.

Chapter 17   NDI OUTPUT ROUTERS

In video production, outputs are a BIG deal, typically in scant supply, and expensive. Imagine a system where you could have a nearly endless supply of outputs. NDI makes this dream a near reality. TriCaster supports virtually unlimited expansibility in this respect and even provides direct and convenient control over your output sources.

Select TriCaster models provide eight special NDI outputs, beyond the already large number of SDI and NDI outputs available. These latter outputs are labeled OUT 1-8.

Notice the two tabs labeled OUTPUTS 1-4 and 5-8, situated just beneath the main PROGRAM output viewport. Clicking a tab reveals one of these two specialized crosspoint panels, which appear in the same place that M/E and PREVIZ modules are normally shown.

The features of these panels are very similar to those normally provided by expensive external matrix routers. Each row in these tabs determines the source sent to the output named at left. The monitors on the right show the video from the currently selected source.

You can assign many different sources to each of these 8 NDI outputs. As elsewhere, the source buttons occupy three banks, similar to the Switcher source rows (the same Bank buttons used for the Switcher change the banks shown in the NDI Output Router panels, although their content is somewhat different). Outputs can be individually renamed by editing the labels shown at left.

Output source options include the displays and audio assigned to any of the four primary outputs, but also any other Switcher source with the exception of M/Es and animated Buffers (a Buffer holding an animated source will output a still image, which may nevertheless 'still' be useful for some purposes).

This means you can simply assign one of these outputs to a suitable downstream system or device, and 'hot-punch' them at will. Downstream NDI-enabled devices connected to one of these outputs can thus be effectively re-configured directly from TriCaster's Live Desktop or Control panel, which provides special support for this feature.

The potential uses of these outputs is nearly unlimited:

- Supply external NDI monitoring solutions (such as the NDI Studio Monitor application included in the free NDI Tools Pack).

- Record them anywhere your network runs using NDI IsoCorder.

- Convert them to SDI for connection to traditional (non-IP) studio systems, using either Viz Connect Studio I/O, Viz Connect Pro, or Viz Connect Solo hardware.

Note: Each Viz Connect IO unit supports up to 4 SDI output channels and a full suite of production tools including per-channel overlays (which can be still images, animated clips, or even other NDI sources), allowing you to re-combine and re-brand your video endlessly.

TriCaster live production systems provide an extensive set of professional quality audio tools, which we'll explore in this chapter.

External audio connections and basic configuration were touched on in Appendix B: TriCaster Connections. A tabbed pane labeled *Audio Mixer,* found just below the main *Switcher* presents more precise control over individual audio sources and outputs.

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

- *External* audio sources
    - Controls for audio *INPUTS 1-n*, (number varies by model).
    - APPS – a special input (on supporting models) for use with Live Call Connect.
    - *TALKBACK* – a special source for Skype TX

Hint: On some models, a scrollbar extends access to the full list of Audio Mixer inputs.

- *Internal* sources – *Media Players*, and *Effects* (sound embedded in *Animation Store* transitions).
- *Aux 1-3* – control for *Aux* audio outputs.
- *Phones* – volume control for the system's headphone output.
- *Master* – controls the primary audio bus.
- (Audio level controls for output recorders and streaming are in the *Output Configuration* pane.)

NOTE: On supporting models, analog outputs carry the first two channels assigned to Master and Aux 1.

SECTION 18.1 AUDIO SPECIFICATIONS

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

SECTION 18.2 HEADPHONES

By default, headphones connected to the ¼" stereo *Phones* jack carry the first two channels of the audio signal from the bus designated *Master 1* – that is, the same audio carried by analog output connectors marked as *Ch. 1* and *Ch.2* in the *OUT 1* group on the system's backplane.

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 – or outputs – *only* the soloed sources are sent to the connector. (See *Solo* in Section 18.7.3 for more information on this feature.)

SECTION 18.3 VU METER CALIBRATION

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. A menu at left beside the *Input* labels opens a small menu offering three options as follows:

- *dBVU* – most familiar to users of typical analog audio mixers
- *dBFS* – dB 'Full Scale' – the digital standard; see the heading Audio Headroom in Section 3.10
- *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)
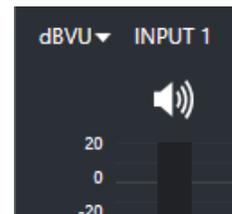
SECTION 18.4 EXTERNAL SOURCES

Columns in the first set of control groups are numbered *Inputs* (number varies by model). Each of these can be assigned to any available audio source – whether your TriCaster supports analog (line level) sound supplied to rear panel connectors, HDMI embedded audio from one of the four inputs, available NDI source, or other system audio source (including network audio sources like Audinate's Dante), with appropriate drivers.

Note: Dante support requires an inexpensive user license from Audinate.

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 linkage, though the default, is not strictly enforced, however. You can connect directly to any external audio source in the *Advanced Configuration* panel (see Section 18.10).

Also, for reasons of your own, you may well prefer to treat various audio sources as independent of the nominally associated video input. The *Follow* (audio follows video) features play an important role in this context – see the sub-heading Follow Program Video in Section 18.10.2.

18.4.1 CONNECTION TYPE

Naturally, only one connection can be active for a given audio input at any moment. 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.
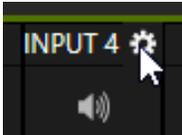
The drop-down *Connection* menu at the top of this pane allows you to assign any one of the supported sources connected to the system to this *Audio Mixer* control column.
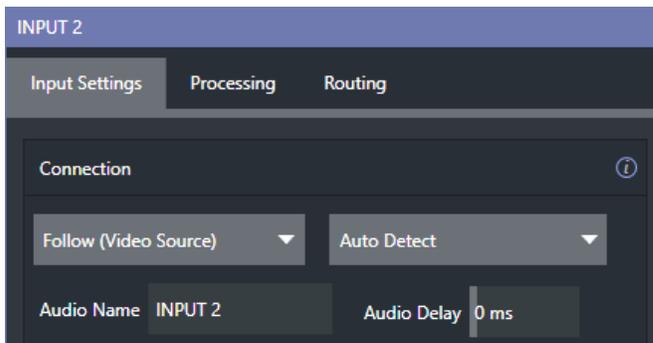
- Local
    - Physical inputs on the system's backplane or faceplate listed, usually as *Input #*, but in some cases as "Mic" or "Line" (varies by model).

  Local sources support different connection types, as determined by a menu at right in the same group. This option typically defaults to *Auto-detect*, but depending on model may include *Line, Mic, or Embedded* (which is the correct setting for audio included with an HDMI or NDI video connection).
    - Network audio from supported protocols (such as Dante; may require third-party drivers).
    - *Skype TX Caller 1, 2* (sound from these two special input types, further discussed in the next sub-heading).

- *Follow (Video Source)* – this is the default selection and causes the control column to follow the same numbered video *Switcher* input.
- All available NDI audio sources.

Note: Channels 1 and 2 from Master and Aux 1 are always placed on Dante output channels 1-4, respectively.

18.4.2 NDI KVM AUDIO

NDI KVM sends audio through the default Windows Playback device at the time NDI KVM is launched. You can change what audio is being sent to NDI KVM by changing your default Windows Playback device and then rebooting. To learn more about NDI KVM, see Section 5.2 The Home Page.

Note: Available as a feature for all 7-3 or higher TriCasters that have Windows 10.

SECTION 18.5 LOCAL SKYPE TX CALLERS AND MIX MINUS

The default *Connection* option for external *Audio Mixer* inputs is *Follow Video Source*. When an audio input set this way is assigned to a Local>Skype TX Caller channel, the audio control group is automatically assigned to govern incoming audio from that remote Skype caller.

It is not necessary to use an *Aux* audio bus to configure a special audio 'mix minus' to return to the remote Skype caller in this case. The return audio for Skype TX is handled automatically, ensuring that (except when the *TalkBack* feature is engaged) the remote caller will receive a special mix comprised of the *Master* mix with the remote caller's sound removed.

Note: These special a/v inputs are based on the professional Skype TX broadcast platform and require the use of its dedicated control application. Alternatively, you can connect directly to NDI a/v output from a dedicated standard 'consumer' Skype client configured for NDI output using any Switcher input. See Chapter 19 Skype and Skype TX for more information.

SECTION 18.6 TALKBACK

The Audio Mixer input labeled *TALKBACK* serves a special purpose, providing a way to converse with remote 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, by default the *Connection* option for an external *Audio Mixer* input assigned to a Skype TX channel allows the corresponding control group to govern incoming audio from that remote Skype caller. In this case (that is, when an audio control is 'listening' to incoming audio from a Skype TX channel), a new button labeled *TALK* appears beside the group's SOLO button.

When the *TALK* button is lit, audio you supply via the *TALKBACK* input (typically a microphone connected to one of the inputs on the system's backplane, or perhaps the system *Stereo Mix* supplying audio with sound from a 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, the Mixer sends incoming sound from the remote Skype caller to its *Headphone* output, enabling you to have a two-way conversation off-air.

Hint: You will 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.

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

18.7.1 AUDIO MIXER SCROLL BAR

For switcher products that have numerous audio inputs, the *Audio Mixer Scroll Bar* provides access to all inputs with the simplicity of moving the scroll bar located below the SOLO buttons.

18.7.2 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.

One important exception to *Mute* operation involves recording. The IsoCorder feature lets you capture any MIX a/v output - i.e., the primary output or outputs, or directly from hardware audio and video inputs with matching numbers. That is, the audio recorded with the video is taken from the audio input having the same number as the video input. In this latter case, the captured audio is routed directly to the recording module *prior* to most adjustments in the *Audio Mixer* – including *Mute*.

18.7.3 SOLO

Solo implementations and options vary widely in the audio industry, but broadly speaking, all variants provide very useful functions. The *Solo* feature offers remarkable flexibility without overly confusing complexity.

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 audio mix (es) sent to any other output.
- ❖ This *Solo* feature is normally what it called 'exclusive Solo' (or 'X-Or' type). This means that enabling *Solo* for a given source disables all other *Solo* buttons.

❖ 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.

It can be very useful to be able to preview one or more audio sources, doing so *without* allowing the test sound to be audible on *Program* output. Typically, this need arises in connection with testing microphones or other audio sources that will be used in the production.

To audition an audio source in this manner:

1. First *Mute* the source, removing it from primary outputs.
2. Then enable *Solo* to hear it on the *Headphones* output.

SECTION 18.8 INTERNAL SOURCES

Besides external audio sources, sounds played from internal storage volumes (including removable media such as external hard drives or 'thumb' drives) via the *Media Players* (*DDRs*, etc.) can be added to the output mix.

18.8.1 MEDIA PLAYERS

Video and audio-only files in *DDR* playlists, along with audio files in the *Sounds* player, may contain one or more audio channels. At most, *Media Players* output the first four audio channels of multiple channels; additional embedded channels are ignored. Other options and controls in these sub-panels are similar to those provided for external audio sources.

18.8.2 EFFECTS (TRANSITIONS)

This control group governs the sound embedded in *Animation Store Transitions*. The remaining control groups in the *Audio Mixer* are dedicated to various audio outputs. We'll come back to them in Section 18.9, but before we do so, let's drill further down into more advanced audio options and tools.

As has been discussed, the *Mixer* supports four primary audio busses – *MASTER* and *AUX 1*. Each of these is represented by its own control group in the *Audio Mixer* output section and regulates sound sent to physical connectors or to 'logical outputs'.

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

Settings in all the control groups in this section take effect downstream from all audio sources, further modulating and processing audio sent to outputs as the *AUX* and *MASTER* mixes, for recording, and for Internet streaming.

Secondary audio busses:

Beyond the primary busses mentioned here, the system maintains a large number of secondary internal busses.

For example, the *Solo* switch for each input (and output) is a 'send' that adds sound to a 'Solo bus'.

Likewise, the IsoCorder module permits discrete recording from the unmodified audio input associated with any single video source; this constitutes up to eight additional audio busses.

18.9.1 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 (0dBFS, the maximum allowable digital level).

Hint: When clipping has occurred, the label for the problem channel turns red briefly.

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 24dB are not uncommon in professional digital audio realms.

You can apply level control to suit your own preference in this regard, using the separate *Record* (and *Stream*) level controls discussed shortly. For example, levels set at -20dBFS in the *Record Configuration* panel approximate typical professional practice. This has no impact on levels at the system's audio outputs, and 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, 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.

18.9.2 STREAM

Level controls for the stereo audio that accompanies *Streaming* outputs are provided in the *Output Configuration* panel (see Section 8.2).

SECTION 18.10 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 advanced *Audio Configuration* panel. We touched on this panel briefly when we discussed selecting and configuring *Connections* for external audio inputs. The *Audio Configuration* panel offers many more important features and controls, however. Let's explore these now.

18.10.1 INPUT TAB

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 at system later than the corresponding sound.

To mitigate this sort of external problem, the Audio Mixer provides an adjustable *Audio Delay* feature.

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 leading the digital output by a meaningful measure.

GAIN

For sources set to *Mic* input type, *Gain* knobs may appear in the *Input Settings* tab to allow you to compensate for microphone variances.

PAN

The *Audio Configuration* panel also provides *Pan* controls. *Pan* is a very useful feature; 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 1* knob splits the sound from *Input 1* equally onto *channels 1* and *2*.
- Sliding *Pan* for *channel 1* fully clockwise results in that source only being audible on *channel 2*.

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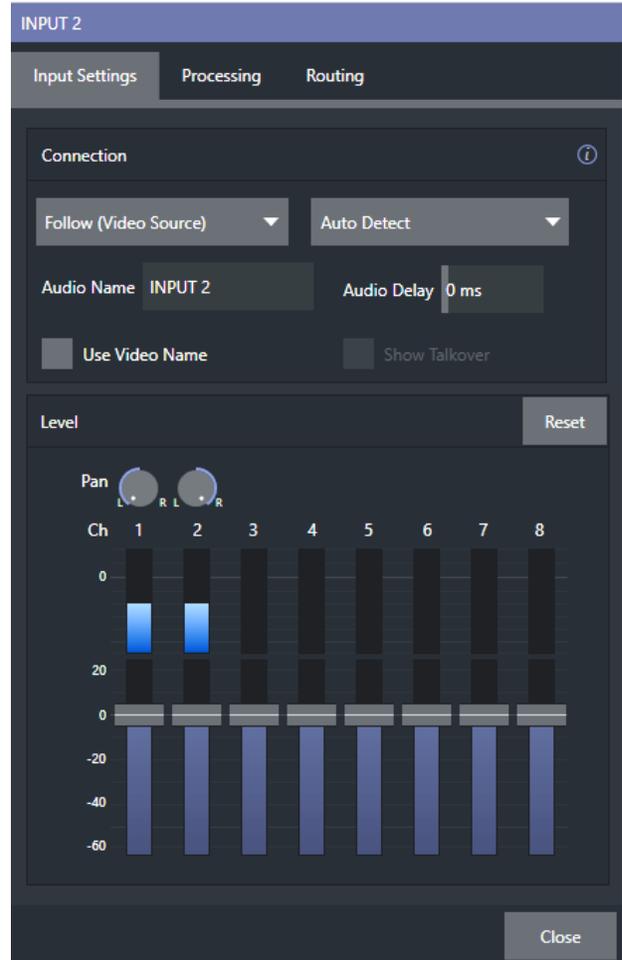
Hint: "Pan" is not the same as "Balance". The balance control in a stereo system varies the relative level of the left and right channels, but sound from the left channel will never come out of the right speaker, or vice versa (Pan does permit this).

18.10.2 PROCESSING TAB

The second tab in *Audio Configuration* is named *Processing* and likewise holds very valuable features.

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 0dB.

> *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.*

COMPRESSOR LIMITER
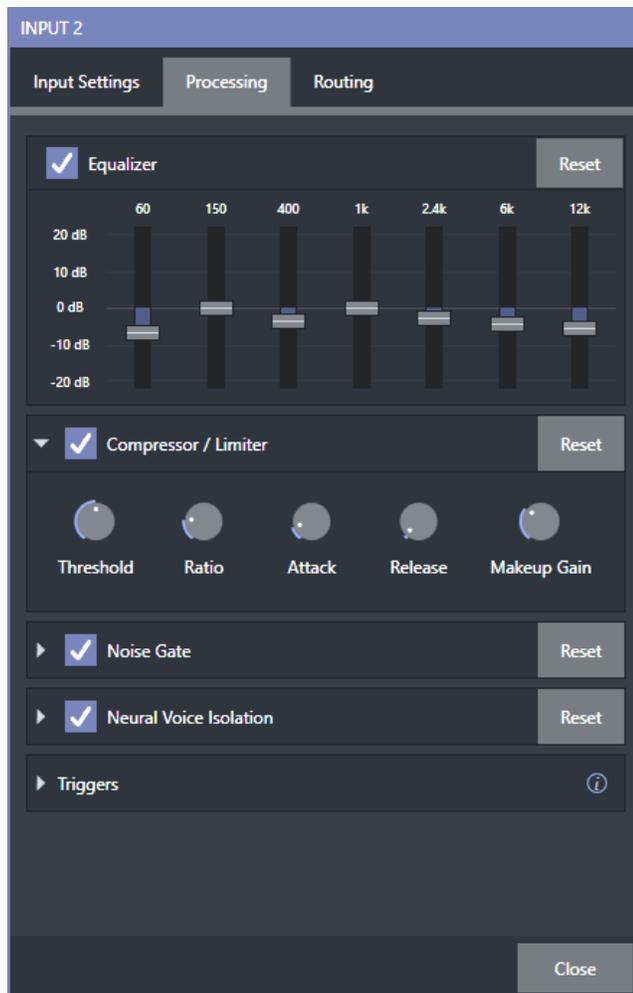
The *Compressor/Limiter* can prevent clipping (see Section 18.9.1) from unexpected peaks or transients and making talent sound better than they do in real life, bringing voices, music, and other audio sources into an optimal dynamic range.

Being able to do this independently for each output too is icing on the cake, especially for Internet streaming, as it ensures correct levels at any time.

THRESHOLD

Sound above the set *Threshold* level will be compressed; the amount of compression and the way 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 3dB. 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 (except for a brief period during a sudden increase in source loudness, as dictated by the *Attack* setting).

ATTACK

Attack is also 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 like *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

Naturally, 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.*

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

Compression and limiting are not really different processes, but rather a matter of degree and perceived effect.

Compression, ideally, takes the form of a subtle, almost imperceptible modulation of the sound level to bring it into a more pleasing and convenient range. 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'.

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.

NEURAL VOICE ISOLATION
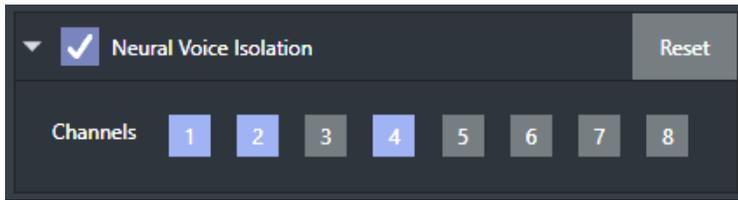
To enable/disable noise reduction, check the *Neural Voice Isolation* box and select your channel. AI audio can be individually selected for each channel of an input.

TRIGGERS
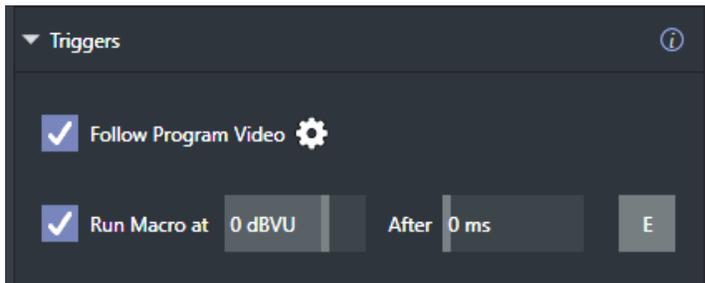
Several different per-input trigger (automation) features are found in the *Processing* tab.

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 displayed on *Program Output*.

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

RUN MACRO

The Active macro assigned using the E button in this group runs automatically when the threshold value (dBVU) is surpassed. A macro assigned as Inactive runs if the level falls below the threshold value. Built-in tolerance prevent unintended operations.
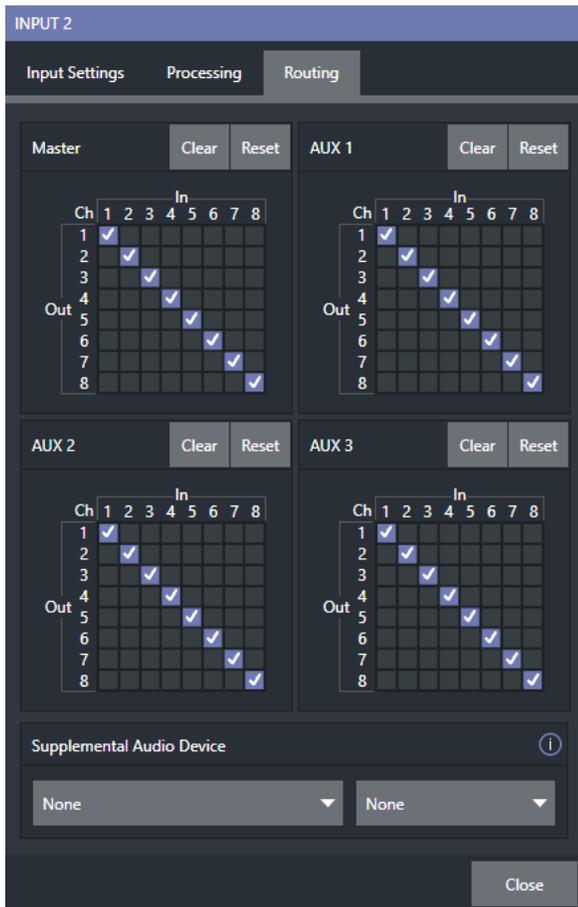
A main tab labeled *Routing* appears in the *Configuration* panel for all sources. The controls in this group determine output routing of the various channels supplied as inputs to the various output mix busses (*MASTER, AUX 1*, etc.) Let's discuss what an audio bus is and its uses before proceeding.

BUSSES AND OUTPUTS

Consider a very basic audio mixer. Its main audio signal path, from input to output, is properly called the 'master bus.' Sound supplied to one or more inputs is placed on this master bus (in the jargon of audio processing, this is called a 'send'), which ultimately flows to output connectors.

Slightly more advanced mixers often provide more than one 'send' for individual inputs. For example, the sound from all inputs may be sent to the master bus, comprising the 'master mix'. A different mix, sometimes called a 'sub-mix', might also be created by sending certain signals to a secondary ('auxiliary', or 'Aux') bus.

Hint: A secondary mix, prepared on an Aux bus, can serve many purposes. For example, you might wish to record a mix with all sound from talent microphones but that excludes any sound effects or music.

Let's summarize what we have learned so far: A 'send' pipes audio signals from an input to a discrete pathway called a 'bus'. Multiple sends can be used to place sound from a given source onto one or more internal busses.

What else should we know?

Each audio bus is discrete. Each can be directed along different output paths. And even when the blend of signals it carries is otherwise identical to another bus, it can be *processed* separately. Thus, its levels, equalization, and compressor/limiter settings can be unique.

The *Audio Mixer* provides four primary *audio busses.* These are identified in the *Audio Mixer* as:

- MASTER
- AUX 1, 2 and 3 (varies by model)

The *Audio Mixer* provides controls for each of these busses, allowing you to manage levels and signal processing. It is important to understand the distinction between *busses* and *outputs.* Now that we understand the former, let's consider the latter.

An *output* may be physical, or virtual – i.e., it may involve a connector on the rear panel, or not. For example, audio recorded internally does not require an output connector. Likewise, it may initially be analog or digital.

> *Note: Analog outputs 1 and 2 are permanently assigned to MASTER and AUX 1, respectively. In contrast, digital (or 'embedded') outputs are configurable in the Output Configuration panel.*

SUB–MIXES AND 'MIX MINUS'

At times you may require specially configured audio mixes. For instance – some installations call for sending audio from one or more internal sources (such as a *DDR* or the *Sounds* player) to a secondary distribution system. Alternatively, you may want a 'clean' output from one or more sources for use apart from the main primary output mix.

Specialized sub-mixes of this latter sort are often referred to as 'mix-minus,' since one or more sources are deliberately subtracted from the main program. Mix-minus capabilities can be invaluable for productions like 'phone-in' shows. The remote caller needs to be able to hear the interviewer; but if you simply send the primary mix back to him, he is forced to endure a late-arriving echo of his own voice. This would be confusing and undesirable.

This approach eliminates annoying echoing, feedback and the like. Meanwhile, both participants can be heard on the main *Program* output. Also important, independent control and signal processing is provided for each part of the pipeline.

Mix Minus for External TalkShow Devices

The *Routing* tab provides four 2x2 matrix routing panels for each input, allowing for more sophisticated mixes than the example above. TriCaster supports multi-channel NDI output, (channel count varies by model) so it's possible to route a unique mono mix-minus on each channel for a single Aux bus. A single NDI output can thus provide all the mix-minus needs for two TalkShow VS4000 systems.

Let's consider a simpler example – configuring unique mix minus audio for return to a single VS 4000.

The example assumes that you have assigned two *Switcher* inputs to receive the two individual TalkShow sources. We will use video *MIX 2* to supply *Program* video for return to each TalkShow caller. And we will assign *AUX 1* as the *Audio* source for *MIX 2*, assigning a unique (mono) mix minus to each of its three channels to supply return audio for each caller.

- In the *Output Configuration* panel, assign *Aux 1* as the *Audio* source for *MIX 2*.

- In the *Audio Mixer*, open the audio configuration pane for *Input 1*.

- Access the *Routing* tab and click the *Clear* button above the *Aux 1* routing matrix.
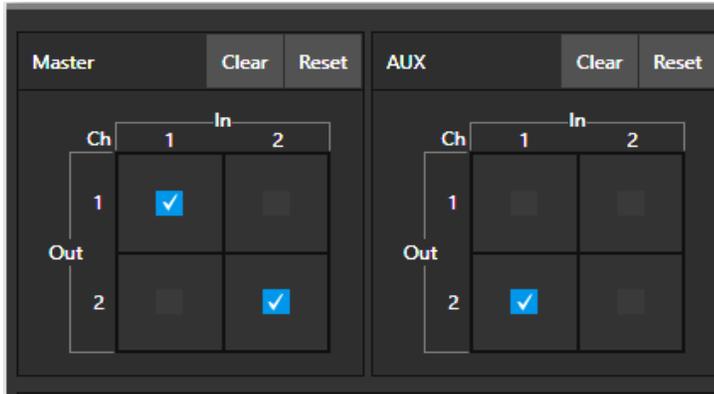
Checkmark channel 2 in the column below *In 1*. This routes sound from the first incoming Skype caller to all *Aux 1* output channels *except* channel 1.

- Open the audio configuration pane *Input 2* and, in the *Routing* tab, clear the *Aux 1* matrix.
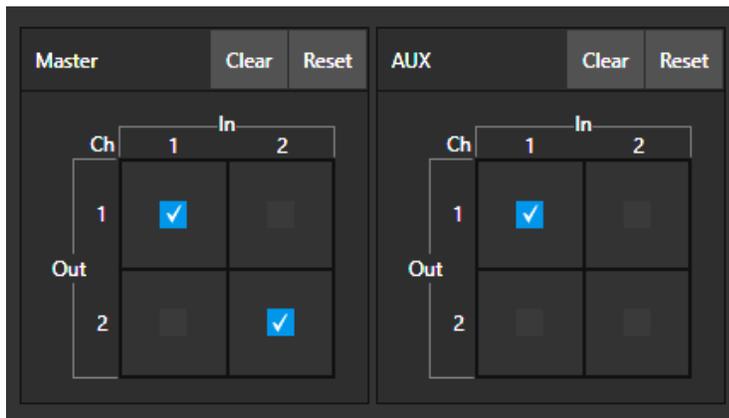
- This time, checkmark channel 1 in the column below *In 1*. This routes sound from the second incoming Skype caller to all *Aux 1* output channels *except* channel 2.

That's it – you've got the perfect mix minus configuration for return to your two Skype callers, using a single NDI output.

TriCaster features two additional menus are provided at the bottom of the *Routing* tab, under the heading *Supplemental Audio Device.*

The left-most menu in this group lists any add-on output devices detected by the system, and a list of multichannel audio-only NDI outputs options.

For example, 'transmit' channels from Audinate's Dante network audio protocol will be listed here if you have installed Dante Virtual Sound Card software. Or, in similar fashion, you may have installed AES67 drivers.

The audio connections on the motherboard are also listed here.

Making a selection results in the sound from source being sent to the corresponding audio channels of the designated output.

Note: Apart from the AUX and Master mixes, routing or mixing is not applied to supplemental audio. Each source channel is mapped to the corresponding output channel in 1:1 fashion, limited by the number of channels the output supports (e.g., a stereo output will always transmit channels 1 and 2 from the source).

18.11.1 ADVANCED AUDIO I/O

Premium Access software, supported in some TriCaster's, provides our most complete support for audio solutions such as Audinate's Dante and AES67 implementations (with required third-party drivers).

Advanced Audio support for ASIO drivers allows you to easily transmit or receive audio using these popular 'audio over IP' protocols.

Send selected channels from any *Mixer* input, *Media Player* output bus and channels you wish to send and match these to the transmit channels provided by your third-party driver.

You can, for example, send your *Media Player* output to an external hardware miser supporting the same protocol, and route that mixer's out back into your TriCaster system for output with your video.
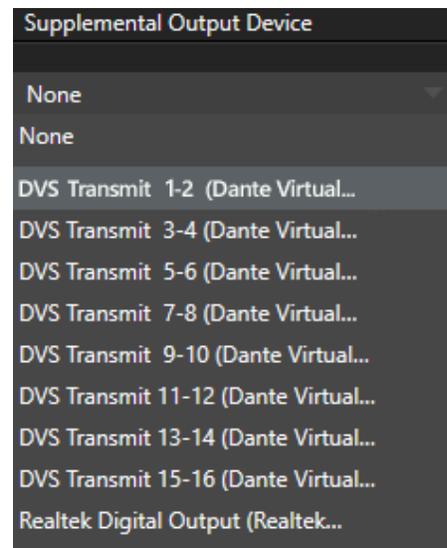
Note: Premium Access is available for subscription at https://store.newtek.com.

Roll the mouse to the left edge of the screen in the *Audio Mixer* to show its *MEM* bin. Audio presets work just like their counterparts in the *Media Players* (see Section 11.1.10).

MEMs are a convenient way to quickly store and recall audio steps and settings for different venues, productions, and users.

SECTION 18.1 SOUND AND MUSIC

Also included in Premium Access is a 100-track bundle of songs including a variety of license-free, full-length audio tracks to engage your audience and give you plenty of soundtrack options. The multiple musical genres in this bundle allow you to develop a theme or evoke specific emotions with background music for live content or edit these unlimited-use music clips into pre- and post-production content.

Chapter 19 SKYPE AND SKYPE TX

Skype and SkypeTX may sound alike, but they are not really the same thing. Each delivers specific capabilities, and their connection and configuration details differ as well. This chapter will help you understand these distinctions, so you can take full advantage of these important connection options.

Literally hundreds of millions of people use Microsoft Skype, so it's very likely that you are already acquainted with its use on mobile and desktop platforms. It's hard to imagine better technology to extend your productions to remote participants, whether around the corner or in far-flung corners of the world.

SECTION 19.1 SKYPE TX

Until recently, however, there were 'missing links' in the i/o chain between Skype and the video broadcast realm. Microsoft introduced its Skype TX platform, comprising purposed-designed hardware, software, and control room tools, to link the two worlds.

SECTION 19.2 SKYPE TX CONTROLLER

A vital part of the Skype TX platform is the call-center application referred to as Skype TX Controller (available here for free). You might think of Skype TX Controller as the 'switchboard' for your calls. The operator can initiate outgoing calls, answer incoming calls, and more.

The Skype TX Controller console provides numerous professional conveniences, including contact and call management tools, auto-answer, detailed call quality metrics, and fallback images to be displayed automatically should network conditions for a remote caller fall below designated minimums.

<div align="center">SECTION 19.3 SKYPE TX CALLER</div>

TriCaster also features native Skype TX capabilities independent of a TalkShow system.

This unique support lets you directly connect Skype calls from anywhere in the world to either of two special *Switcher* inputs by leveraging the Skype TX Controller.

All you need to use this feature is a network connection between your TriCaster system and the computer running the (free) Skype TX Controller application that provides call management.

<div align="center">19.3.1 AUDIO AND VIDEO CONNECTIONS</div>

Section 8.1.1 explains how to assign a *Skype TX Caller* to a selected video *Switcher* input.

In this implementation, by contrast with the use of an external Viz TalkShow system discussed earlier, it is not necessary to manually create a special mix minus audio return feed to send to the remote caller(s). You will find details on the special 'mix minus' that is automatically supplied in Section 18.5.

In addition, you will find it worth reading Section 18.6, which explains the unique *TalkBack* feature provided in the *Audio Mixer* to let the production system operator talk 'offline' with selected callers, without fear of the conversation being overheard on program audio output.
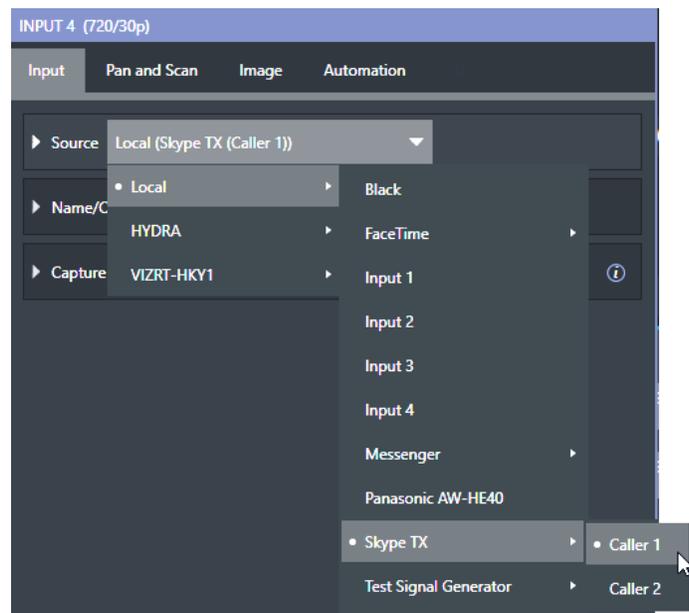
Hint: The return video sent to remote Skype callers can show a tally overlay. The overlay image is named SkypeTally.png, and is located in the file folder at one of the locations below, by model:

C:\ProgramData\Vizrt\TriCaster\Configuration\Skype\ or ...

This image can be deleted to disable the feature, or replaced to modify it.

Microsoft offers several variants of Skype. The Desktop version of Skype provides new possibilities for Skype users including broadcasters, streamers, and vloggers. including output using NDI protocol. This support for NDI provides yet another way to bring Skype calls into NDI–enabled software and systems.

Input setup for Skype a/v output is like connecting any other NDI source. The Skype client does not directly support NDI input from you to remote callers, but you can use the NDI Webcam application (included with the free NDI Tools pack) to connect program video output and a mix minus audio return feed prepared as discussed in the sub-heading Sub-Mixes and 'Mix Minus' in Section 18.10.3 of this manual.

Chapter 20   MACROS AND AUTOMATION

Macros smooth out your workflow, reduce complex operations to a single button press, and make it easier to produce sophisticated programs. They provide many opportunities for both workflow streamlining and creative applications. (As well, macros can reduce or eliminate embarrassing operator errors.)

One of the hardest things about live switching is keeping up with the action. We're only human, limited as to how fast our fingers can move, recall, and perform important sequential steps, and so on. Macros are the answer to that dilemma. Record any sequence of events as a macro and play it back with one click. Alternatively, trigger it with a keystroke, or control panel operation.

Note: For a deeper dive into Macros and Control Panels, see the Automation, Integration & Control Guide located in LivePanel > Resources > Documentation within the Notifications Pane.
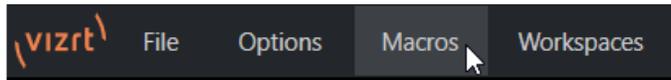
Macros can do almost anything; preload and play content, modify audio settings, automate complex switcher sequences, or perform synchronous operations. The compelling usefulness of macros justifies the prominent *Macros* menu placement in the *Dashboard* at the top of the *Live Desktop*.
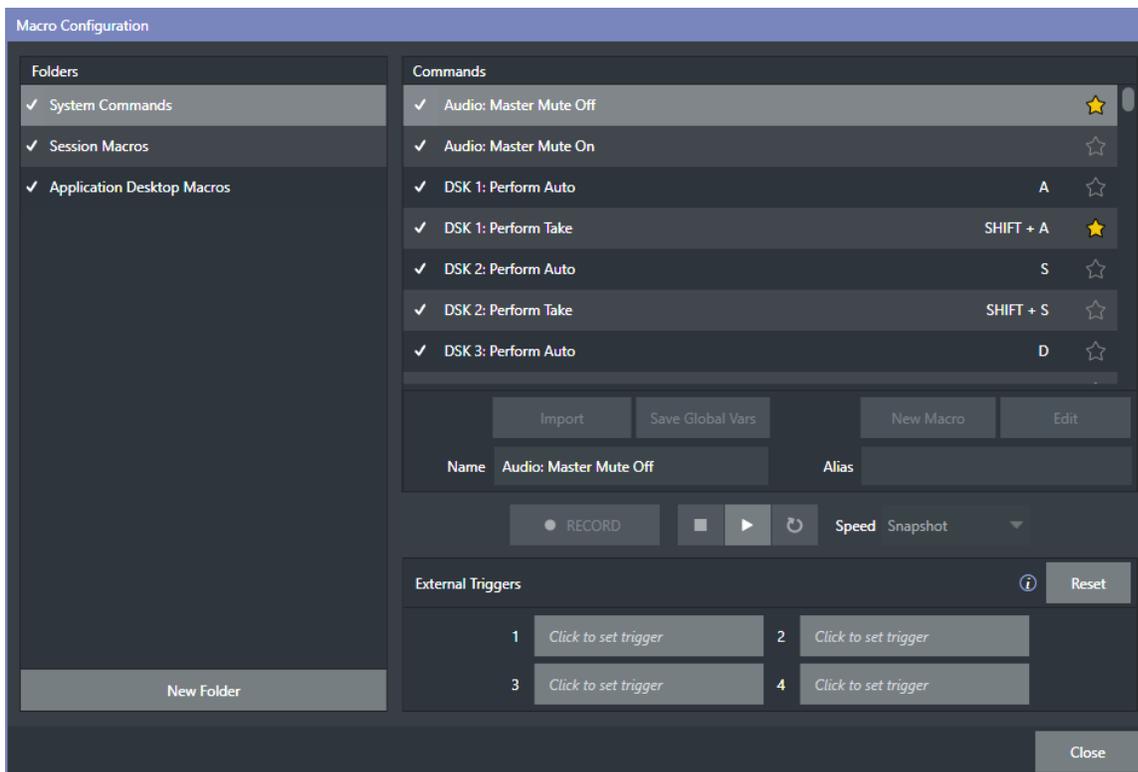
Click *Macros* to show a menu containing a *Configure Macros* item. This opens a large panel that allows you to create, organize, and even edit macros.
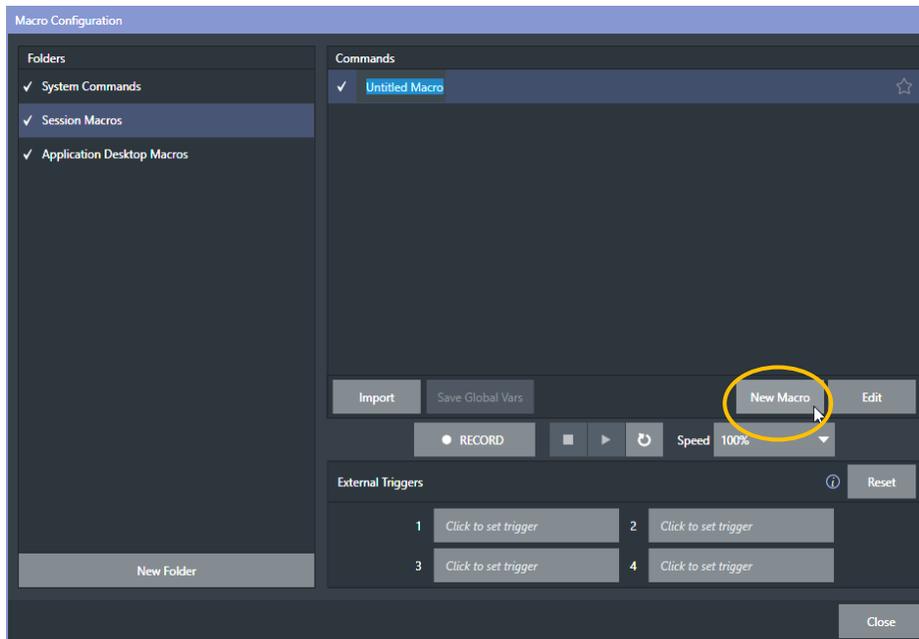
Creating a new macro is simple. Select a folder in the *Folders* column at left to contain the new entry (or add one, using the *New Folder* button below), then click the *New Macro* button below the *Macros Bin* at right.

Continue to define the macro by clicking the *Record* button at the bottom of the panel, and then just go ahead and perform the sequence of operations you wish to include in the macro. You can use mouse, keyboard, and *Control panel* operations when doing so.

When finished, click the *Stop* button to complete recording. Test the new macro by clicking the *Play* button. You'll notice that an animated bar in the background of the macro entry in the list tracks playback progress. Of course, you can modify the playback rate using the menu next to the *Record* button. You can even set macros to loop using the button at extreme right.

20.1.1 SPEED AND SNAPSHOT MODE

The Speed menu lets you modify the playback rate of your macro. One option in the *Speed* menu bears explanation: When you choose *Snapshot* as the macro's speed, you essentially force it to jump to its end result as fast as the system can get there. *Snapshot* mode is very useful for macros that configure the system to a particular state.

One example would be when you want to instantly reconfigure *M/Es* with different virtual sets for a scene change; or perhaps you want to quickly disable *LiveMatte* for all *Media Players* at once. The possibilities are endless.

20.1.2 MACRO ALIAS

Name | Virtual Set Preset Editor: Zoom in | Alias | Zoom
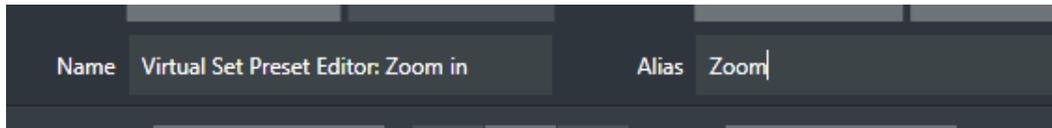
The *Name* field is an editable text field showing the default or custom full-length name for the associated Macro. The Alias field is also an editable text field where you can enter a custom short name that will be visible on the Switcher button for the associated Macro.

20.1.3 TRIGGERS

External Triggers ⓘ Reset

| 1 | Click to set trigger | 2 | Click to set trigger |
| 3 | Click to set trigger | 4 | Click to set trigger |
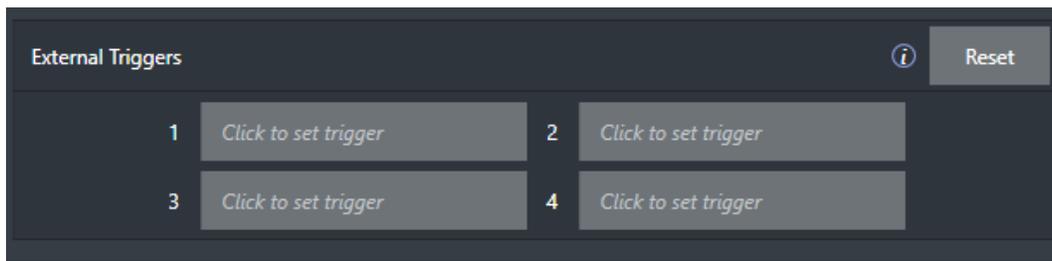
The *External Triggers* controls located near the bottom of the Macro Configuration panel allow you to configure one or more ways to launch macros. For example, select a macro, click in one of the Trigger boxes, and then press a suitable keyboard shortcut to assign it to that macro.

SECTION 20.2 MANAGING MACROS

The *Macro Configuration* panel has management features such as folders, rename, clone, and hotkey assignment, as well as *Import* and *Export*, useful to copy macros to other units, and for backup (support for these features varies by model).

20.2.1 CONTEXT MENU

The *Macro Configuration* panel has numerous features to help you organize and manage your macros, including not only folders, but also rename, clone, copy and paste, and hotkey assignment, as well as *Import* and *Export.*

Entries in the macro lister have a context menu, shown when you right-click an item. Menu items allow you to play, stop or record a macro, delete or rename it. You can, of course, cut, copy, and paste macros, or clone them, combining the latter two operations in one step.

You can also export selections, including multi-selected macros, or even entire folders. Import and export can be used to share macros with multiple users and systems (or in *LivePanel*), and that is where *Copy GUID* (globally unique identifier) comes into play. When exporting a single macro or macro folder using *Copy GUID*, the exported file will retain its original GUID.

20.2.2 SESSION MACROS

It's easy to keep macros designed for use with a specific production organized and accessible, thanks to the *Session Macros* folder in the *Macro Configuration* panel. Macros in this group are exposed within that session only (or new ones based on it, if the operator uses template sessions).

20.2.3 LIVEPANEL BUTTONS
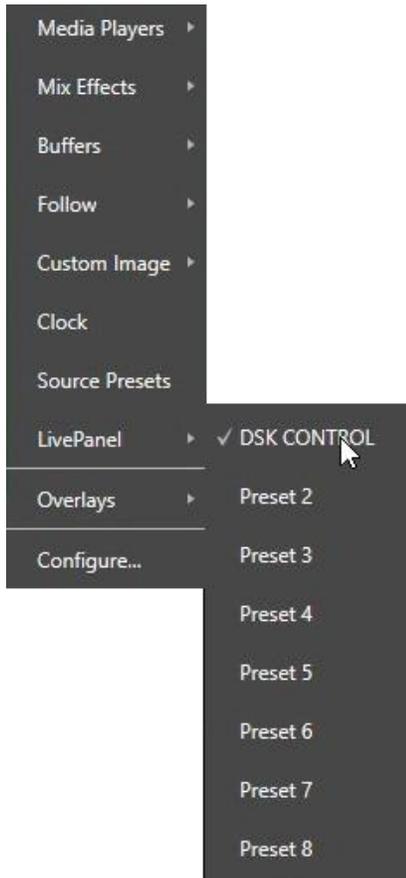
The LivePanel Buttons included in some TriCaster models add the convenience of not only presetting macros, but the ease of editing them as well, all without ever leaving the user interface. Simply right click your mouse over any viewport to display the context menu, hover your mouse over LivePanel and eight Preset options will appear.

To configure the buttons right-mouse click over the viewport showing the preset buttons (as shown below) and select Configure from the context menu. In the Configure LivePanel Buttons panel you can edit the size of the buttons, styling properties, the color of the buttons and/or text, and more.

In the *Configure LivePanel Buttons* panel you can select the *Width* and *Height* of your buttons, (changing the size will 'absorb' other buttons, but they will not lose their properties). There is a *Two-State Toggle Button* checkbox to give you the ability toggle on/off your macro with just a push of a button.

Just below the Two-State Button field, is the *Label* section and Styling options. Not only do you have many background color choices, but also an option to *Choose Image*, which can be helpful to remind yourself of what is on your viewport. In the Macro field, you have the option of using *System Commands* or *Application Desktop Macros* from the pull-down menu.

To revert your preset configuration to a default state, click the Reset All button to undue any changes you have made. You also have the options to *Import* or *Export* your presets.

Chapter 21 LIVE STORY CREATOR

Live Story Creator (support varies by model) delivers numerous powerful benefits. Coupled with the NDI Studio Monitor this is a revolutionary tool. There is a great deal more to Live Story Creator, however: Live Story is first and foremost a powerful natural language automation system.

In an era where storytelling plays a pivotal role in engaging audiences across various platforms, Live Story Creator stands out as an innovative solution that seamlessly integrates with TriCaster's cutting-edge technology. With its intuitive interface and powerful features, Live Story Creator empowers storytelling to bring their ideas to life in real-time, whether it's for live broadcasts, streaming, or recorded content. This dynamic software not only streamlines the storytelling process but also enhances the overall viewer experience, making it an indispensable asset for professionals in the ever-evolving world of media production.

Note: Live Story Creator inclusion varies by model but is optional for other models. Visit https://store.newtek.com/ to learn about the Premium Access program.

SECTION 21.1 OVERVIEW
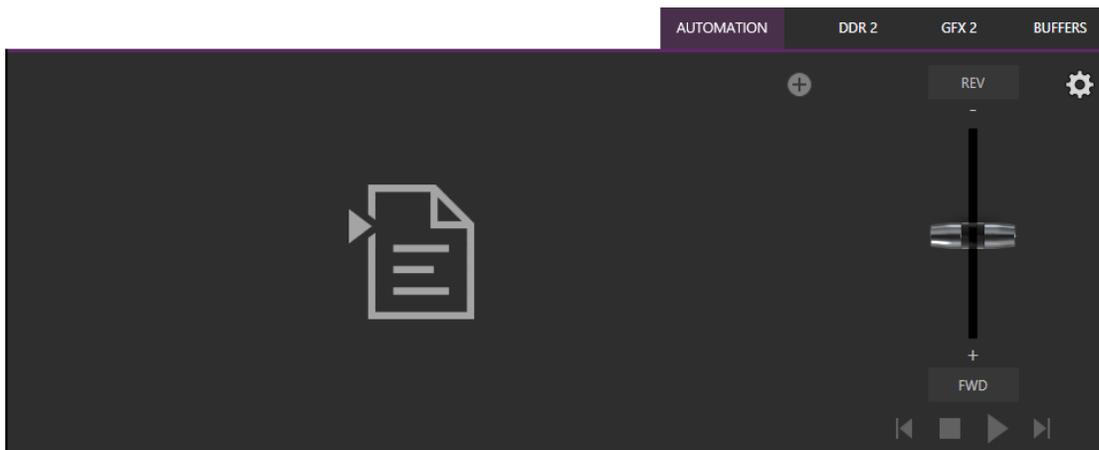
When you first open the new *Automation* tab, located right below the main *Switcher* (near *Buffers*), you'll see the empty script pane and some (rather lonely looking) controls at right.

Click or tap the (+) plus sign gadget below and to the right of the tab to open File *Explorer*. Here you can navigate to a location where you have previously stored a .docx file such as those created in Microsoft Word (or compatible software with similar features). Let's discuss a few of the Live Story interface controls and features before continuing.
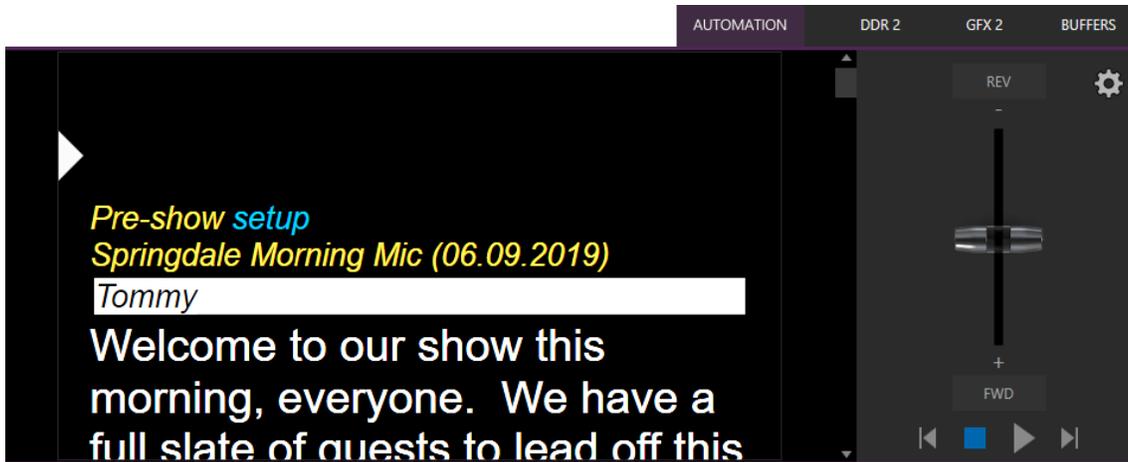
Examining the tabbed Live Story panel from left to right, you'll see:

- An (x) gadget at upper left. Click this to unload the current script (.docx file).
- The eyeline control is a white caret (triangle) control that can be dragged up and down to adjust the position of the similar eyeline indicator on a teleprompter display.
- The script pane, or canvas, displays the content of the .docx document, as interpreted by Live Story.
  - Colors and font styles have special meaning:
    - Generally, text shown as yellow and italicized is not meant to be read aloud.

For example, in the image above, the first line ("Pre-show setup") is used to issue a command to TriCaster to place Black on output before the show begins. The line has Word's *Subtitle* style applied to it, indicating it is not intended to be read aloud. Live Story shows this in yellow italics.

You'll notice, though, that the word "setup" is blue in the script pane, despite also being in *Subtitle* style in the document. This is because the command we inserted to cause black to be shown on output is in a comment applied to this word in the document.

Blue identifies commented text in the document, and comments can be used to issue commands (we'll discuss all of this in more depth shortly).

Hint: Move the mouse pointer over blue text in the script pane to see a tooltip showing how Live Story Creator has interpreted your comment.

Notice that the show's title ("Springdale Morning Mic") is displayed in yellow, too. Live Story recognized this as the SHOW TITLE because the *Title* style is applied to this text in the document.

- Document styles can trigger corresponding actions, too. For example, the *Title* style can automatically display a specially prepared LiveGraphic animation to introduce your show – all without any manual intervention.
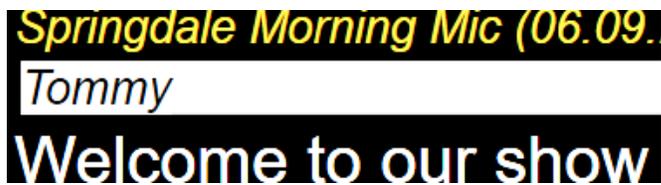
- In similar fashion, the document style *Heading 3* denotes a CUE, used to introduce someone who will be speaking next. CUEs are shown in inverted color, black text on a white background.

Like the *Title Style*, CUEs can also automatically trigger TriCaster operations. For example, if a *Switcher* input name matches a name in the CUE, that source will be placed on output, and a title identifying the newly introduced talent will be shown. (After a few moments, the title is automatically removed.)

- Text meant to be read aloud is shown in a large white typeface.

- Live Story's operating controls are located in a small panel just right of the script pane.

This *Control Panel* is dominated by a vertical *Speed* control. You can modify the scroll rate during playback or traverse the script backward or forward by dragging the *Speed* bar up or down.

Transport controls below the *Speed* bar include *Stop* and *Play*, as well as *Previous* and *Next Segment* buttons.

- Click the familiar gear gadget in the upper-right corner of the *Control Panel* to open Live Story's configuration panel.

- The two switches in the *Automation Triggers* toggle automation in response to *Comments* or *Headings* (styles) applied in the .docx document.

When both switches are off, Live Story does not process automation commands and operates as a simple teleprompter.

- Font controls let you adjust text display for legibility when you are using an external teleprompter device.

- The Flip switches in the Image group likewise allow you to conform the teleprompter output to match your local devices, while the margin sliders let you move text confine teleprompter output to best suit your preference.
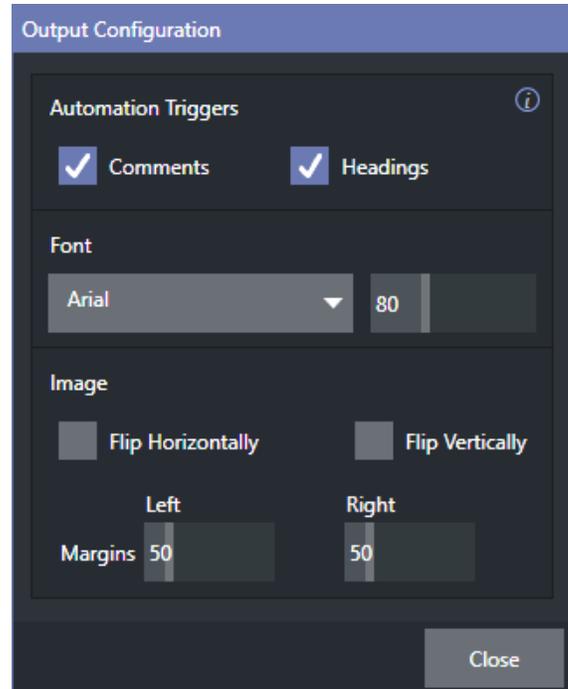
SECTION 21.2 STYLE–BASED OPERATIONS

As discussed earlier, various styles applied in the .docx document serve different purposes in the Live Story Creator context, and some styles can even trigger automatic operation.

Document Style	Applies to	Displayed on output	Description	Sets value for DataLink key	DataLink Key Description
Title	Show Title	Yes	e.g., "State of the Union Address"	%SCRIPT_ShowTitle%	Main show title
Heading 1	Show Descriptor	No	Sets value for a DataLink key	%SCRIPT_ShowDescription%	Main show descriptor
Heading 2	Segment	No	e.g., "Intro Package", "Welcome Monologue"	%SCRIPT_ShowSegment%	Current show segment
Heading 3	Cue	Yes (inverse)	e.g., talent name: "Billy Bob"	%SCRIPT_CueName%	Name of speaker
Subtitle	Information text	Yes (yellow, italics)	Displayed but not meant to be read (e.g., "walk behind desk")	%SCRIPT_Info%	Current/Last information text
Normal	Body text	Yes (white)	Text to be read by on-air talent.	n/a	n/a

The following styles automatically trigger TriCaster operations when the *Headings* switch is enabled:

Title – triggers automatic display of a LiveGraphics show opening title animation. This title uses the text from the Title-style line to populate the first line of the animated title and takes (hidden) text from a line entered using the Heading 1 style for its second line (when used).

Heading 3 – identifies a CUE. When the Headings switch is enabled, a lower-third title is automatically displayed for a short duration when the eyeline reaches a CUE for the first time in a segment. The first line of the title shows the full Switcher input name set in Input Configuration for that source. The second line of the title is drawn from the (Input Configuration) Comment entry for the source.

Hint: Titles as discussed above default to a pre-selected LiveGraphics title, and transition in and out automatically. To display a different title page, preload the desired title into Buffer 1 beforehand. This can be done using a command entered as a Comment in the docx file. You can also use Comments to change the title's transition effect, display duration, and so on.)

SECTION 21.3 COMMENT–BASED COMMANDS

While heading styles provide some useful automation possibilities, the use of *Comments* in the .docx file provide much more powerful and detailed options.
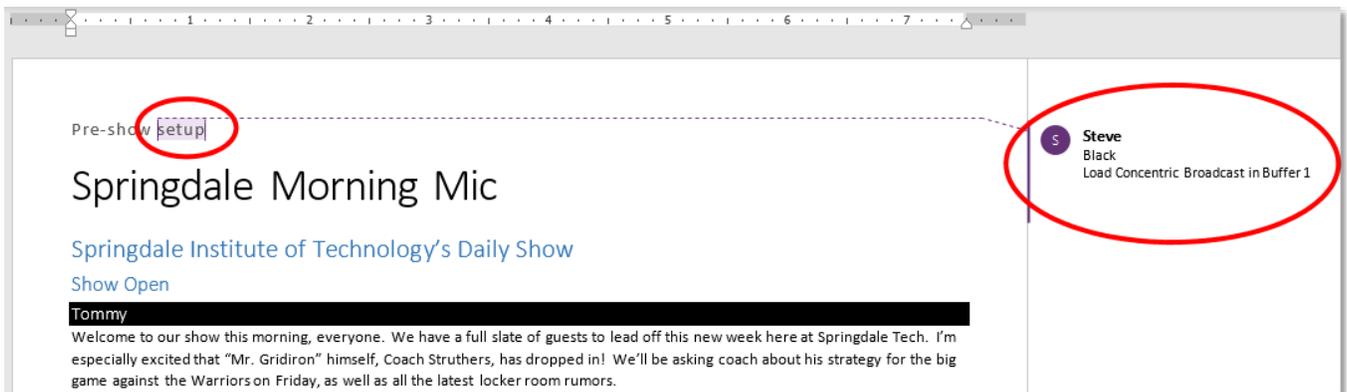
Note the *Comment* inserted into the text in the image above. You'll see that it has two lines. The first is simply "Black", which tells TriCaster to select the input named "Black" on its *Program* row.

21.3.1 FUZZY LOGIC

Interestingly, the very same thing would occur if the command entered in the *Comment* had instead said "Show black", "Put black on program", "Send Black to Program", or "Output black". Live Story uses "fuzzy logic" to try to find the best match to your entry.

We mentioned earlier that you can move the mouse pointer over blue text in the script pane to see a tooltip showing how Live Story interprets your comment. It's helpful to know that Live Story determines the probability that the interpretation is correct. If the wording of a *Comment* entry is ambiguous, and could be interpreted differently, the text color in the script pane is red rather than blue.

Hint: If a comment has multiple lines in it, Live Story adds an asterisk to any ambiguous lines in the tooltip. The entry "Output black" would trigger this behavior, even though it is correctly interpreted, with the result that black is shown on output.

21.3.2 LIVE STORY CREATOR VS. MACROS

Let's pause at this point to consider how Live Story commands differ from the somewhat similar shortcuts used by macros.

Like Live Story commands, a macro shortcut is entered on a single line, and may support arguments, or parameters. Macro shortcuts, however, require you to use very specific syntax. By contrast, though, Live Story commands are entered using 'natural language' – the way you might normally speak or write. A macro shortcut will generally fail with an error if your syntax isn't perfect, while, as mentioned previously, Live Story uses fuzzy logic to try to find the best match for your command and only fails 'reluctantly'.

Hint: Live Story documents are evaluated on loading. When Live Story determines its evaluation of a specific command in a Comment could be incorrect, it posts a message to TriCaster's Notification panel to note the ambiguity, in addition to marking the commented text in red in the script pane.

Additionally, a single *Comment command* can do things that would otherwise require multiple commands entered on separate lines in a macro. Consider for example, when Live Story encounters the simple *Comment* entry "fade tom slow", it results in the following steps:

1. Select an input named "Tom" (or "tom", or with a similar string, such as "Tommy" in the input Comment box) on the Switcher's *Preview* row.
2. Set the Switcher's *Background* transition effect to Fade
3. Set the effect speed to *Slow*
4. Perform an *Auto.*

To do something similar using a macro, you'd need to enter four separate lines, getting the syntax correct for each macro shortcut – and since macro commands require an input index parameter rather than a name, you'd need to know in advance which camera would be pointed at Tom. If Tom was moved to a different chair on your set at the last minute, the macro would need to be modified. Using Live Story Creator, you could simply rename the camera.

Better yet, continuing with the example above, if – rather than naming an input "Tom", you prepared a PTZ preset (or Pan and Scan preset, for a non-PTZ source) and named it "Tom", TriCaster would automatically select that preset at step 1 above.

> *Hint: Imagine what this means if you are using a few PTZ cameras to cover a city council meeting, with PTZ presets prepared for different participants. If two people change seats at the last minute, all you need to do is update the PTZ presets and Live Story Creator will take care of everything else for you!*

So, not only are Live Story Comment commands easier to write, often performing multiple operations with a single entry, but they are 'smarter', and easier to maintain and update. Which brings us to another key feature.

21.3.3 LIVE UPDATES

As clever as Live Story is, at times you will want to experiment, or need to tweak your wording to bring about the result you intend. As we mentioned, you don't even need to press *Play* to test modifications, you can simply reload the .docx file and hover the mouse over commented text to see the way the embedded commands have been evaluated.
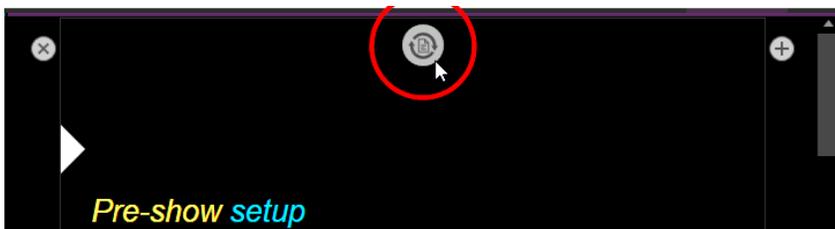
Making this exercise even better, Live Story Creator has a built-in *Update* feature, and monitors changes to the script file you loaded. Suppose you are using a laptop to edit your script in Microsoft Word. You might opt to save the file across a network connection to (for example) the shared Public\Documents folder on your TriCaster.

Then, when you modify the document and save it (which typically requires just a quick keyboard operation to perform - CTRL + s) Live Story will immediately show an *Update* icon at the top of the script pane. Click this to reload the .docx file with the changes you made.

> *Note: This will reset Live Story's eyeline indicator to the top of the script, so don't update when your talent is reading from the teleprompter you are quite confident that they will miss you with whatever they throw!*

21.3.4 DEFAULT BEHAVIORS

We mentioned that Live Story's *Comment commands* can perform compound operations and are simpler to use than macros. They are designed to provide a useful result even when you don't supply complete information. Let's look at an example.
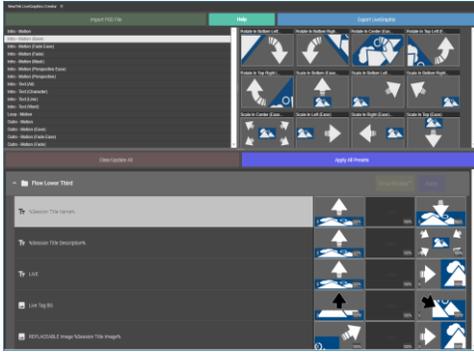
The left image above illustrates the result of the *Comment command* "Fade Football Star on in PiP" (the simpler entry "PiP football star" would have produced the same result). We didn't supply much detail about our intentions, so Live Story produced a 'default' picture in picture effect, as shown.

But perhaps you want to make some changes. In the image on the right, we have edited the Comment command to read "PiP Football Star large top right". Since we defined the position of the overlay, and specified a size, we achieved a more pleasing result.

The *Comment command* "title" provides another example of default operation. Add the simple entry "title brackets lower third" to a comment. Live Story evaluates the comment when the *eyeline* indicator reaches it, and the predetermined defaults are used so you may not even need to add any more detail. The designated title page (Brackets Lower Third) is automatically i) loaded into a Buffer, ii) assigned to a DSK, iii) faded on, iv) held briefly, and then v) faded off).

In this example, you might kick things up just a bit by changing the effect used to introduce the title page. The *Comment command* "Show Title brackets lower third Edge LtoR(H)" works quite nicely for this purpose.

> Hint: You might want a title to remain in view longer than the default time. To do this, add the word "hold" to the command you use to display the title. Then insert a new comment into your script at the point where you want to remove the title from view and enter the command "title off".

Try different things – you can change effect speed (Fast, Medium, Slow), specify the DSK to use, and so on.

21.3.5 MORE COMMENT COMMANDS

We can't provide an exhaustive listing of every possible command and combination of options, but we'll identify the main features Live Story currently supports (varies by model) and give some examples and a few alternatives that work just as well. The best way to learn is to just try typing in what you want to happen!

- "Set input 2 Volume to -5"; "volume input 2 5dB"; "input 2 9dB"; " Set volume for input 2 to -20"
- "volume master 5dB"; "Set Saster Volume to 5"; "set volume to 5"
- "mute"; "mute on" – mute master output
- "unmute"; "mute off" – unmute master output
- "mute out 2"; "mute out 2"; "mute aux 2"; "mute aux 2 on"; "aux 2 mute on" – mute named output
- "aux 2 mute on"; (etc.)
- "mute input 3"; "mute input 3 on" – mute the named input
- "mute input 3 off"
- "solo input 6"; "solo input 6 on" – solo the named input
- "solo input 6 off"
- "unsolo input 6"; "solo input 6 off" – disable solo for the named input
- "follow input 6"; "follow input 6 on" – solo the named input
- "follow input 6 off"
- "input 4 eq"; "input 4 eq on"; "input 4 enable equalizer"
- "input 4 eq off"; "input 4 disable equalizer"; (etc.)
- "input 5 compressor on"; "input 5 enable compressor"
- "input 5 compressor off"; " input 5 disable compressor"; (etc.)
- "AudioMemName"; "select AudioMemName"; "recall AudioMemName"; "mixer AudioMemName"; "audio AudioMemName"; audio select AudioMemName"; "audio recall AudioMemName"
- "audio select MEM 3"; "audio select 3"; "audio recall 3"; "audio recall mem 3"; "mixer select 3"; "mixer select mem 3"; "mixer recall 3"; "mixer recall mem 3"

COMPS

- "load MyComp"; "select MyComp"; "myComp" – loads the named main Switcher *Comp.*
- "comp 3"; "load Comp 3"; "select comp 3"; "go to comp 3"
- "m/e 1 comp 2"; "me1 comp 2"; "select comp 2"; "load main comp 2"; "go to myMEname myCompName"; (etc.) – loads the designated *Comp* into the main *Switcher* (default) or named *M/E.*
- "myComp medium"; ""myComp normal"; "myComp 1.0"; "go to myComp slow"; (etc.) – loads a Comp using the designated speed.

MEDIA PLAYERS

- "play lion"; "play lion on main"; "="take lion on me1"; "cut to lion on m/e 1"; (etc.) – locates, loads and plays a clip named "lion" on the main Switcher (default) or named M/E; performs an auto or take when playback ends. The scrolling of the script pauses until playback is complete.
- "circle(h) lion" works as above but uses a Circle wipe to display and remove the clip.
- "play lion ddr2" forces the operation to use DDR 2 (rather than selecting a default DDR)
- "add lion to ddr 2; "load lion ddr 2" – adds the clip without displaying it
- "play lion at 9 db";

- "play lion voiceover"; play lion vo" – the script continues to scroll during playback
- "play lion at 5 db"; "play lion 5db"; "lion 5 db"
- "DDR 1 stop"
- "DDR 1 Next"; "DDR 1 Previous"

DSKS

- "Toggle DSK 1"
- "toggle DSK 1 slow"
- "auto on dsk 2 slow"; "auto on M/E 2 key 2 slow"; "Fade M/E 2 keyer 1 slow";
- "fast auto off dsk3"
- "Set main dsk 1 as input 1"; "Set input 1 on main dsk 1"; "set DSK 1 to GFX 1"; "set M/E 1 Keyer 1 to GFX 1"; "assign GFX 1 to Me2 key 2"; (etc.)
- "Play lion in dsk2"; "Play lion on dsk2"; "Show lion in dsk2" – plays a clip named lion in DSK2, fading on and holding the last frame.
- "Play lion on key 2 in M/E 1 with slow circle(h)" – as above but uses a slow Circle wipe in M/E 1.
- "Show lion on dsk 3 with fast auto"; "Show lion on dsk 3 with take"
- "set main DSK 3 transition to circle(h)"; set circle(h) Me2 key 1"; "change transition on me4 for key 2 to circle(h)"; (etc.)
- (etc.)

See also dedicated PiP (Picture in Picture) commands)

BUFFERS

- "Add globe to buffer 6"; "buffer 6 load globe" – loads the Globe *Frame Buffer Animation* effect to the target buffer
- "Add Hexagon lower third to buffer 6" – loads the named static title page into the target buffer
- "buffer 3 load Hexagon Broadcast" - loads the named LiveGraphic into the target buffer
- "Buffer 1 set speed medium"
- "Buffer 1 speed 2"; "Buffer 1 set speed 2x"; "Buffer 6 globe 200%" – set speed to 2x the default (Medium).
- "set buffer 1 to layer preset 2"; "set buffer 1 to index 2"; "set buffer 1 to preset 2"; "buffer 1 select preset 2"; "buffer 1 preset 2"; select buffer 1 index 2 (etc.) – select the designated *Layer Preset* for a LiveGraphics title page loaded in the buffer slot specified.
- "set buffer 1 to data preset 2"; etc.– select the designated *Data Preset* for a LiveGraphics title page loaded in the buffer slot specified.

MACROS

Of course, at times you may want to run a more complex macro from within a script, using a *Comment command.* The commands below will let you do that.

- "*macro_name*"; "macro *macro_name*"; "run *macro_name*"; "play macro *macro_name*"; etc.

- "stop *macro_name*"; "stop macro *macro_name*"; macro *macro_name* halt"; *macro_name* end"; etc.
- "stop all macros"; "stop macros"; "halt macros"; etc.
- "Continue Paused Macro"

PiP (Picture in Picture)

- "Input 5 pip"; "pip input 5"; "ots input 5" – assign input 5 to a default DSK and display it using default options
- "pip globe" – show the matching file (in the example, a Framebuffer Animation) using default PiP settings
- "pip globe center large"; "pip globe middle large"
- "pip me1 key 2 globe small bottom right"
- "pip input 5 large center" – assign input 5 to an unused DSK and display it large size at center screen
- "pip main dsk 3 input 5" – assign input 5 to DSK3 and display it using default options
- "pip me1 dsk 1 input 2" – assign input 2 to DSK1 in M/E 1, and display it using default options
- "pip input 5 fly in L" - – assign input 5 to an unused DSK and fly it in from left
- "fade pip off"; "ots off" – remove the default PiP from output using a fade effect
- "pip main dsk 2 off"– remove the PiP in DSK 2 from output
- "pip *myPtzPreset*" – recall the named PTZ preset and show that source in a PiP
- "pip dsk1 *myPtzPreset* "; "pip me1 key1 *myPtzPreset*"; "take pip *myPtzPreset* "; (etc.)

PTZ

- "*myPtzPreset* "; " *myPtzPreset* on program"; "put *myPtzPreset* on program"; "take *myPtzPreset* on program"; "select *myPtzPreset* on program"; "take to *myPtzPreset* "; (etc.) – locate a PTZ preset named "myPtzPreset" and display it on Program output.
- "put *myPtzPreset* on preview"; "select *myPtzPreset* on preview"; etc.
- " *myPtzPreset* on M/E 1 b row"; "me1 put *myPtzPreset* on b row"; "me1 select *myPtzPreset* on b row"; "set me1 b row to *myPtzPreset*"
- See also PiP-related PTZ preset commands.

Record, Grab

- "record"; "record on"; "recording on"; "start record"; "begin record"; "start recording"; etc.
- "record off"; "recording off"; "stop recording"; "end recording"; etc.
- "Grab still"

Stream

- "stream"; "stream on"; "streaming on"; "start stream"; "begin streaming"; etc.
- "stream off"; "streaming off"; "stop streaming"; "end stream"; etc.

SWITCHER

- "auto"; "transition" – perform a *Background* transition on the main *Switcher*
- "take"; "cut"
- "fade"; "crossfade"; fade slow; etc.
- "input 4"; "input 4 on program"; "put input 4 on program"
- "bob"; "take to Bob"; "take Bob on program"; "fade to Bob"– perform a *Background* (Take or Fade, respectively) transition to show a source (or PTZ preset) named "Bob" on the main *Switcher.*
- "input 4 on preview"; "put input 4 on preview"; "set preview to input4"; "input 4 on b row"; "set layer b to input 4"; etc.
- "me1 put input 4 on preview"; "set M/E 1 preview to input 4"; etc.
- "set M/E 1 b row to input 6"; "set me1 layer b to input 6"; "input 6 on me1 b row"; etc.
- "auto to input 4"; "transition to input 4" etc.
- "fast auto to input 4"; etc.
- "auto to input 4"; "transition to input 4" etc.
- "M/E 3 bob"; me3 auto to input 4"; "transition me3 to input 4"; etc.
- "ftb"; "fade to black"; "ftb off"; etc.

DSK

- "DSK1 Auto"; "dsk 1 perform auto"; etc.
- "dsk2 take"; etc.

DATALINK

- "set datalink key myVar to I'm a Yankee Doodle Dandy"
- "datalink key myVar equals 12";" set datalink key myVar to value 12"; "set datalink myVar to 12"; "set myVar to 12"; "myVar equals 12"

TITLES

- "Aero Broadcast"; "Title Aero Broadcast" – for a LiveGraphic title, sets the default layer preset (10), then transitions the designated title in a default buffer assigned to a default DSK, removing it after 8 seconds;
- "Aero Broadcast hold"; "title Aero Broadcast hold" – as above but does not automatically remove the title
- "title Aero Broadcast Fly In L medium"; etc. – as above using the designated transition and speed
- See also title-related commands listed in the Buffers subheading.

ALIASES AND COMMENTS

You can use these *comment commands* to eliminate the need to pre-configure Switcher source names. Instead, you can set them right in the .docx script. This also allows you to change the metadata associated with a Switcher inputs at various points in your show as you wish.

- "Sam Smith is on input 4"; "assign input 4 to Sam Smith"; "set input 4 to Sam Smith" - set an alias for the designated input's name value

Hint: You'll likely want to use the full name here, for use in connection with titling.

- "input 4's description is CEO of Megadyne Inc."; "Input 4 memo is CEO of Megadyne Inc."; etc. – sets the descriptor for the input, which is used as the value for the second line of default lower third titles

SECTION 21.4 TELEPROMPTER OUTPUT

Even apart from all the foregoing (for example, if you disabled both the Comments and Headings support), Live Story Creator would still be very useful as a native teleprompter. Coupled with file watcher functionality to easily update your script right up to 'air-time', this feature saves setup time, expense, and provides exceptional output flexibility.

21.4.1 CONTROL

We discussed Live Story's onscreen teleprompter controls earlier in this section, but these primarily serve for use during setup.

For live use, most prefer a dedicated physical controller device, whether for use by the talent or another teleprompter operator in the studio. Live Story natively supports the ShuttleXpress USB controller by Contour Design Inc.

You will find this device provides common teleprompter controls in an easy to use and affordable manner.

To support a wide array of external teleprompter hardware, Live Story assigns the scrolling text output to the highest numbered Switcher output by default. You can then assign this signal to a video Mix output supplying a physical video output connector to feed an external device.

Of course, in an NDI environment, you have other powerful options. TriCaster automatically supplies the teleprompter output to your network as an NDI stream, offering many display options. For example, the Studio Monitor application included with the free NDI Tools bundle can be used to display your teleprompter output on Windows and OS X platforms. Another option, (in a new session) Live Story assigns the highest numbered external Switcher source to the Teleprompter's NDI output, making the Teleprompter output available to Multiviews.

Chapter 22   STREAM/ENCODE

Live webcasting has dramatically altered the broadcast landscape. The live streaming market provides many creative and profitable opportunities. When it comes to taking advantage of this new medium, your TriCaster live production system places you in the forefront of all the excitement.

SECTION 22.1 INTRODUCTION

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.

TriCaster's *Streaming Configuration* panel supports the creation and configuration of all the information and settings you are likely to need in this context.

SECTION 22.2 CONFIGURATION

To open the *Streaming/Record Configuration* panel click the *gear* at right of the *Dashboard*'s large *STREAM/ENCODE* button.
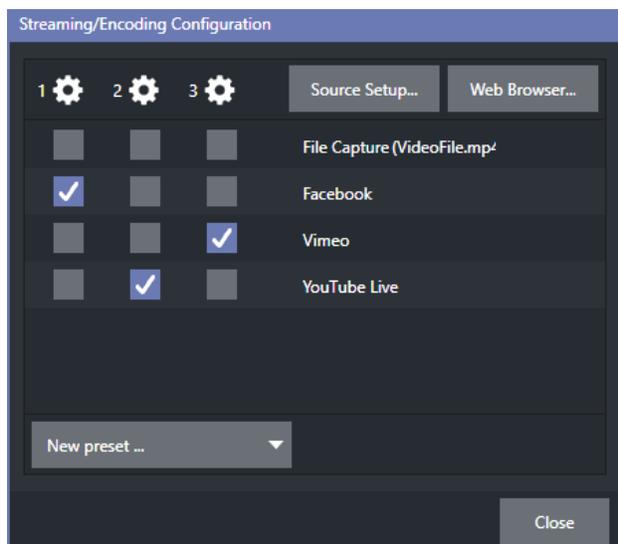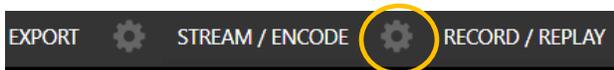
Note: The number of streaming encoders provide varies by TriCaster model.

22.2.1 SOURCE SETUP
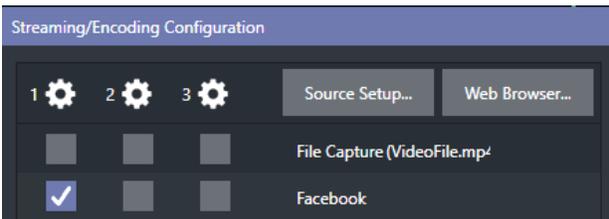
To assign video and audio sources to either streaming encoder, click the *SOURCE SETUP* button in the header of the *Streaming/Record Configuration* panel. Doing so opens the *Output Configuration* dialog, where you can continue to choose audio and video sources and adjust audio volume.

22.2.2 THE WEB BROWSER

The *Web Browser* button in the header of the *Streaming Configuration* panel (next to Source Setup button) does what you would expect, opening a web browser. This feature is provided for your convenience 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 reuse this button to bring the browser window to the front again.

22.2.3 CONFIGURE ENCODERS
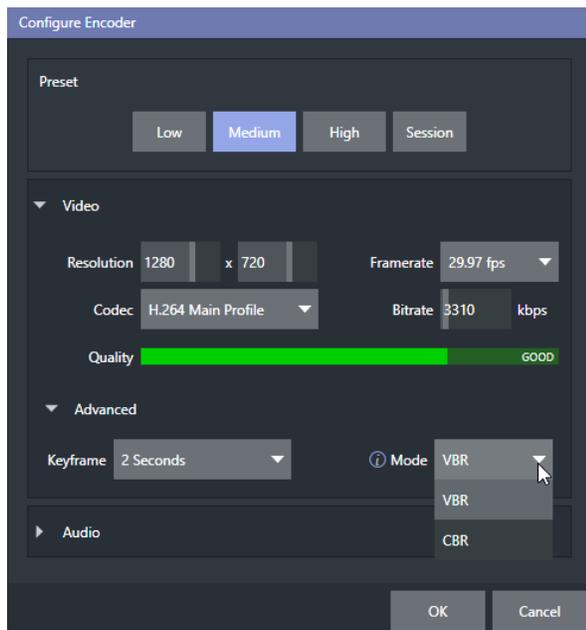
Settings for the two encoders are configured in the *Configure Encoder* dialog. Open this dialog by clicking the configuration (gear) icon for either encoder at left in the header of the *Streaming Configuration* panel.

Select an encoder *Preset* (such as *Medium* or *High*) or manually configure custom settings using controls in the *Video* and *Audio* control groups. The *Codec* menu in this panel allows you to select from a number of H.264 profiles as well as HEVC.

Under the twirl-down *Advanced* menu you will see two options for *Keyframe* and *Mode*. *Keyframe* provides an encoder keyframe rate in (1 to 5) seconds and to the right an *Encoder Mode* option offers (constrained) variable bitrate (VBR) and constant bitrate (CBR).

Hint: With constant bit rate vs variable bit rate video, CBR is best for live streaming encoding, and VBR is best for on-demand videos.

If you choose to enable a preset whose target requires different encoder settings, TriCaster will identify potential conflicts, and a yellow 'bang' will appear. Hoovering over the bang opens a pop up that will provide recommended encoder settings.

SECTION 22.3 DESTINATION PRESETS

The information for a given CDN or other encoder target is also retained in a *preset* (e.g., Facebook, Twitch.tv, YouTube Live, etc.) you can add these presets as needed to the *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.

On the left in this panel are three columns of checkboxes; these allow you to send the output from either of the two *Encoders* to the presets on the right.
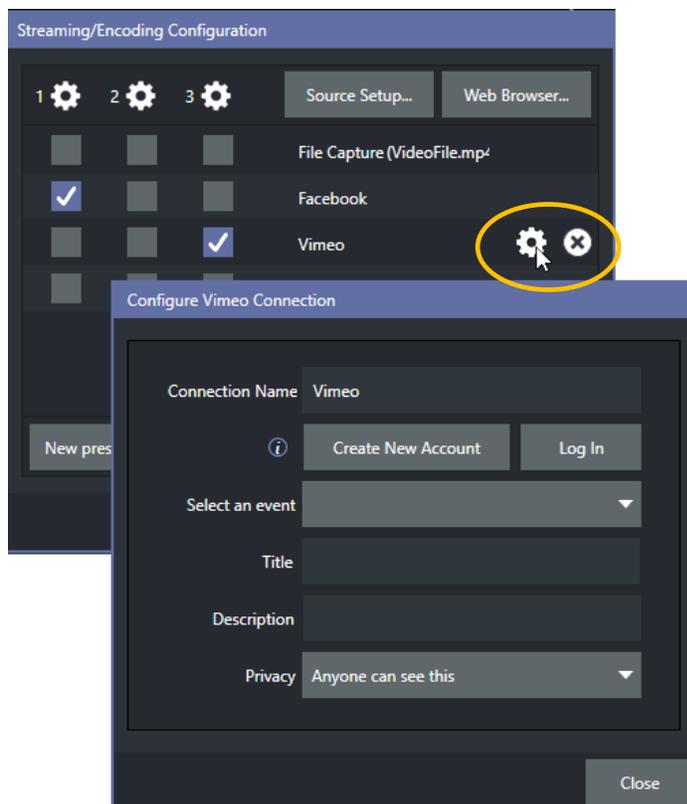
If you move the mouse pointer over a *Preset,* two new gadgets are shown on the right. Click the familiar *Configure* gear to open a suitable dialog. It may invite you to enter your account credentials for a site and *Sign In* or provide suitable controls for other relevant settings that are required. 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*.

22.3.1 CUSTOM PRESETS

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.

In some cases, a CDN (Content Delivery Network) service may provide you with an XML file containing the recommended configuration settings related to your streaming account. (The *Import Settings* button in the Custom Connection dialog can be used to load this file, from which it will extract suitable values for streaming via the service automatically.)

SECTION 22.4 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/ENCODE button in the *Dashboard* at the top of the *Live Desktop panel*. (The button will display elapsed time during streaming/encoding.) Once streaming has started, clicking the presets will start or stop that individual preset independently from the others.

> *Note: You cannot click a Preset streaming on one encoder and expect it to switch to another encoder. You must stop the first encoder, then select the other encoder.*

SECTION 22.5 CAPTURING THE STREAM

To archive a live stream file as it is created by an encoder, simply configure and checkmark a *File Capture* preset for that encoder.

SECTION 22.6 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.

22.6.1 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.

ON DEMAND HOSTING

The *Record* module permits you to capture your productions to a local hard drive. 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

Live streaming is a growing international market, and one you may well wish to serve. This form of streaming is a somewhat more demanding implementation. Rather than record a file and deal with it later, live video is transmitted over the network (effectively in real-time, 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. Also, 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.).
- SRT is an open source protocol that is managed by the SRT Alliance. It can be used to send media over unpredictable networks, like the Internet. More information about SRT can be found here - https://www.srtalliance.org/

The processing demands from high-quality video applications and devices have increased in the last few years. As video content continues ever-expanding, technology evolves to handle the demand. Beginning with TriCaster version 7-4 dated January 2021 and later, TriCaster will take advantage of GPU hardware acceleration for all stream decoding.

Unfortunately, some streams are simply incompatible with the GPU decoder. We recommend that the originating stream vendors look to solve the compatibility and take advantage of modern GPU decoding. We also understand that users of TriCaster may not have that option and must wait for vendor development cycles.

As a workaround, if a stream is found to be incompatible, you can append the URL with a command that instructs TriCaster to not use hardware acceleration.

(optional components are enclosed in square brackets)

rtsp://\[username\[:password\]@\]ip_address\[:rtsp_port\]/server_URL\[?param1=val1\[&param2=val2\]...\[**&hw_accel=false**\]\]

For example, the original URL of:

rtsp:// stream_IP_address.com:554/myStreamserver

Would change to:

rtsp://stream_IP_address.com:554/myStreamserver**?hw_accel=false**

Band width Considerations

You'll often hear the term 'bitrate' in connection with streaming. This expression refers to data throughput per second (generally measured in Kilobits per second, or Kbps.) You could think of this as being like water flowing through a hose. You control the 'faucet', because you get to choose the *streaming Profile* setting in the system's *Configuration* panels. However, you don't own the 'hose' – or, at least, not the *entire* hose.

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 an example 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 ensures their experience will be poor. The client player tries to play at the specified bitrate, but (in this example) the wireless bottleneck impedes flow. It is as if you connected a fire hose on your end, giving them a suitable high-capacity nozzle for their end – but in the last stage of flow, the stream must pass through a small garden hose. Sadly, the stream will be quite insufficient, and output from the 'nozzle' (the client player) will 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. (Nothing inclines viewers to turn away quicker than a stuttering, start and stop stream. See "Speed Tests" in Section 22.8.1 for some useful resources.)

22.6.2 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 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.

SECTION 22.7 PRODUCTION AND CAPTURE CONSIDERATIONS

If you're not intent on live streaming, but wish to capture a live switching session, you would likely record at full resolution using the *Record* button (rather than *Stream*). The high-quality captured files can then be used later in a *DDR* or perhaps be transferred to another computer (even on a different platform) for external processing or editing.

> *Hint: Use a portable hard drive to transfer the files between systems or simply move them across a network.*

You can always convert these files to a streaming file format if you later decide you'd like to supply them for 'on demand' Internet viewing. This lets you retain best quality right through to final output. When you eventually encode for streaming, you can choose settings that best suit the intended audience and streaming environment.

At the very least, if (perhaps to save conversion time) you capture video for web distribution using an encoder, it's best to capture it at least at the size that you intend for final output. This helps ensure satisfactory video quality for your viewers. When video is compressed (as it invariably is for web viewing) you can lose important detail; compressing a full-screen video down to a quarter or a sixteenth of its size is a lesson in humility!

Other variables to keep in mind when you're creating 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. Too, audio from cameras and camcorders is rarely as good as that from external microphones. You should at least use a clip-on lavaliere microphone, if not a directional or shotgun microphone to be sure you record only the audio you really want.

SECTION 22.8 DIAGNOSTICS AND TROUBLESHOOTING

Video streaming is becoming commonplace, but there are still a lot of things to consider. You have the necessary tools, but problems can occur. This section will point you in the right direction to overcome them.

22.8.1 TESTING YOUR STREAM

When it comes to using your system in a professional live production environment (i.e., your bread and butter depends on getting it right, and <u>now</u> - not tomorrow), 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, backup recording devices (there's no shame in having a VCR backing up your digital record – 'low tech' still has a place in the grand scheme.)

But you also need to perform onsite testing, to ensure your live stream is working well before 'zero hour.' No-one will thank you for excuses, no matter how brilliantly they point the finger at forces beyond your control.

1. Set up and enable a test stream.

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, 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 local system and its encoder.

Ping is a humble but effective tool to ensure the basic connection exists, thus it can help you with streaming, (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 to know the IP number of the target computer.

Finding the target IP number

For Windows XP

1. Select *Run* from the Windows *Start Menu* (look in the *Settings* sub-menu if it is not listed at the top level).

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, along with other data.

For Windows Vista (or later)

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 on the 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.

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

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

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 the first image below. A success ping will display a report like in the second screenshot.

```
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>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
```

Apple® OS X

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.

22.8.2 SPEED TESTS

Are you sure your upload bandwidth is adequate to the bitrate you've set for your stream? Why not test and make sure? Again, several 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

22.8.3 WHERE IS THE PROBLEM?

When diagnosing streaming issues, don't overlook the fact that TriCaster is just one piece of the puzzle. Many other factors are just as important.

One useful thing to try is to check the streaming file. Archive the streaming output file locally and then examine it to see if it has any problems. This file corresponds exactly to what the encoder is sending to 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 after the encoder (perhaps a network problem or CDN configuration mismatch).

Chapter 23   EXPORT

The Export feature allows you to publish clips and stills from events like sports, entertainment, seminars, or news programming to social media sites, even while the live action and capture continues uninterrupted. Networks, corporate users and others with sophisticated website and distribution needs can deliver content moments after events occur for all manner of timely applications.

SECTION 23.1 OVERVIEW

In today's broadcasting world, a single program feed is often inadequate. Many viewers ingest media from multiple sources, even simultaneously. A live (and lively) online presence is critical for many productions with little or no traditional broadcast following. Publishing backstage feeds, locker room interviews, pre- and post-game chatter, etc.), to popular Internet sites can provide many opportunities for brand extension and monetization. In addition, the *Export* feature supports both transcoding and distribution to local or networked storage for archival or postproduction purposes.

Briefly, once you configure presets for your social media accounts and other publishing targets, the *Export* tools in the *Live Desktop* make it quick and easy to distribute selected content to multiple sites even while production and recording is still underway – just perfect for concerts, galas, and sport events.

SECTION 23.2 EXPORT MENU

The *Export* feature's user interface conforms in large measure to *Stream*, which we just discussed. Click the *Configure* gear next to the large *Export* button in the *Dashboard* at the top of the screen to open the menu.
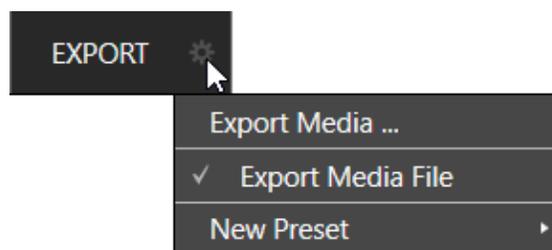
At the top (where you would see *Web Browser* listed in the *Stream* menu), is an *Export Media* item. This opens the panel which allows you to manage media files you intend to export. We'll discuss this panel soon.

23.2.1 PRESET LIST

Below the *Export Media* menu is a list of any presets you have configured as *Export* targets. (Before you create any presets for yourself, this list shows only the default *Export Media File* entry, a transcoding preset which cannot be deleted.)

Notice that each preset listed in the menu can be checked or un-checked. When you add media files to the *Export Bin* (by any method), the check-marked entries determine which *Export* targets are *automatically* assigned to them (you can also manually modify the presets for each item in the *Bin* at any time).

Hint: When the mouse pointer is over a preset in the Export menu, two gadgets are shown at right; the familiar gear allows you to modify the preset, and the (x) will remove it from the list.

23.2.2 NEW PRESET

Let's consider the *New Preset* menu item. Click this to display a sub-menu listing various supported *Export* targets (such as Twitter, or Facebook). Select an item here to open a dialog that lets you create a custom preset that will then appear in the list discussed above.

For most external sites (i.e., social media sites or ftp sites), the dialog requires you to enter account credentials. Typically, you will need a *username* and password for your social media accounts, as well as FTP servers (credentials are tested when you press *OK* and will report an error if a problem exists).

23.2.3 SOCIAL MEDIA SITES

Export can publish media to Facebook, Twitter, YouTube, and many more sites and services. Other connections may be supported as it becomes possible to do so.

23.2.4 TRANSCODE, SMTP, AND FTP

The *Transcode, FTP* and *SMTP* options let you handle various file conversions and publishing to local (or networked) storage volumes, or even as email. These are very useful output alternatives, effectively providing live export methods that do not force you to wait until production ends. This can be invaluable for collaboration, whether local or remote.

Transcode exports provide options to re-encode video in different formats before sharing. Select suitable options for your target device or application. For SMTP, replace the dummy email server entries with those of your own mail service.

23.2.5 WATERMARKING

To avoid unauthorized use of private or copyrighted media, you may want to add a watermark before exporting it to public sites. The *Watermark* feature in the footer of the various *Export* preset configuration panels allows you to select a suitable overlay image.

The image you select will be composited onto exported video or still image files. It should normally be a 32bit still image file (supported formats include popular formats such as PNG and Targa) that positions the watermark correctly in the frame considering the resolution and aspect of exported files.

Having discussed configuration of export accounts, let's move on to look at live operations. In the Dashboard's *File* menu, select the *Export Media* item to open this panel which allows you to manage the list of clips and still images you wish to export.
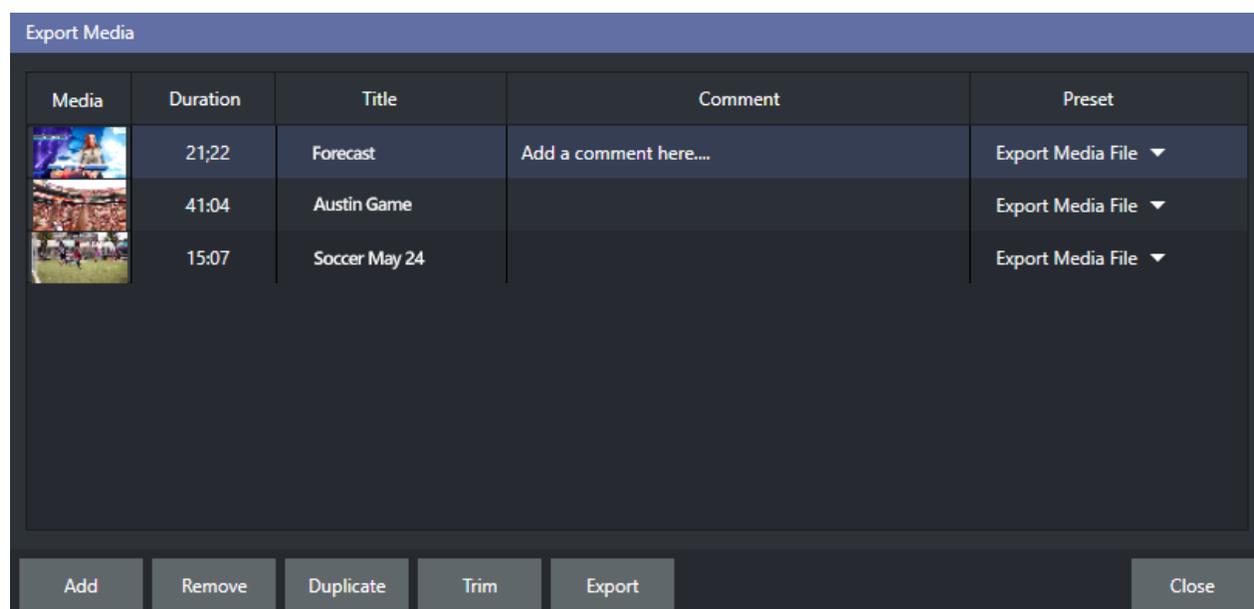
The features of the *Export Media bin* are powerful, but not hard to grasp. Click the *Add* button in the footer to open a *Media Browser,* which you can then use to select (and multi-select) content you wish to export. You can choose items from your current session or another location. These files will be added to the bin, but they will not be exported at this point.

> *Hint: You can Add and even Upload files that you are currently recording, even before pressing Stop. These files will be found in the virtual Session Recordings folder the Media Browser shows for the session.*

23.3.1 METADATA

Information is displayed for each media file added, including the file name (or 'alias', in the case of files added from a *Media Player* playlist, as we will discuss later), *Duration*, and *Preset* (depending on settings, multiple entries pointed at different destinations may be added in one operation).
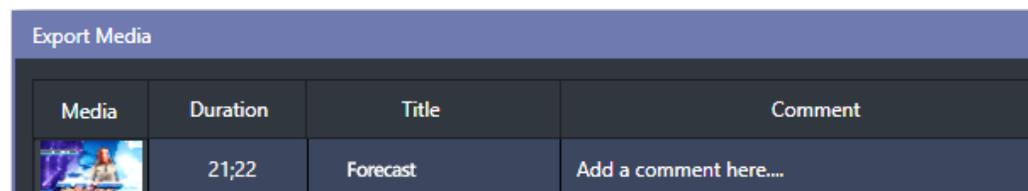
The *Comment* column allows you to add remarks that will be sent along with the upload to sites that support this. Click in this column to enable keyboard entry or navigate to it and simply start typing. Press *Enter* or click elsewhere to end editing. Similarly, type in the *Title* column entry to change the title supplied for the file to social media accounts but note that this has no effect on *FTP* or *Transcode* preset operations.

The *Preset* column provides a menu allowing you to change the export preset or even add multiple targets for each individual item in the bin. A checkmark beside a preset indicates the target is active.

Of course, *Preset* selections can vary from one item in the *Bin* to the next. Obviously, if no checkmarks appear here, the entry on that row is not fully configured, and will be ignored by the *Export* processor.

We touched on the *Add* button in the previous section. Three other nearby features help you manage your *Bin* entries.

- *Remove*, as you'd expect, deletes entries from the *Bin*, doing so without any effect on the source files.

- *Duplicate* clones selected entries. You may prefer this way of publishing an item to multiple targets (over adding multiple checkmarks to the *Preset* column for a single entry) at times.

For example, the encoding settings for one target may involve longer processing than you want to allow at the moment. Using a duplicate entry, you can defer processing that entry until a more convenient opportunity

- Click the *Trim* button in the footer to open a trimmer pane that allows you to set the *In* and *Out Points* for clips you plan to share (some file formats do not support trimming).

  Clips that are added while still being captured can be re-trimmed to take advantage of file 'growth'.
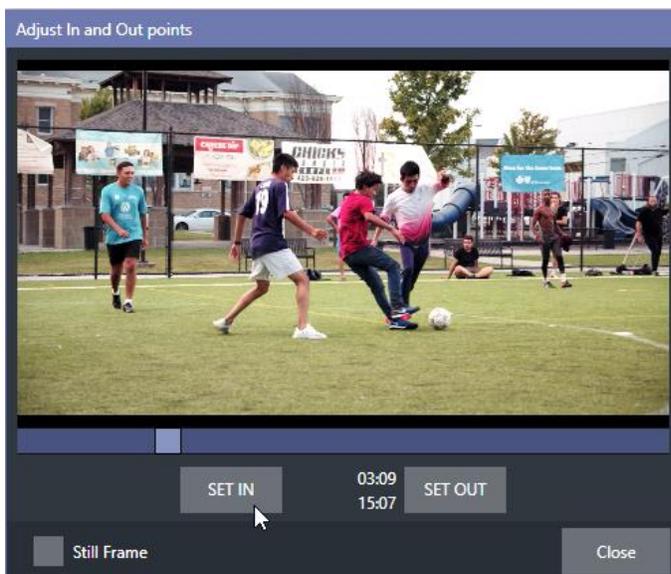
23.3.4 THE EXPORT BUTTON

Also located in the footer of the *Export Bin*, the *Export button* is a toggle; that is, like the light switch in your foyer, it has two states – on and off.

When lit, the *Export processor* is activated and is either watching for qualified entries *Bin* entries to appear for exporting or actively processing those that are 'ready to go'. (Conversely, of course, no light, no go …)

23.3.5 OTHER 'ADD TO' METHODS

Let's handle the final details you need to become a social media maestro. It seems obvious that manually managing the minutiae of exporting could intrude into the already hectic life of a switcher operator. Live production already demands a lot of attention.

Using *Add* in the *Export Bin* panel, entering comments, etc., would be quite a distraction. For this reason, Export makes it as simple as possible to share your media, as follows

Once you have configured your *Export* presets, check-marked one or more in the *Export* menu, and decided whether to add checks to *Stills*, *Clips*, or both in the *Auto Queue* menu, you have eliminated a good deal of the fuss. But we can do better yet – in two ways:

- You can flexibly add both stills and clips to the *Export Bin* with a single click, keystroke, or button press. You can also add items from the playlist of a *Media Player*, or directly from the *Grab* and *Record* features (see the heading File Operations in 11.1.1).

- Second, you can even automate the matter of adding custom titles and comments. *Grab, Record* as well as the *Media Players* all support individual custom *Names* and *Comments*, which will supply the corresponding metadata for your *Export Media* additions.

  Better still, the *Name* and *Comment* fields in *Grab* and *Record* support *DataLink* (compare Section 11.2.3). This lets you automatically supply unique and meaningful information to social media sites along with your *Export* uploads. You can even mix *DataLink* keys with literal text, to produce comments that embed things like the current time, the current score of a game, or the name of the person on camera at the moment into coherent sentences.

Chapter 24   RECORD, GRAB, AND REPLAY

You will often want to capture video clips from external sources, as well as to record your own live productions. Similarly, it can be quite useful to be able to grab stills from Program output for use in the current production. This chapter will provide everything you need to know about this topic.

SECTION 24.1 RECORD

TriCaster live production systems provide a great deal of flexibility when it comes to capturing your program, selected elements of it, and a wide array of internal and external sources (with embedded timecode).

TriCaster's IsoCorder technology delivers powerful recording capabilities. TriCaster's primary outputs are configurable; you can capture *Program*, *Program (Clean),* individual *Switcher* sources, *M/E*s, and more. Depending on your TriCaster model, you can record up to eight such "Mix" video sources simultaneously and also capture individual Switcher sources (recording capabilities vary by model and are also affected by storage bandwidth and capacity).

Recording is easily enabled and disabled by clicking the large *RECORD* button in the *Dashboard*. During capture, a nearby time counter tracks the length of clips recorded with the current base filename, and a horizontal VU meter beneath the button assures you that you are capturing audio.

> *Note: It is not necessary to interrupt recording to add a clip that is being captured to a DDR playlist or the Publish Bin. Clip icons show a red 'recording' indicator on clips currently being captured in playlists, the Publish Bin, and in the Media Browser.*

24.1.1 RECORD CONFIGURATION

Of course, before you begin recording, you'll want to determine *what* to record, *where* to record it to, and so on. To support IsoCorder's flexible ability to capture almost anything, settings and controls for recording are provided in the individual *Input Configuration* panels as well as the *Output Configuration* pane. Click the *Configure* button (gear) for the control panel of the source you wish to configure to access these settings.

Let's review the features and settings found in these control groups.

24.1.2 CAPTURE CONTROLS
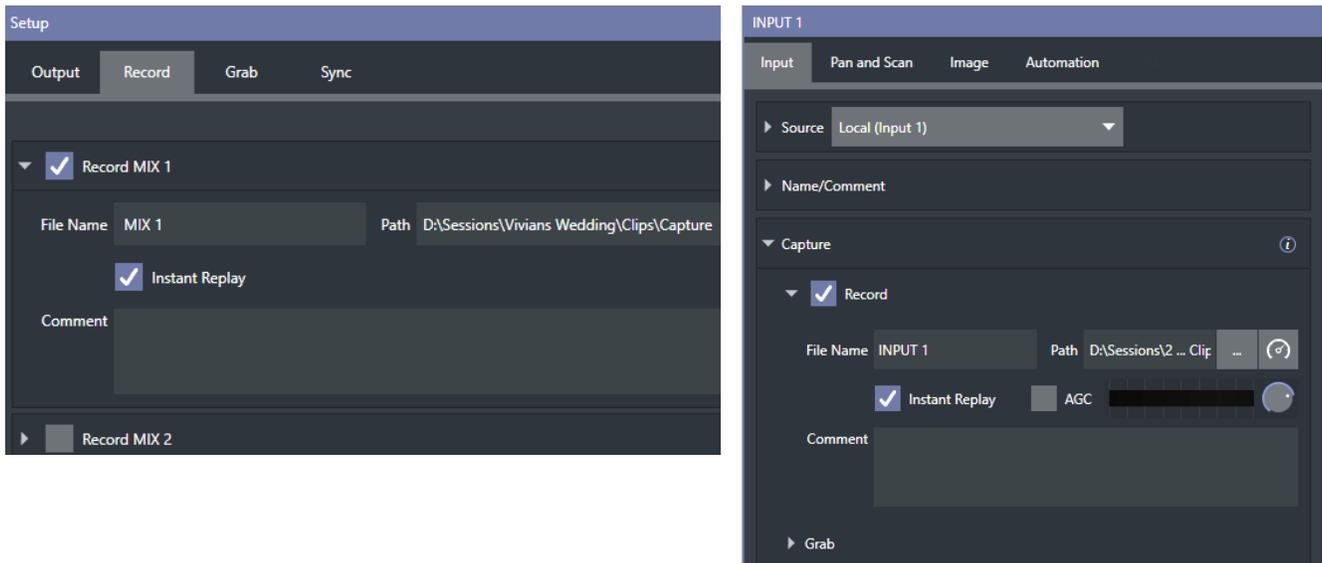
Whether you are setting up a recorder for a video input or output *Mix*, the *Capture* control group features are the same.

- A switch at the top is used to enable or disable the recorder
- Filename and path text boxes appear just below.
- A convenient *Drive Speed Test* button appears to the right of the *Path* field. Click it to open a utility that lets you evaluate the speed and capacity of your storage volumes.

Note: The same source cannot be selected for multiple recordings. For example: "IN 1" cannot be selected as the source for two recorders.

FILENAME AND COMMENT

IsoCorder uses the source name to supply the default filename for each recording (names are numerically incremented automatically as well), but these can be edited. Conveniently, TriCaster's DataLink key system allows you to insert dynamic values from real-time production sources into the filename.

For example, every recorded or grabbed file can automatically incorporate a date stamp, identify the input selected on the *Program* row at the time of capture, and so on. This is useful not only in locating files from specific sources later, but also when posting media to social media services using the *Export* feature.

Note: IsoCorder captures a low resolution 'preview' file along with the high-quality recording. We do not recommend deleting or moving these supplemental files when using the recordings on a TriCaster, as doing so will result in higher resource usage during live production.
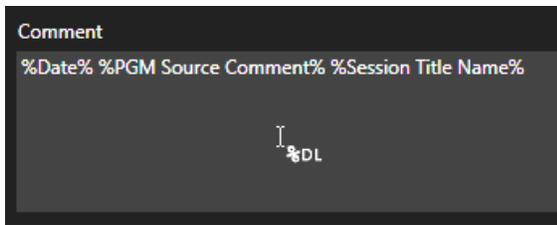
The *Comment* entry can likewise use *DataLink* values, and in turn can be used to provide metadata to title pages that refer to the captured clip's comment.

PATH

Click the three dots at right beside the *Path* field to select from available storage volumes as targets for the recording.

> *Caution: It is recommended that any single drive be tasked to capture one or two video sources at most. A warning message is displayed if you exceed this number when assigning Destination settings. You are allowed to exceed this limit, however, when you are confident that very fast volumes can handle the load.*

AUDIO LEVEL

The *Audio* Level control lets you set the volume independently for each source you capture and feature a convenient AGC option (Automatic Gain Control).

FILE FORMAT

IsoCorder records a high-quality Quicktime file. (You can use the *Transcode* function in *Export* to supply files in several different formats, when necessary.)

> *Hint: Download free Vizrt codec packs for Windows and Apple computer platforms from the Downloads page on Vizrt's Support website. TriCaster record format is also supported by the NDI file plugin for Adobe Premiere included with the free NDI Tools bundle.*

SECTION 24.2 REPLAY

Not too surprisingly, the *Replay* switch in each *Capture* control group enables instant replay features for individual recorders. Before considering how to perform a replay, let's examine the *Dashboard* menu *Replay* options, which affect its playback settings.

- *Replay Duration* – determines the length of replay clips added to the *DDRs*
- *Replay Speed* – set the playback speed for clips added to the *DDR* using the replay workflow
- *Replay in DDR* – select a DDR as the target for replay clip playback
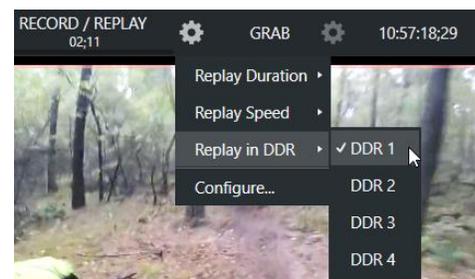
24.2.1 INSTANT AND DEFERRED REPLAYS

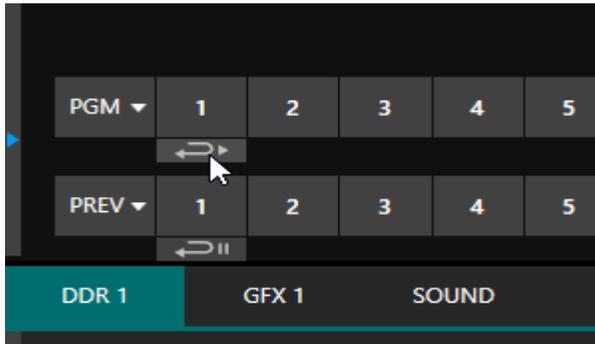The method of triggering a replay varies depending on whether your want to replay a clip captured from a *Mix* (output) or directly from a *Switcher* input.

24.2.2 SWITCHER SOURCE

When the *Record* and *Replay* switches in the *Capture* control group for a *Switcher* source are both enabled, special replay controls are shown beneath its buttons on the *Program* and *Preview* rows of the *Switcher*

Click the replay button beneath the *Program* row to trigger an instant replay using the DDR's *Show On* (PGM) feature and settings. (Or hold down CTRL and click the larger Switcher button itself to do the same thing.)

The similar button beneath the *Preview* row is even more useful; it adds the replay clip to the *DDR*, and leaves it selected, but does not play it on *Program Out* immediately. When you are ready to insert the replay clip into your program, press the keyboard *CTRL* key and the *Spacebar*. This will trigger the *Show On* (PGM) feature for the DDR currently assigned to replay duties. This workflow lets you defer replay playback until a more appropriate moment.

24.2.3 MIXED OUTPUT

Since outputs do not appear on the *Switcher* rows, the methods above do not apply. Instead, simply press a number pad key from 1-4 to trigger an instant replay from the corresponding output (Mix 1-4) recorder.

> *Hint: It's possible to assign an NDI output from the system to one of its own inputs if you prefer to use the same method as described earlier for your output replays.*

At times, all you really want to capture is a still image from the current *Program Output* video stream (or perhaps, an input). This is the purpose of the *Grab* function.

Grab is represented by a large button in the *Dashboard* at the top of the screen, and smaller grab (camera) icons which appear at upper-right on *Switcher* source viewports. The former grabs stills from MIX outputs (when enabled individually), while the latter grabs an image from specific *Switcher* sources.

THE GRAB MENU

Click the *Configure* button (gear) next to *Grab* in the *Dashboard* at the top of the *Live Desktop* to choose a target *Media Player* for grabs. Otherwise, input and output grab configuration options are very similar to those described above for recording.

> *Note: De-Interlacing is automatically applied to avoid a 'comb' effect caused by inter-frame motion in fielded sessions.*

TriCaster ships with a huge number of stylish title template pages that can be edited even while live, as discussed in Section 11.2. Many include replaceable images embedded in them. This chapter explains how you can create your own custom title template pages.

Of course, you can create static titles and graphics in Adobe Photoshop or other popular graphics and paint applications, and display these as images in (for example) a *DSK*.

However, you will often find it useful to create, instead, an *editable* title page in Photoshop that, once loaded and compiled by TriCaster as a native CGXML file, works just like those supplied with your system. The text remains editable, and embedded images can be marked replaceable too.
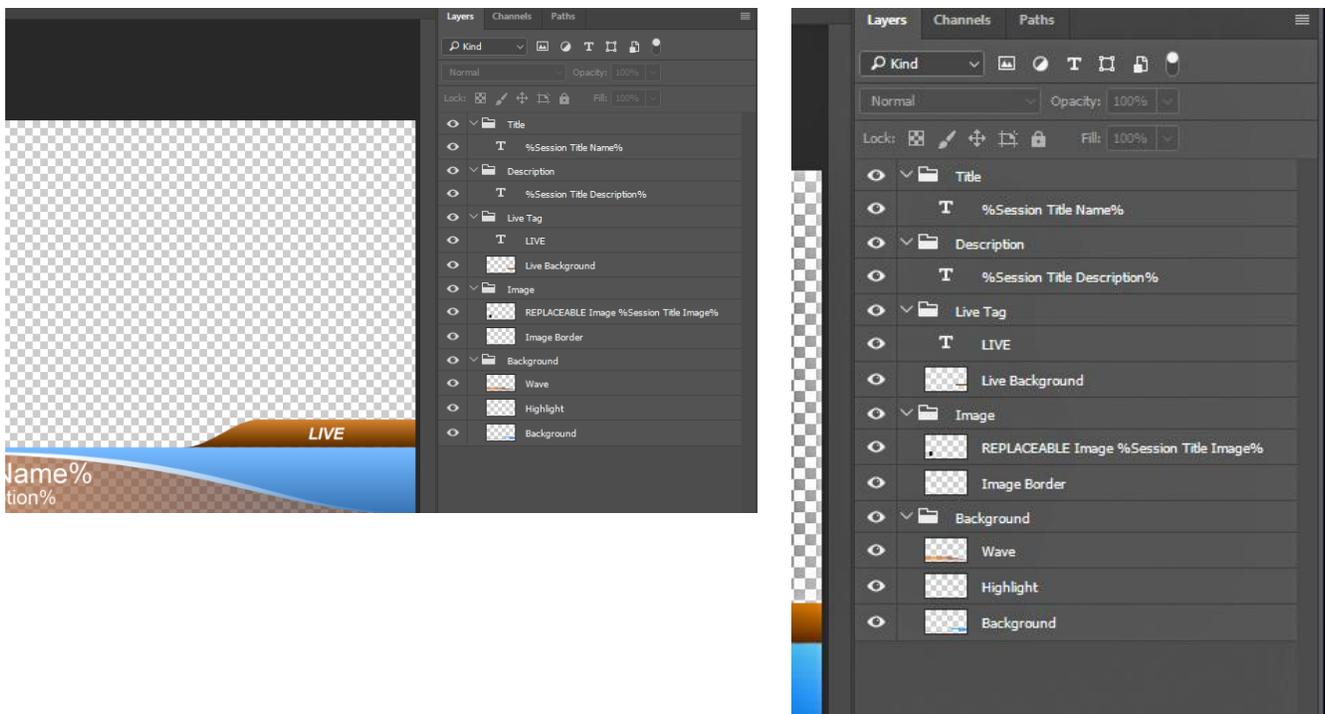
To make an image replaceable, simply add the string "REPLACEABLE" to the layer's label in Photoshop. You can even assign a *DataLink* key to the layer in the same fashion – naming the layer in the format "REPLACEABLE %twitterpic%", for example (without the quotation marks, of course).

As mentioned above, when you load the PSD into a *Media Player*, then open it in the *Title Editor*, the text is editable, and placeholder images can be replaced. And it gets even better if you load the file into a *Buffer*.
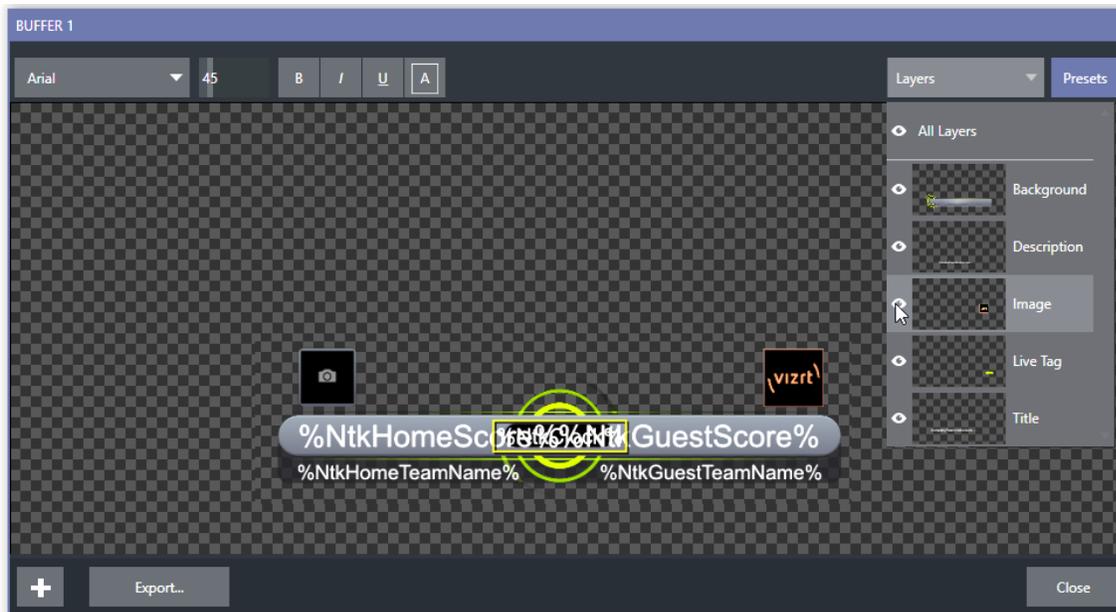
In that case, the *Title Editor* will show both *Layer* and *Data* presets, just like when you load a *LiveGraphic* title page, and store the result in a preset. Having done this, you can selectively hide or display different layers (or layer groups) of your Photoshop composition with a click or tap using the *Buffer* preset system.

In this manner (using *Layer presets*), a single title page can be used to display a whole theme pack of CG elements, and likewise (using *Data Presets*) a single title page can be updated to show individual player statistics for a whole team, and so on – all with a single click.

PART III APPENDICES

Appendix A: FEATURES & SPECIFICATIONS

This section provides a feature comparison for the various TriCaster models. The first table compares advanced features by model; the second lists technical specifications.

NOTE: PA = Premium Access

A.1 FEATURES

Feature	TriCaster 410+	TriCaster TC1	TriCaster 1 Pro	TriCaster 2 Elite	TriCaster Vectar	TriCaster Vizion
12G SDI Support	N/A	N/A	N/A	N/A	N/A	Yes
Advanced Audio I/O	N/A	Yes	Yes	Yes	Yes	Yes
Advanced DSK Compositing	With PA	With PA	Yes	Yes	Yes	Yes
AI Keyer & AI Gaze Redirection	N/A	N/A	N/A	N/A	N/A	Yes
As-run Logs	With PA	With PA	Yes	Yes	Yes	Yes
Configurable I/O Connectors	N/A	N/A	N/A	N/A	Yes	Yes
Copy/Paste Keyer	N/A	N/A	N/A	Yes	Yes	Yes
Custom Session Presets	Yes					
Digital Media Aspect Ratio & Frame Rates	With PA	With PA	Yes	Yes	Yes	Yes
Fail-Safe (AV Passthrough)	Yes	Yes	Yes	Yes	Yes	N/A
HDR Session & I/O	N/A	N/A	N/A	N/A	Yes	Yes
HEVC 10 Bit Encoding	N/A	N/A	Yes	Yes	Yes	Yes
HTML CEF Buffer Graphics	Yes					
Live Call Connect	N/A	N/A	Yes	Yes	Yes	Yes
Live Call Connect Audio/Video Routing	N/A	N/A	N/A	Yes	Yes	Yes

Feature	TriCaster 410+	TriCaster TC1	TriCaster 1 Pro	TriCaster 2 Elite	TriCaster Vectar	TriCaster Vizion
Live Story Creator	With PA	With PA	Yes	Yes	Yes	Yes
LiveGraphics	With PA	With PA	Yes	Yes	Yes	Yes
LiveMatte Ultra	With PA	With PA	Yes	Yes	Yes	Yes
LivePanel	With PA	With PA	Yes	Yes	Yes	Yes
LivePanel Builder IsoPreview	With PA	With PA	Yes	Yes	Yes	Yes
Macro Aliases	Yes					
Macro (xlsx) Import	With PA	With PA	Yes	Yes	Yes	Yes
Matrix Router (NDI Routed Outputs)	N/A	N/A	N/A	Yes	Yes	Yes
NDI Alpha Out	With PA	With PA	Yes	Yes	Yes	Yes
NDI KVM	Yes					
Pre-multiplied Alpha	With PA	With PA	Yes	Yes	Yes	Yes
Previz	Yes					
Programmable Outputs	N/A	N/A	N/A	N/A	Yes	Yes
PSD Import Support	Yes					
Source Presets	Yes					
Supplemental Audio	With PA	With PA	Yes	Yes	Yes	Yes
Switcher Comps	N/A	Yes	Yes	Yes	Yes	Yes
Test Patterns	With PA	With PA	Yes	Yes	Yes	Yes
TriCaster NDI Camera App	Yes					
Unified Setup Pane	N/A	N/A	N/A	N/A	Yes	Yes
Unlimited Recording	With PA	With PA	Yes	Yes	Yes	Yes

Feature	TriCaster 410+	TriCaster TC1	TriCaster 1 Pro	TriCaster 2 Elite	TriCaster Vectar	TriCaster Vizion
Input Rotation & Flipping	With PA	With PA	Yes	Yes	Yes	Yes
Video Resolution Indicator	With PA	With PA	Yes	Yes	Yes	Yes
Virtual PTZ (Pan-and-Scan)	With PA	With PA	Yes	Yes	Yes	Yes
Virtual Set Editor	Yes				N/A	Yes
Virtual Set Editor Premium Sets	Yes	With PA	Yes	Yes	Yes	Yes

A.2 SPECIFICATIONS

Specifications	TriCaster 410+	TriCaster TC1	TriCaster 1 Pro	TriCaster 2 Elite	TriCaster Vectar	TriCaster Vizion
Inputs (SDI/All)	4/8	4/16	4/16	8/32	*/44 *SDI count varies with hardware configuration (when applicable)	
Outputs (SDI/All)	2/6	4/8, 1x 4K (via SDI quad-link)	4/8, 1x 4K (via SDI quad-link)	8/8, 2x 4K (via SDI quad-link)	*/16 *SDI count varies with hardware configuration (when applicable)	
Streaming Outputs	2	2	3	3	3	3
Monitor Outputs	3	4	4	4	4	4
Supported 4K Displays	N/A	N/A	1	2	2	2
Max Session Resolution	1080/p60	4k/p60	4k/p60	4k/p60	4k/p60	4k/p60
Mix/Effect Buses (M/E)	4	4	4	8	8	8
M/E BG Layers	2	4	4	4	4	4

Specifications	TriCaster 410+	TriCaster TC1	TriCaster 1 Pro	TriCaster 2 Elite	TriCaster Vectar	TriCaster Vizion
DSK Channels	2	4	4	4	4	4
Internal Media	2 DDRs 2 GFX 1 SOUND	2 DDRs 2 GFX 1 SOUND	2 DDRs 2 GFX 1 SOUND	4 DDRs 15 Buffers	4 DDRs 15 Buffers	4 DDRs 15 Buffers
Buffers	15 Total (5 Anim - Web)	15 Total (10 Anim - Web)	15 Total (10 Anim - Web)	15 Total (10 Anim - Web)	15 Total (10 Anim - Web)	15 Total (10 Anim - Web)
Keyers	All Switcher inputs, including internal sources (Media Players, Buffers, and M/Es).					
NDI Genlock	Yes					
Macro Variables	No	N/A	Yes	Yes	Yes	Yes
Audio In SDI	4	4	4	8	N/A	Up to 16
Audio In XLR Line, Balanced	1 stereo pair				N/A	
Audio In ¼"(6.35mm) Line, Balanced	3 stereo pairs				N/A	
Audio Out SDI	4	4	4	8	N/A	Up to 16
Audio Out XLR Balanced	1 stereo pair				N/A	
Audio Out ¼" (6.35mm) Balanced	1 stereo pair				N/A	
Audio Out ¼" (6.35mm) (Phones)	1 (stereo)				N/A	
Neural Voice Isolation (AI Audio)	Yes					

Specifications	TriCaster 410+	TriCaster TC1	TriCaster 1 Pro	TriCaster 2 Elite	TriCaster Vectar	TriCaster Vizion
Tally Output	DE-15 and NDI				NDI	
Network Audio	• Native Support for NDI audio input/output • Supports AES67 via compatible WDM audio drivers • Supports Dante protocol (requires Dante Virtual Soundcard license from Audinate, sold separately)					
Supported Media File Formats	• Video: AVI, DV, DVCPro, DVCProHD, FLV, F4V, H.263, H.264, MOV, MKV, MJPEG, MPEG, MP4, WMV, WebM, more • Image: PSD, PNG, TGA, BMP, JPEG, JPEG-XR, JPEG2000, EXR, RAW, TIF, WebP, and more • Audio: AIFF, MP3, WAV, more					
A/V Processing	• Floating Point YCbCr +A 4:4:4:4 • Audio: Floating Point, 96 kHz					
Latency	• Processing Latency: ~1.0-1.5 frames • Practical Throughput Latency: 4 frames					
MIDI Input	MIDI supported as Macro Triggers					
NIC	1 x 1-Gigabit	2 x 1-Gigabit	2 x 1-Gigabit	1 x 1 Gigabit 1 x 10 GbE		
Control Panels Supported	TC Flex Mini CS TC1S TC1L 8000 CS	TC Flex TC Flex Dual VMC4S VMC2S TC1S TC1L 8000CS Mini CS	TC Flex TC Flex Dual VMC4S VMC2S TC1S TC1L 8000CS Mini CS	TriCaster Flex TriCaster Flex Dual VMC4S VMC2S		
Dimensions	19.0 x 3.5 x 19.57" (48.3 x 8.9 x 49.7cm) with rack ears			19.0 x 5.25 x 21.12" (48.3 x 13.34 x 53.65cm) with rack ears	N/A	**Tower**: 17.5 x 15.2 x 6.65" / 44.5 x 38.6 x 16.89 cm - 27.8 lb / 12.6 kg **1 RU Rack**: 25.7 x 17.2 x 1.7" / 654 x 438 x 43 mm - 26.7 lb / 12.1 kg

Appendix B: TRICASTER CONNECTIONS

In this appendix you'll find instructions for connecting audio and video devices to each TriCaster model. Since output connections are the same for all models, however, we will cover that aspect first and then address unique input options by model.

B.1 CONNECTING OUTPUTS

Let's begin by discussing video output, not only so you can view your results, but because certain matters are best considered before beginning a live production session.

B.2 AUDIO

Connect external analog audio devices to the quarter-inch (6.35mm) audio jacks marked "OUT" on TriCaster's backplane. Digital audio output is supported on NDI and HDMI (where provided) outputs. Output from the 1/8" motherboard audio jacks and USB audio devices can also be enabled as Supplemental Audio Devices in the Audio's Mixer's configuration popups on supporting models.

B.3 VIDEO

Connect downstream video production devices to SDI connectors marked "OUT" as desired. NDI and other Video over IP types, and Internet Streaming outputs obviously require a network connection, and in the latter case, an Internet connection.

SUPPLEMENTAL VIDEO OUTPUTS

As mentioned previously, there are multiple monitor ports on the system's backplane. The operating system will have set one of these as the "main display", and this is where the *Live Desktop* (the primary user interface and Multiview on the same screen) appears.

Hint: You can choose which monitor is the "main display" by choosing Administrator Mode, then clicking Display under the Settings heading.

Additional monitor ports (number varies by model) *located left of the SDI inputs on the backplane* are available to connect more monitors or projection devices (etc.) for various broadcast or IMAG (Image Magnification) installations.

These supplemental monitors are referred to as *Multiview* outputs and can display a variety of optional layouts that can be selected and configured at any time in the *Live Desktop*.

Note: A mismatch of output format and connection type is possible at times. For example, imagery in a Graphics player may not match the current output format or the selected connection type. Display mismatches can often be handled, but in rare cases the source may simply not be shown.

While a single NDI stream can convey video with an embedded alpha channel (transparency), SDI's inherent limitations require *two* genlocked SDI outputs to supply separate key and fill streams for downstream use. One output (Mix) must be assigned to the full color source, while a second is assigned to the Key (or Matte) output.

To support this workflow, TriCaster provides a method to generate the necessary key output (matte). This can then be assigned to an SDI output in the Output Configuration dialog.

To accomplish this, select the desired source (e.g., the output from a Buffer, or perhaps a keyed video source) on the A row of an M/E. Select the "Show Alpha" effect from the LiveSet Utilities category as the background effect for the M/E.
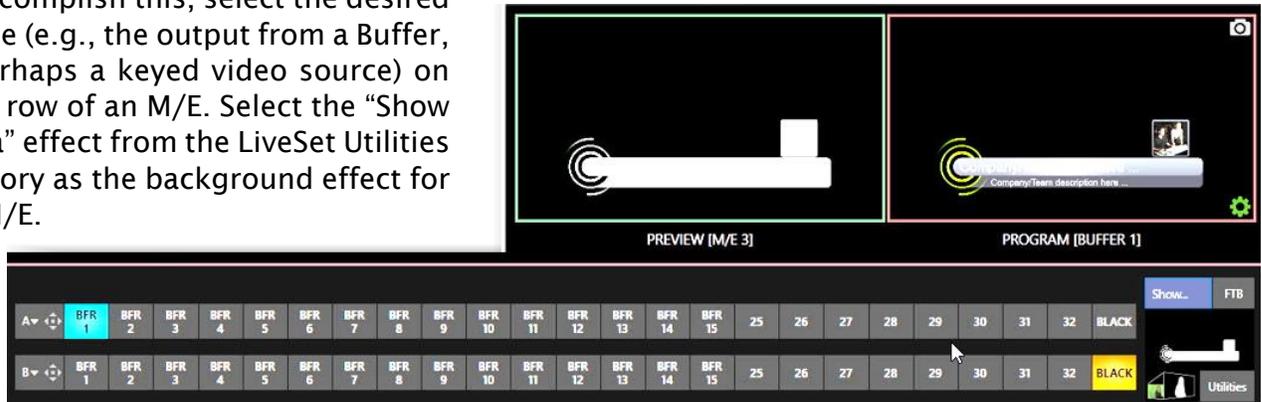
This effect causes the M/E to output a monochromatic video stream; full transparency in the A row source is represented as black, while full opacity is white, with grayscale values where partial transparency exists in the A row source (the B row source is not relevant in the result of the Show Alpha effect). For more information on *Show Alpha LiveSet Effect*, see Section 16.5, Default Effects > Utilities.

Note: Key and fill video streams carried over SDI must be in the same video format and in sync (usually accomplished by genlocking TriCaster's output).

TALLY LIGHTS

TriCaster provides *Tally Light* support to allow you to connect external tally lights and similar devices.

These typically provide a red LED for a video input selected on the Switcher's *Program* row. (NDI outputs also natively support tally over the network, without a separate connection.)

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

• Pin1 – LED1	• (4RU only)	• Pin12 – GPI2
• Pin2 – LED2	• Pin7 – LED7	• Pin13 – NC
• Pin3 – LED3	• Pin8 – LED8	• Pin14 – 3.3V
• Pin4 – LED4	• Pin9 – GND	(20 Ohms current limit)
• Pin5 – LED5	• Pin10 – GND	• Pin15 – NC
• Pin6 – LED6	• Pin11 – GPI1	

- Pins 1-(4 or 8) are 'hot' when the LED should be illuminated.

- Each LED pin 1 (4 or 8) has a 200-ohm current limiting resistor.

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

- GPI stands for General Purpose Interface. Pins 11 and 12 are assigned for possible future use as GPI1 and GPI2 connections, but software support for GPI triggers has not been implemented at this time.

- 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.

B.4 CONNECTING INPUTS

B.5 AUDIO

Connect external analog audio sources to the XLR or quarter-inch (6.35mm) audio jacks marked "IN" on TriCaster's backplane. Embedded digital audio input from SDI inputs, along with NDI and other supported IP sources is also supported.

Sound from the 1/8" (3.5mm) motherboard mic and line inputs and USB audio devices can also be selected as sources in the Audio's Mixer's Input configuration panes.

B.6 VIDEO

Connect external video sources to SDI input connectors on TriCaster's backplane, or quarter-inch (6.35mm) audio jacks on the unit's backplane. Of course, NDI video streams and a number of IP video protocols (such as SRT) are also supported (some may require third-party software).

B.6.1 INPUT CONFIGURATION FOR KEY/FILL

The classic means to ingest video overlay sources depended on 'Key/Fill' input pairs; one source (Fill) supplies the full-frame color video, while a second carries a monochromatic 'matte' (Key) stream to define parts of the Fill to be treated as opaque, transparent, or something in between.
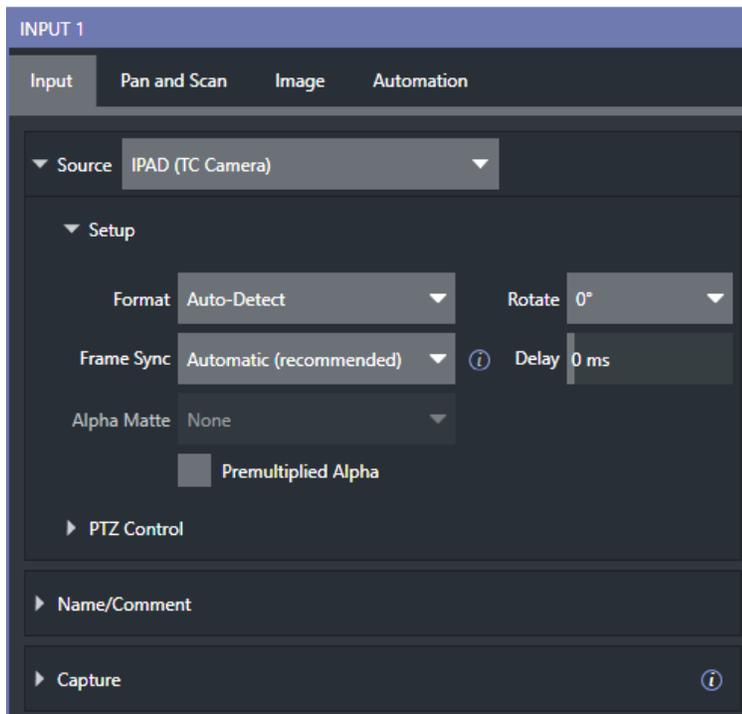
This system is still common in production workflows that rely on SDI cables for transport since a single SDI connection does not handle embedded transparency. If the key/fill method is used to provide, for example, title overlays to TriCaster, two SDI connections must be used for ingesting – one to supply the Fill, and the other the Key.

The Input Configuration dialog for any even-numbered TriCaster input assigned to an SDI source shows an Alpha Matte drop down menu, select the alpha matte source connection for the key/fill source input pairs here (both sources must share sync, format and framerate). The configuration 'gear' shown on viewports for Switcher sources will turn green (from original white) whenever transparency has been applied.

Hint: To ensure proper sync and alignment, both the Key and Fill source should be in the same format and genlocked. TriCaster's Input Configuration pane also provides a variable Delay feature in the Source Setup control group found in the Input Tab, which may be helpful if further fine-tuning is needed.

B.6.2 CONNECTING A VIDEO ROUTER

In supporting models with the appropriate software installed, your system can control and access output from router models supporting the popular Grass Valley® Native Protocol, as well as Black Magic Design® Video Hub routers.

The implementation offers a number of configuration options; a basic setup would be as follows:

- Connect the router to the system by Ethernet cable and then connect one (or more) of the router's video outputs to SDI inputs with matching numbers, using suitable video cables.

- (For example, by default router output number 3 would be connected to *Input 3* for control communication between the devices to be properly linked.)

- Click the *Shutdown* icon on the *Home page* (Launch Screen) and click the *Administrator Mode* on the right.

- In the Administrator Mode panel, click Exit to Windows.

- Navigate to the appropriate folder below:
   - C:\ProgramData\Vizrt\TriCaster\Configuration

- And open the file named *router_setup.xml* by double-clicking it (it will launch in *Notepad*).

This file is where you add the routers you wish to connect. Each router is identified by an entry you insert between the starting and closing "config" tags, as explained in the file comments.

A typical entry might be as follows:

<grassvalley ip="10.28.1.128" port="12345" name="AJA KUMO"/>

- Save the file after editing and re-launch the system.

Note: The system communicates with routers using individual IP address and port numbers, allowing multiple routers to be connected simultaneously. File comments explain how you can bypass the default 1:1 mapping of router outputs to inputs when required or prevent accidental changes to inputs that are displayed on Program output, along with other extended configuration options. If you assign names to router inputs or outputs in this file, make sure the names for each are unique.
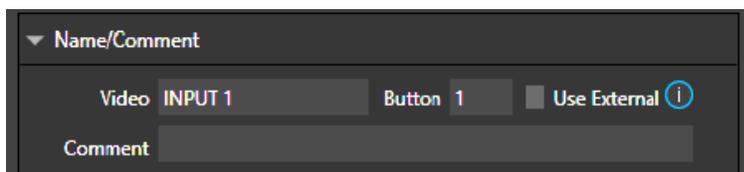
Some routers allow each router input to be provided with a unique name. In such a case, the system may be able to access that name and use it for *Switcher* buttons as appropriate.

To enable this behavior, checkmark the *Use External* (name) switch in the *Input Configuration* panel – see Section 8.1.1 for more detail.

For backwards compatibility reasons, these routers are auto detected by default. (Black Magic® routers may use a USB control connection, rather than a network connection. The router's firmware should be up to date. If detection fails, please contact BMD support for assistance.)

You can, if you wish, disable auto detection by editing the XML configuration file discussed above. (You might do this to avail yourself of the extended configuration options that are provided by doing so.) To do this, simply add the line below to the <config> section of the file.

<blackmagic_config discovery="false"/>

B.6.3 GENLOCK CONNECTION

The *Genlock* input on the backplane is for a 'house sync' or *reference signal* (often a 'black burst' signal intended specifically for this purpose). Many studios use this method to synchronize equipment in the video chain. Genlocking is commonplace in higher-end production environments, and genlock connections are typically provided on professional gear.

If your equipment allows you to do so, you *should* genlock all cameras *and* TriCaster. To connect the genlock source, supply the reference signal from the 'house sync generator' to the *Genlock In* connector. (See Section 8.2.4 Sync Tab regarding genlock configuration.)

B.7 410 PLUS, TC1 AND TC1 PRO CONNECTIONS
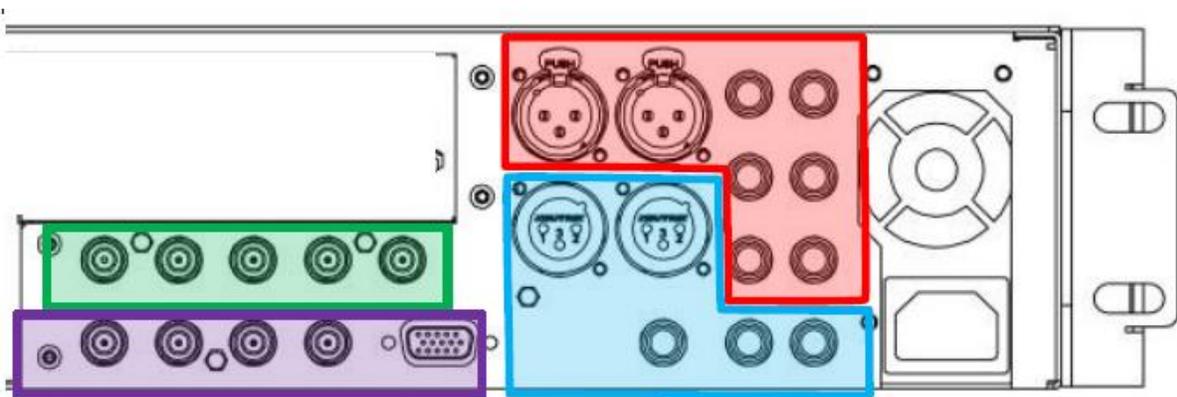
- Analog audio inputs: 1-4
- Analog audio outputs: 1(Master) & 2 (AUX 1), and Phones jack
- SDI Video Inputs 1-4 and Genlock input.
- SDI Video Outputs 1-4 and Tally connector

Note: Hardware details as depicted are subject to change without prior notice.

Connect any local SDI video sources to one of the four BNC connectors in the *SDI IN* section.

Note: SDI video sources with embedded audio do not necessarily require separate audio connections.
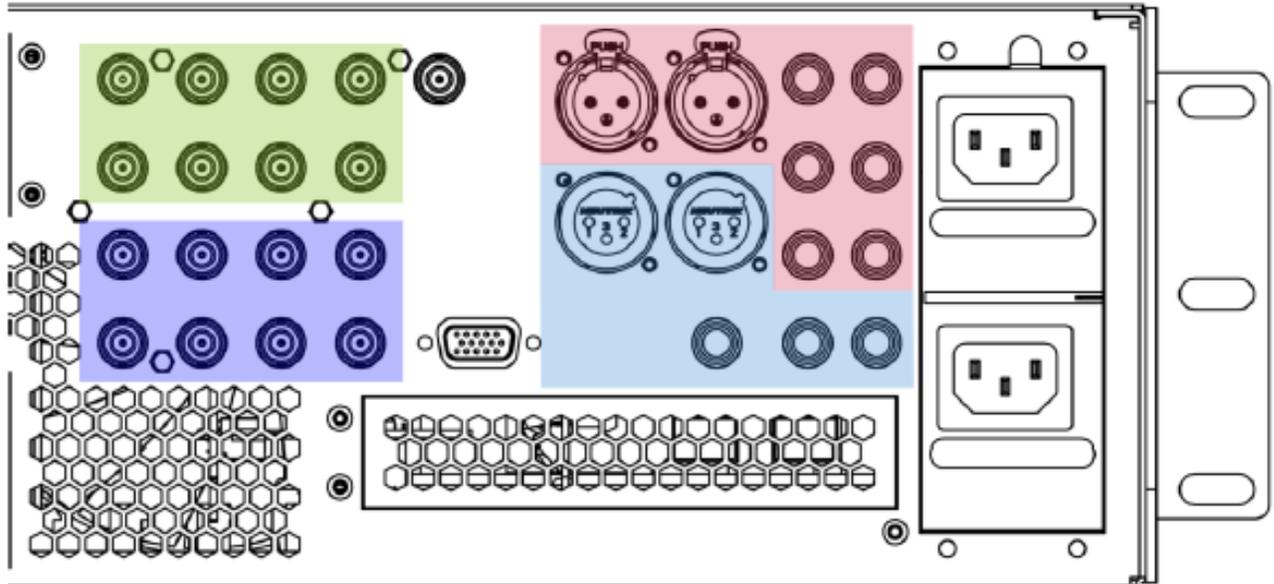
- Analog audio inputs: 1-4
- Analog audio outputs: Master, AUX 1, and Phones jack
- SDI Video Inputs 1-8 and Genlock input
- SDI Video Outputs 1-8 and Tally connector

Note: Hardware details as depicted are subject to change without prior notice.

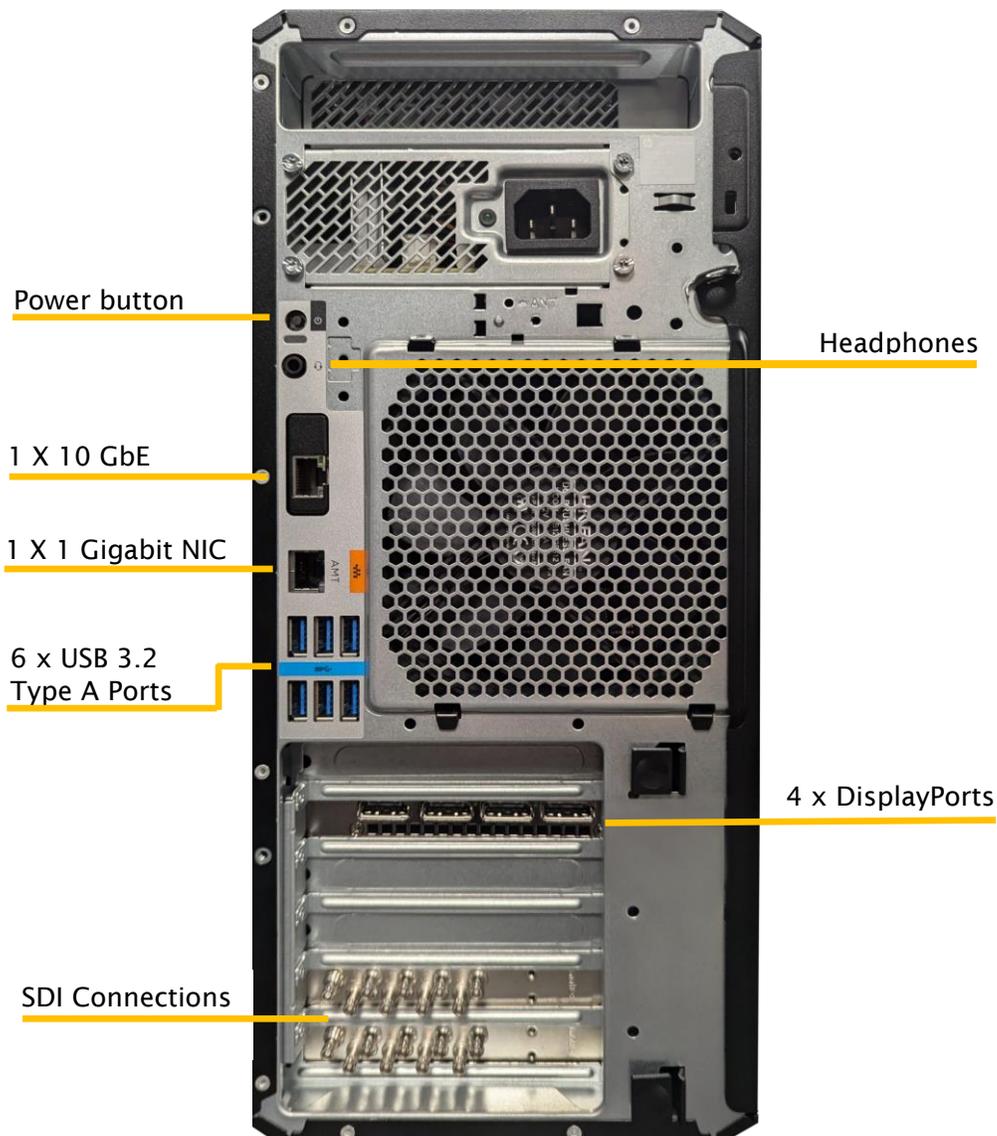Connect local SDI video sources to the BNC connectors in the *SDI IN* section.

Note: SDI video sources with embedded audio do not necessarily require separate audio connections.

B.9 TRICASTER VIZION HARDWARE CONNECTIONS

HARDWARE

TriCaster Vizion Tower

Note: The 'main' power button is on the faceplate for easy access.

Power button

Headphones

1 X 10 GbE

1 X 1 Gigabit NIC

6 x USB 3.2 Type A Ports

4 x DisplayPorts

SDI Connections

Note: Hardware details as depicted are subject to change without prior notice.

Connect local SDI video sources to BNC connectors in the *SDI IN* section.

Note: SDI video sources with embedded audio do not necessarily require separate audio connections.

4 X Display Ports

1 X 10 GbE

2 X USB 3.2
Type A Ports

1 X 1 Gigabit NIC
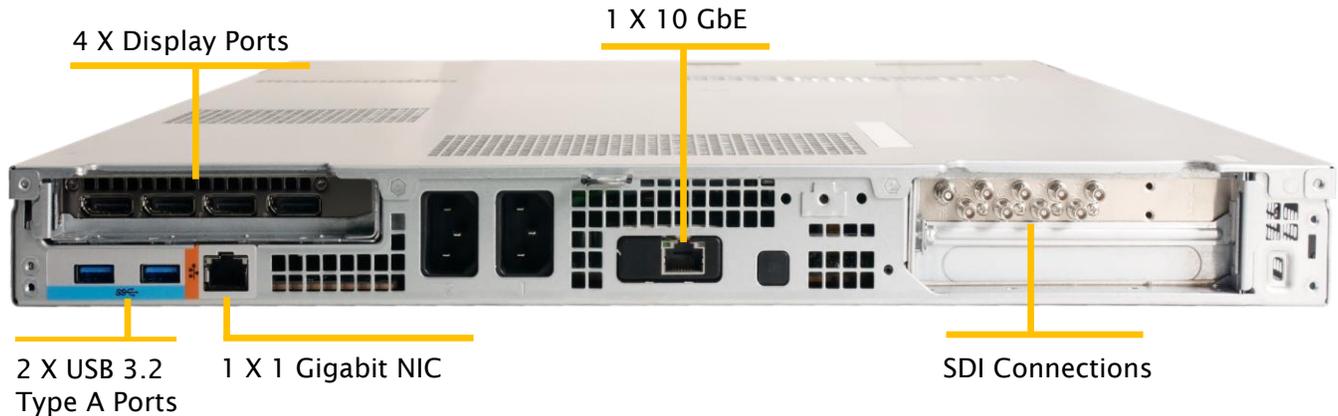
SDI Connections

Note: Hardware details as depicted are subject to change without prior notice.

Connect local SDI video sources to BNC connectors in the *SDI IN* section.

Note: SDI video sources with embedded audio do not necessarily require separate audio connections.

B.10   TRICASTER VIZION & TRICASTER VECTAR SOFTWARE

To learn how to install your TriCaster Vectar License, see section 3.3.1 TriCaster Vectar License Activation

B.10.1   OS

System Requirements:

- OS: Windows 10 or 11 (64-bit, Pro or Enterprise recommended).
- CPU: High-end multi-core, like Intel i9-12900K or AMD Ryzen 9 5950X.
- RAM: 32GB minimum, 64GB+ for 4K workflows.
- GPU: NVIDIA RTX 3060 or higher (8GB+ VRAM) for real-time rendering and AI features in supporting models.
- Network: Gigabit Ethernet for NDI (low-latency LAN critical).

B.10.2   INSTALLATION

Simply run your TriCaster Vizion Installer Wizard and accept the End User License Agreement. Once installation is complete, restart your PC to load all drivers and services. Upon launching, enter your license key (from your Vizrt account or purchase email). You are ready to begin your live production!

Note: Required operating software is Windows 10 or 11.

B.10.3   TRICASTER VIZION & TRICASTER VECTAR A/V OUTPUT

TriCaster Vectar can switch, mix, and produce many types of live production. There are none of the traditional limitations of media format or I/O. Your content can be delivered to any infrastructure that meets performance requirements.

Here are some of the possibilities:

- Pull in streams across the internet from various sources using standard protocols such as SRT and mix them into your productions.

- Output from a broad range of sources – including eight unique mixed compositions, support for over 40+ output signals over IP, multiple internal recorders, and three additional local multiview monitors.

- Send program output, secondary mixes, or custom 'monitor bridge' layouts to three supplemental monitors.

- Configure, stream and record to two independent video outputs, to multiple Content Delivery Networks. Each of the primary outputs (referred to as MIX 1 – 8), can be configured independently.

- All video format settings for each output is entered in the Live Desktop's Setup > Output Configuration panel.

- Output video from anywhere to anywhere with an IP-based software solution.

- Re-entry function allows for multiple versions of the same production to be simultaneously output with different aspect ratios, resolutions, and graphics.

- Native support for network audio input and output via NDI®.

B.10.4   TRICASTER VIZION & TRICASTER VECTAR AUDIO

Embedded digital audio input from SDI inputs, along with NDI and a number of other popular IP sources are supported.

Sound from the 1/8" (3.5mm) motherboard mic and line inputs and USB audio devices can also be selected as sources in the Audio's Mixer's Input Configuration panes.
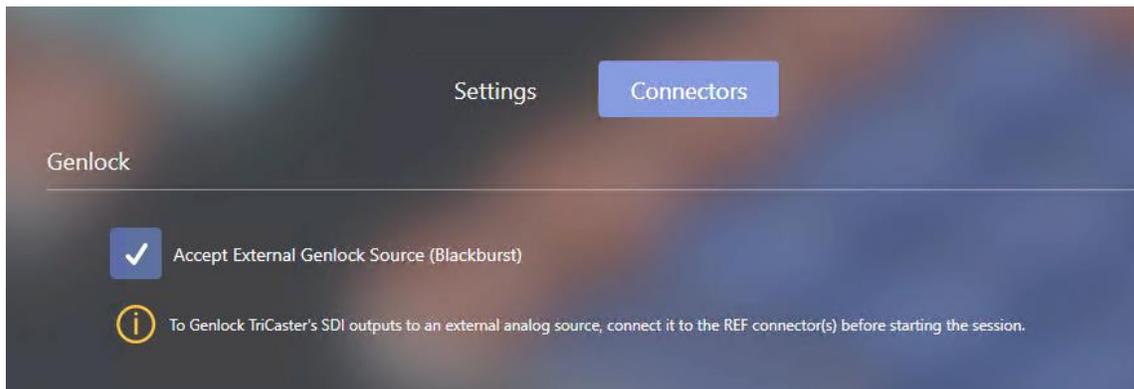
Note: This Genlock option and the Connectors tab will not appear in Tricaster Vizion without Matrox cards.

For TriCaster Vizion models with either one or two Matrox cards, a toggle control provided in the *Session* page enables or disables the REF (Reference) connector. When enabled, an *External* (*Blackburst*) signal supplied to the REF input prior to launching the session is used to genlock the SDI outputs.

Appendix C: LIVE CALL CONNECT

Conduct live video calls from virtually anywhere using TriCaster's *Live Call Connect* functionality. This capability enhances your productions with high-quality video and audio, allowing you to flexibly present remote conversations, interviews, reports, and more—regardless of the caller's device.

C.1   SUPPORTED APPLICATIONS

Microsoft® Edge Chromium is pre-installed on your TriCaster. However, if you prefer a different web browser, Google Chrome (or another Chromium™ based browser) can be installed.

A number of popular video conferencing applications are also supported, such as Microsoft® Teams, Facebook Messenger, WhatsApp, FaceTime, VooV™ Meeting, Slack®, Discord, and Zoom.

Note: To use FaceTime and Messenger please click the link below (the link can also be copy & pasted in the Notifications panel) and install the WebView2 runtime using the x64 Evergreen StandAlone Installer.

https://developer.microsoft.com/en-us/microsoft-edge/webview2/#download-section

Exit the TriCaster software to download and install the supported applications you wish to use.

C.2   DEPLOYMENT PLATFORMS

TriCaster Vectar is designed to take advantage of the hardware accelerated capabilities of the latest versions of Windows. Because of this, the Live Call Connect feature requires Windows Build 19041 or later.

There are some cloud platforms like AWS on which this might not currently be available in the current default configurations although this is of course very likely to change overtime. In most cases you can work around this by bringing your own Windows 10 version and deploying that manually in the cloud platform.

This may have implications on cost, technical complexity and licensing agreements with Microsoft. this manual process is not something Vizrt can support installing, however, we do support our software.

C.3   APPLICATION DESKTOP WIDGET

In supporting applications, a special *Live Call Connect* widget pins itself to the titlebar of your browser or conferencing app window when it has focus. The widget has the following components:

- The hamburger icon at left side collapses the widget to a tiny size, reducing the possibility of its obscuring any of the application's video sources.

- The *LIVE* button performs several tasks; including detecting the caller's video viewports, begins video capture, auto maximizes the application screen, and locks the mouse out of the application to prevent it intruding. The *LIVE* button is highlighted in blue when active.
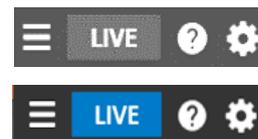
Note: Some additional steps are required for both Tencent and VooV in order for Live Connect Call to work properly. In the settings you must enable "Always show Toolbar", and disable both "Show Active Speaker" and "Speaker Spotlight".

- The *gear* on the right side of the widget opens a menu listing the following options:

  - *Color Group* – After choosing a color corresponding to a color group in TriCaster's *Switcher*, you can click a caller's video viewport in the conferencing application to assign that caller to the color-linked Switcher channel.
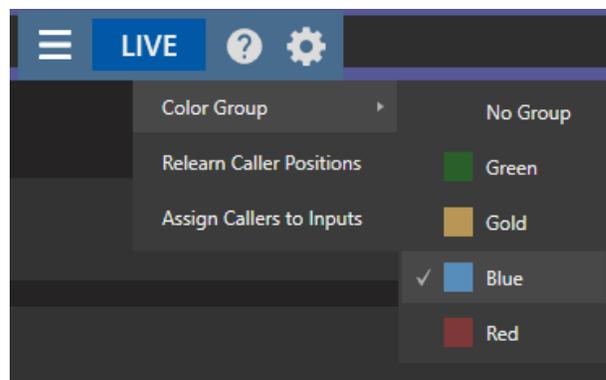
  - *Relearn caller positions* – This selection triggers the *relearn algorithm*, including re-detecing the caller's screens (useful if things change unexpectedly in ways that can't be automatcially detected).

  - *Assign callers to inputs* – Automatically assigns caller video output from an application to *Switcher* inputs 9-17 (TriCaster 1 Pro inputs 9-12).

  - *Help* – Opens a convenient Help applet to walk you through the use of the feature.

C.4   SETTING UP A CALL USING TEAMS

You need at least one secondary monitor to access the *Application Desktop* you assign to it using the *Workspaces* menu (as disccussed in the earlier section on *Workspaces*).

Once you have selected the App Desktop from the Workspaces menu, the Live Desktop will appear on your secondary monitor. Your video conferencing application(s) and the system default browser will appear in your task bar. Click on your preferred app's icon, and join a meeting or display a web page in the usual manner for that application.

Note: TriCaster does not support "High Contrast" mode within any video application.

In our example we are using Microsoft® Teams Application for a *Live Call Connect* walk-through. Notice the *widget* in the application's titlebar. You can either host or join a meeting.
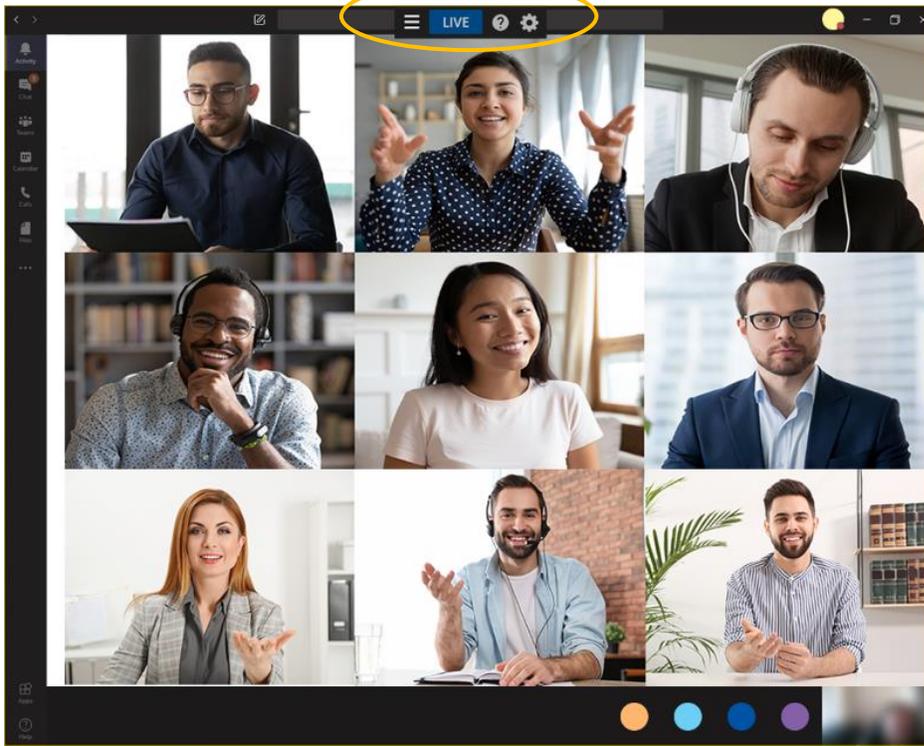
Note: When using the Teams application, we suggest using "Fit to Frame" (which can be found in the current version of Microsoft Teams 1.4.00.4167 or higher) by right clicking the individual caller feeds.

Once all callers have joined, you can use the "*Assign Callers to Inputs*" menu item to automatically assign the number of inputs starting from input 9. Or you can manually assign the callers to Switcher inputs using TriCaster's standard *Input Configuration* dialog. After this, it's time to take it live (by pressing the *LIVE* button).

Live Call Connect attempts to maintain callers at the Switcher input you assign them to, but should the need arise you can turn off LIVE and apply the *Relearn Caller Layout menu option.*

Live Call Connect crops out static application tools and borders, and supplies the callers' video to TriCaster *Switcher* as potential sources.

Note: Recording Switcher Inputs assigned to output from Live Call Connect is not supported.
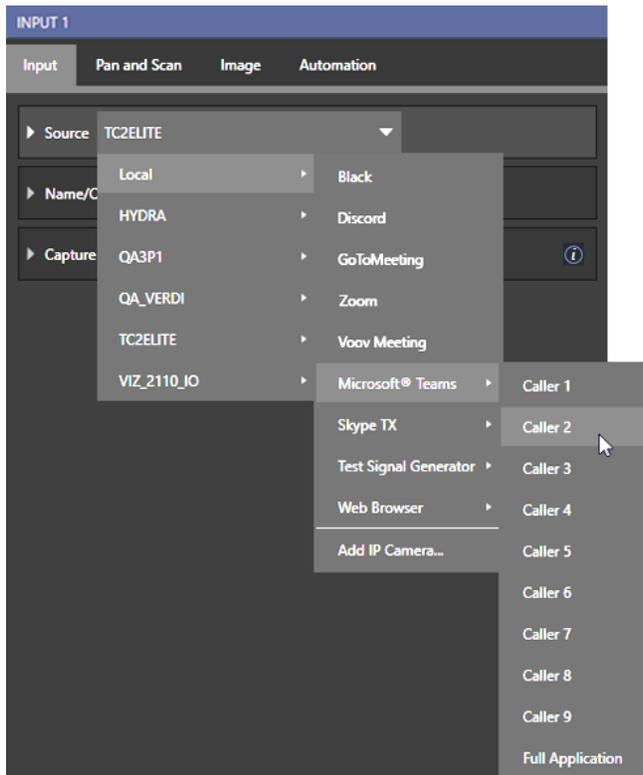
In the TriCaster Input Configuration panel the conferencing or browser applications will appear along with other local sources. Each application will support up to a 9-user configuration (4 in TC1 Pro) in each application's layout .

Hint: Should you wish to capture the entire application interface, select Full Application. Web browsers offer just two options, Full Application and Page Area (which crops the browser's toolbar at the top).

C.5   SETTING UP A CALL USING ZOOM

We have updated the Zoom integration in this version of *Live Call Connect*. This update introduces an enhanced workflow and new features, including vastly improved video quality, per caller audio, and simplified setup.

To effectively use the *Application Desktop*, you'll need at least one secondary monitor. (See Section 10.3, Workspace Presets for details on showing the App Desktop.)

- **Assign the *Application Desktop***: Navigate to the *Workspaces* menu (as previously discussed) and select the *App Desktop* preset as the *Multiview* layout for your secondary monitor.

- **Display Setup**: Once selected, the *App Desktop* will appear on your secondary monitor.

- **Launch Application**: You'll see icons for your video conferencing application and the system's default browser in the taskbar.
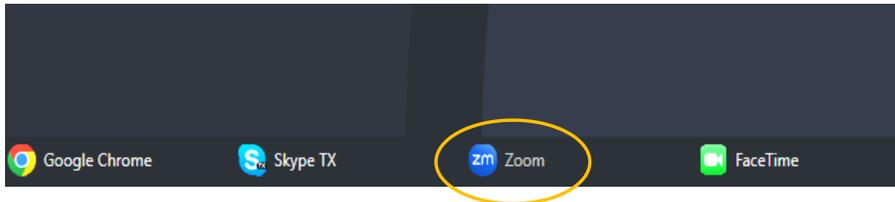
Sign into Zoom:

- Click on the Zoom icon in the taskbar.

- Enter your username and password. Note that for your first login, you might need to input a one-time passcode.

- After this initial sign-in, Zoom will save your credentials for future use.
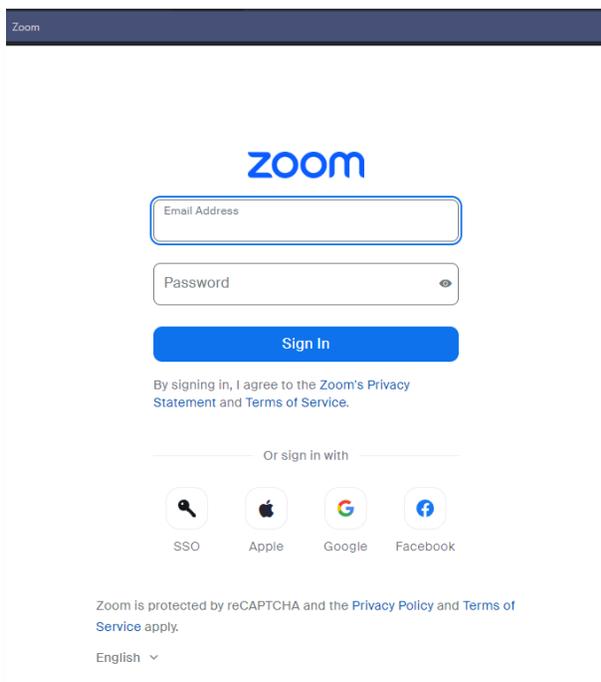
- **Permissions and Policies**:
  o You will be prompted to accept Zoom's Terms & Privacy Policy.
  o Check the box next to 'Allow this app to use my shared access permissions'.
 o Click 'Allow' to proceed.
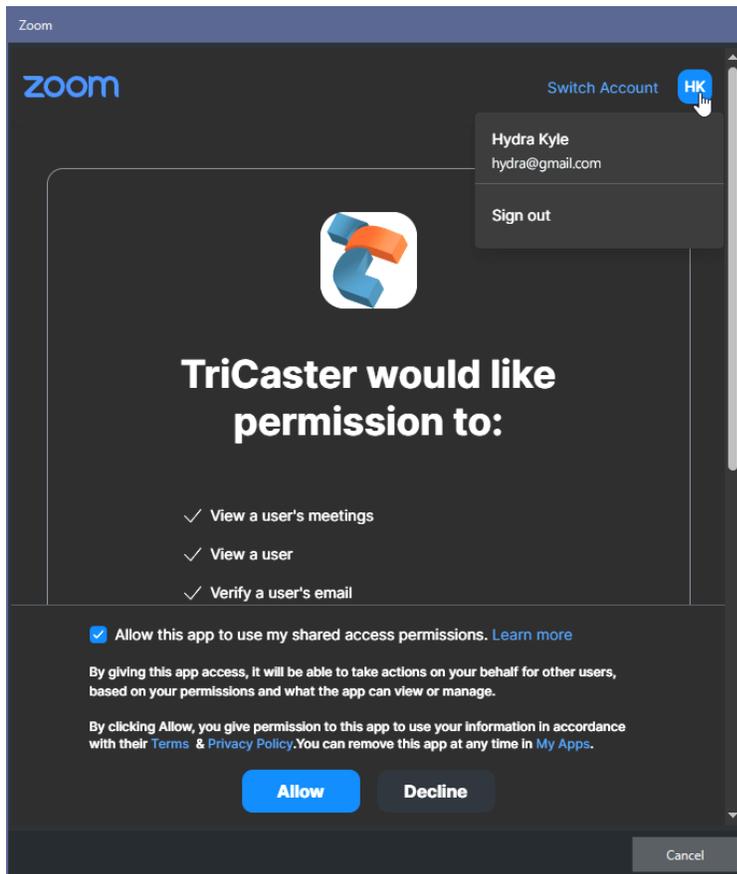
C.5.2 REMOVING THE APP

Click or highlight your profile icon in the top right of the Terms & Privacy Policy panel to sign out or switch the account to a different user. Signing out automatically removes permissions that the user previously enabled for the Zoom application.
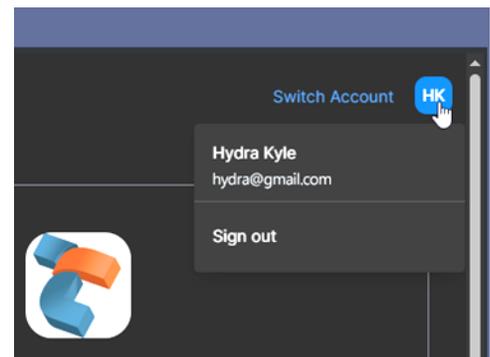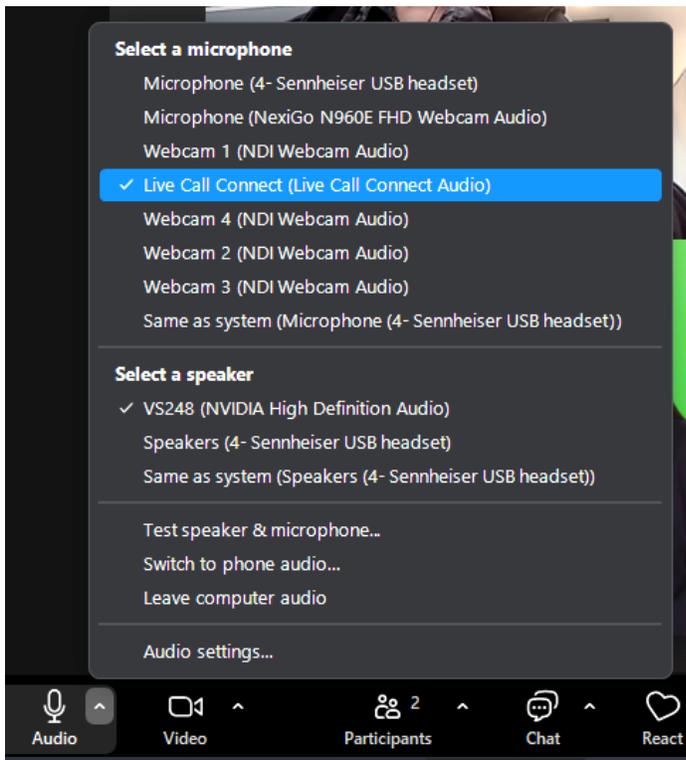
In Zoom's Video menu, select the *Live Call Connect Video* entry to provide TriCaster's video output to Zoom.
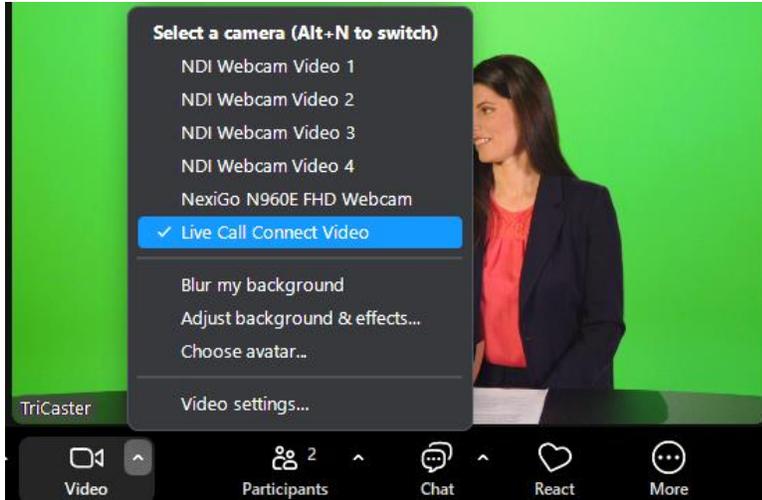

Similarly, select *Live Call Connect Audio* in Zoom's Audio menu to supply audio from TriCaster to your external Zoom callers.

C.5.4 ZOOM AUDIO OUT TO TRICASTER

Zoom's audio output is available as an input source in TriCaster's *Audio Mixer* (labeled APPS, by default). The *Input Configuration* panel *Connection* option for the APPS input in the Audio Mixer defaults to *System Audio*. This permits you to control the audio level sent to TriCaster from Zoom in TriCaster's Audio Mixer.
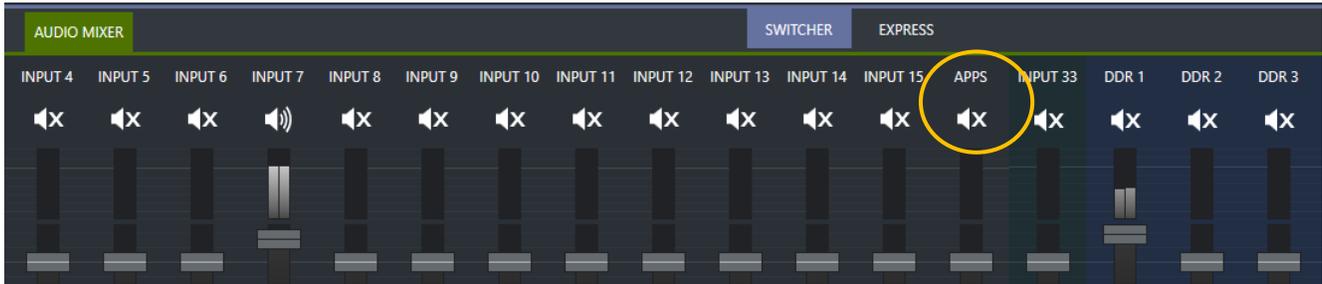
C.5.5 TRICASTER A/V RETURN TO CALLER

TriCaster's main video *Mix 1* output is returned to the conferencing application, and thus passed to remote callers so those calling into the meeting can see it. This video mix defaults to Program, but you can choose output from other TriCaster video sources if you wish.

The audio return is configurable in the *Output Configuration* panel (Section 8.2) and corresponds to a mix minus of the *Master* and *AUX* busses, or any input.
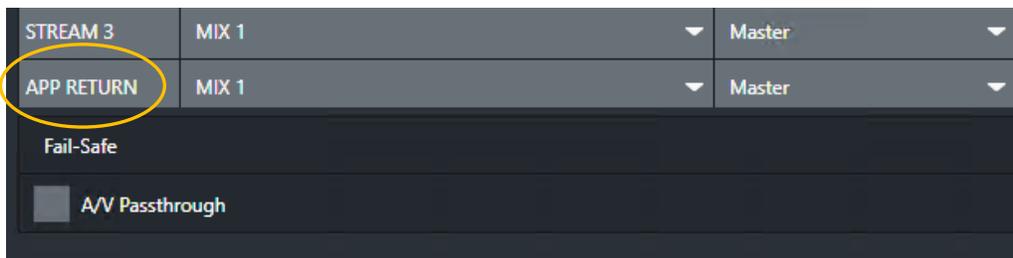

Hint: See Section 18.6, TalkBack for details on using this Audio Mixer feature to give off-air audio direction to your callers.

C.5.6 JOIN A MEETING

Once you are logged in, a popup will appear giving you the choice to either join or start a meeting. To join a Zoom meeting:

- **Enter Meeting Details**: Simply type in the *Meeting/Personal ID* along with the *Passcode*.

- **Audio and Video Settings**: You can choose to enable your microphone and camera from here.

- **Invite Others**: There is a copy/paste button next to the Meeting/Personal ID field. Use this if you want to invite others by sending the invitation link via your web browser.
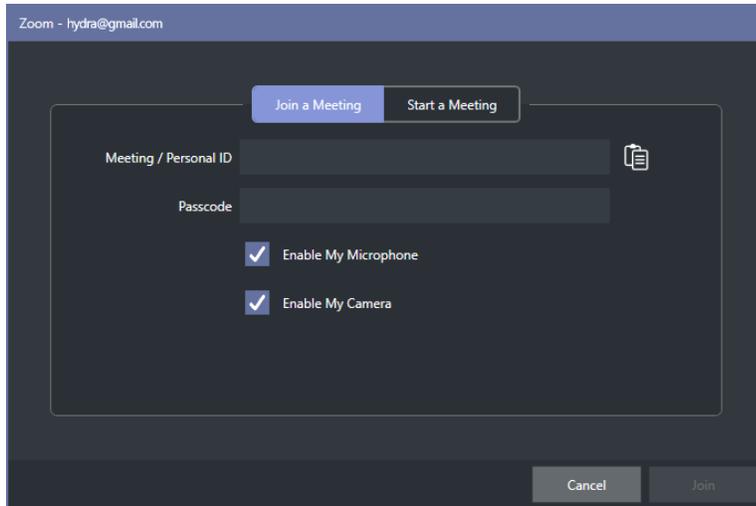

After you have entered all the necessary information, click **Join** to enter the meeting.

C.5.7 START A MEETING

- **Select Personal Meeting**: Choose your *Meeting/Personal ID* or use the dropdown menu to see a list of past hosted meetings (you can schedule new meetings using Meetings tools in your Zoom account's web portal page).

- **Configure Settings**: You can enable your microphone and camera, decided whether to *Mute Participants Upon Entry* and copy the meeting link to invite others.

Once you have set your preferences, click **Start** to initiate your meeting.
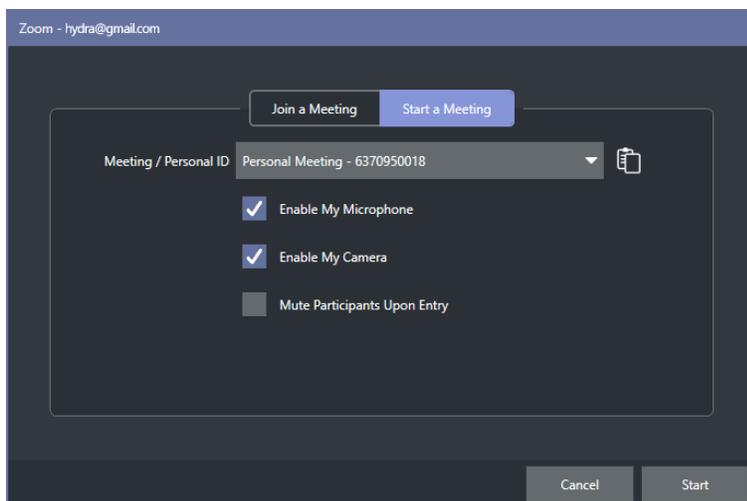
After starting your meeting, invited participants will appear in the Zoom application, waiting for your approval to join. Follow these simple steps:

- **Admit Callers**: Allow each participant into the meeting by clicking "Admit".

- **Assign to Inputs**: Use TriCaster's standard *Input Configuration* dialog to assign each caller to *Switcher* inputs. You will see a list of callers under Local > Zoom, identified by their individual names, (you can also pre-assign callers prior to your meeting).
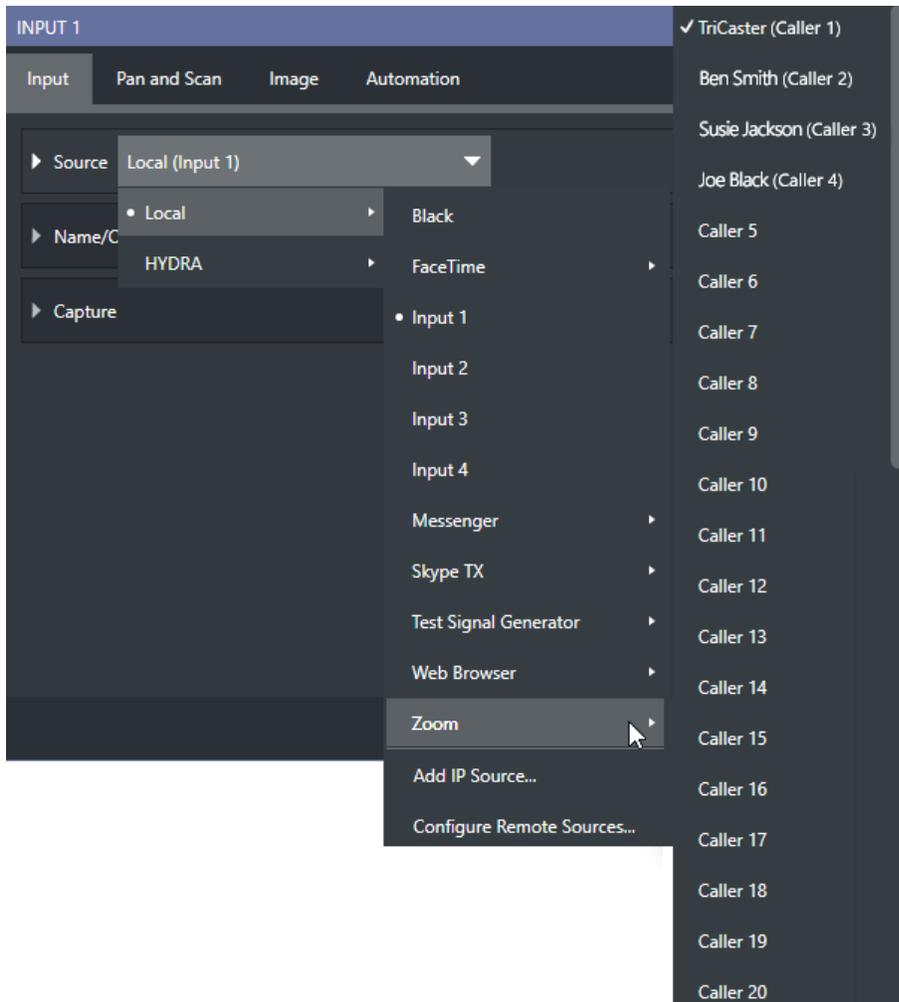
Appendix D: PERFORMANCE CONSIDERATIONS

In this section, we'll consider the most common questions you may have (and of course we'll provide the answer, too). Answers are intentionally brief – perhaps just a reminder of one or two steps required to perform some operation. For this reason, we'll also point you to explanatory information elsewhere in this manual whenever that would be useful.

D.1   TESTING, ONE TWO …

Professionals simply do not leap into new environments blindly. They prepare, plan, plan some more, and then – most importantly – they test. This allows them to tackle the tough jobs with confidence.

D.2   IMAG AND LATENCY

What's IMAG? 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.

D.3   RELATIVITY AND THE SPEED OF LIGHT

Wouldn't it be nice if audio and video travelled from their respective broadcast devices at the same speed? Then, wherever you were seated in the audience, the sound from hypothetically perfect speakers and the video image from huge video displays co-located at the front of the auditorium would reach your ears and your retinas at precisely the same moment!

This is not the case, however. Sound travels quite slowly – so slow, in fact, that even in relatively small venues it reaches those in the rear of the audience noticeably later than those in the front.

> *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.

If transmission of the video signal from the camera lens right through to the projection screen were instantaneous (it's not, mind you), we'd likely need to *find* a way to delay it. Viewed in this light, a certain amount of latency is actually "A Good Thing!"

D.4   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 – <u>unless</u> 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, but it would also be a bad idea.

Even before considering minimizing latency in the device chain, acknowledging that there is always going to be some latency calls for some creative thinking with regard to 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 extremely unlikely to notice a small amount of latency.

D.5   LATENCY AND YOUR VIZRT SYSTEM

Vizrt systems excel at IMAG, but inevitably constitute 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.

Your Vizrt system's portion of the total latency 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.

How can you achieve the lowest possible latency for the switcher's section of the IMAG chain? One trick is to 'Genlock' your cameras to the switcher output. This bypasses input time-base correctors, ensuring latency is consistent during switching operations. For genlocked sources, consider disabling *Frame Sync* – see Section 8.1.1.

> *Hint: You can assess the latency of your pipeline 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.*

D.6   OTHER SOURCES OF LATENCY

Often, significant latency is added by other devices in the IMAG chain that come *after* the switcher. Projectors are a common contributor, but at times the cameras themselves are a factor.

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

- If you use Multiview output from the switcher to the projector – if at all possible, match the format sent from the switcher to the native format 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.)

- When possible, try supplying the projector with analog video. This can eliminate a lot of the complexity from the process (of course, this is not always possible.)

- 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 may be slightly lower for progressive sessions, so for lowest latency, (genlocked) 720p cameras and session are theoretically ideal (again, for genlocked sources, consider disabling *Frame Sync* – see Section 8.2.3).

Appendix E: VIDEO CALIBRATION

An oft-heard expression is "Don't worry – we'll fix it in post". Post-production techniques are invaluable, but they do not invalidate another often-repeated axiom – "Garbage in, garbage out." And, in the case of live production, the results are immediately obvious to your audience … for good or for bad.

For these reasons and many more, it's important to control the visual quality of your work all the way through the production pipeline. Adequate lighting, good cameras, and high-quality connections are critical, but there are other things to consider.

Human vision is remarkably adaptable. In one study, participants equipped with inverting lenses initially saw everything upside-down. After a few days, people reported that things appeared right-side-up again.

Even when things are dramatically wrong our brains compensate to a remarkable degree. Have you ever looked at a television in a store without noticing anything untoward, and then realized that the colors on another unit nearby looked much better?

This built-in tolerance makes it difficult for us to judge whether the blacks in our video productions are black –or just dark gray; whether reds are purple or tinged with a slight greenish caste, and so on. What we really need is a reference for comparison – just as we find it easier to pick the best-looking display from a row of television sets on a store shelf.

E.1 WHAT (AND WHERE) TO CALIBRATE?

Tip one – forget 'point and shoot'. Lighting, set design, and countless other factors have an impact on the video attributes our cameras 'see'.

As a first step, cameras need to be properly calibrated. *Ideally, this is done right at the camera.* Corrective measures taken downstream never fully compensate for problems at the first link in the chain. Most cameras, even inexpensive consumer models, provide adequate controls for this purpose. Some other video sources do not offer much if anything in the way of adjustment, however. You may need to adjust the *Proc Amp* settings to improve previously recorded video played from a DVD player, or a networked 'video chat' system.

In both cases above, the *Waveform* and *Vectorscope* monitors will help. We also need to consider *downstream* devices, though.

Computer displays are inherently different than television sets. Thus, the video you see on your computer interface can vary quite a bit from what your viewers see on their televisions. Too, you will want to be able to correctly judge colors when preparing titles and graphics. It will help you a great deal if your downstream video monitors are properly set up to allow you to make these judgments.

E.2 CALIBRATING VIDEO SOURCES

The obvious disparity between neighboring televisions on display in a store amply demonstrates that even identical (and brand-new) video devices can differ dramatically. When mixing multiple cameras, we need to ensure that their output matches. Switching to a camera with obviously different color characteristics will be seen as a glaring error by your viewers.

Even when we restrict matters to a single unit, color characteristics can change as the system warms up, and as it ages. For this reason, it's important to allow a device to warm up before attempting to calibrate it.

E.3 SETTING BLACK AND WHITE

Naturally, the color range available for transmission and recording is bounded at the upper level by white and at the lower level by black. Anything else falls somewhere in-between.

Consider what happens if you gradually raise the brightness control on your television. Beyond a certain point (and unlike claims made for laundry detergent) your whites do not become whiter. They can't – the upper limit (white) is firmly fixed. Instead, parts of the image that are nearly white are boosted, eventually also becoming white. Meanwhile, black portions of the picture are tending towards gray. Since white cannot become whiter, and black has become gray, we could say that the dynamic range of the image has been narrowed. The net result is a less vibrant image.

The same thing is true for video from your cameras. If the black and white levels from the camera are incorrect, you are effectively losing either shadow or highlight detail. For this reason, the first thing many do is calibrate their camera for correct levels.

WAVEFORM MONITOR

From days of old, for video engineering purposes the scale between black and white was defined in IRE units (IRE being an acronym for "Institute of Radio Engineers"). White was pegged at 100 IRE. For PAL (and NTSC-J) countries, black was defined as 0 IRE. For NTSC lands, black properly sat at 7.5 IRE.

Thankfully, the day of strict adherence to these analog video concepts has virtually disappeared. Today, confirming that the black and white levels your camera is sending are correct is as simple as sending first black, and then white (or the brightest past of your scene, and reading values from the scale alongside the *Waveform* scope.

> *Hint: Your system automatically compensates for the traditional 7.5 IRE black (also known as "setup" and "pedestal") in SD format NTSC sessions.*

Connect your camera to the correct input, block the lens so it receives no illumination, and check the level shown in the *Waveform* monitor. Generally, it should be 16 on the 8bit scale.

To check white, use either the brightest part of your scene or a white card, ensuring that it is evenly illuminated with the same lighting your main subject will receive.

Move in or zoom to fill the viewfinder with this, and confirm that the Waveform monitor is showing 235 on the same scale. Otherwise, you might try using your camera's Auto White Balance feature with the white card – your camera manual will provide instructions. Afterwards, check the black level again.

Some more professional cameras offer full manual controls for white balance and/or black level. Use these as instructed to ensure your camera is providing the correct white and black levels.

If you cannot make source adjustments, or can't get it quite right by these means alone, you can use the Brightness and Contrast controls in the *Proc Amp* for that input to tweak black and white levels. (Of course it is always best to perform adjustments at the source if possible.)

E.4 ADJUSTING COLOR

We're going to move into color calibration next, but first we can use our black and white signals for some further tests.

VECTORSCOPE

While we're still working with black and white levels, we can introduce the *Vectorscope* and perform an initial test of the camera's color balance.

A vectorscope can be likened to the familiar 'color wheel' which sweeps radially through the colors of the spectrum – yellow, red, magenta, and so-on, around the arc of a circle. Colors are more progressively intense (saturated) towards the outside of the circle, while color saturation is zero at its center.
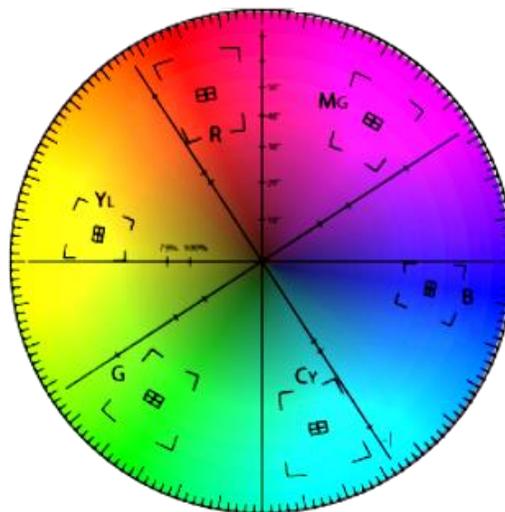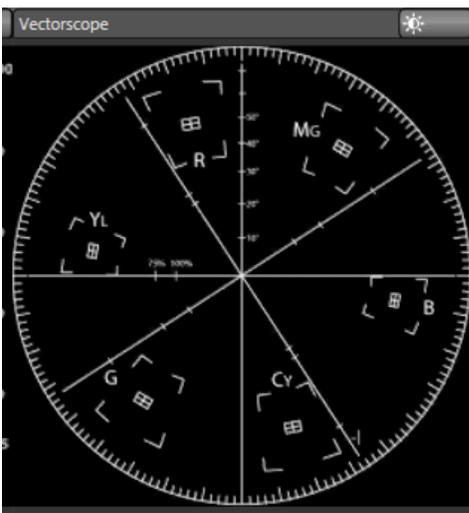
As it happens, from the vectorscope point of view, neither black nor white properly have any color saturation.

Thus, with the lens cap on (or with a white card filling the viewfinder), the vectorscope should show only a small fuzzy trace at its center. If the fuzzy dot is off-center horizontally or vertically, this would indicate that the camera is incorrectly calibrated, tinting gray areas.

When the trace *is* off center, the direction and distance of the offset tells us what sort of tint (and how much) is represented by the deviation. You may be able to use the color controls at your camera to correct for this offset, or you can use the Proc Amp's *U Offset* and *V Offset* controls to do so (as always, source controls are best). Adjustments to *U Offset* move the trace left or right, while *V Offset* changes adjust its vertical position.

Let's move on to a slightly more rigorous testing.

E.5 COLOR METRICS

At this point, we've assured ourselves that the signal from the camera is neither too bright nor too dark, that its output falls within broadcast legal luminance limits, and that the black & white part of the signal does not have an unwanted color cast.

We haven't done anything yet, though, to assure our reds are red, not slightly brown, or that our blues are not slightly green or magenta, etc. The *Vectorscope* can provide much more specific information about your cameras color signal. Let's see how it can assist you to ensure your colors are accurate.

USING COLOR BARS

You'll no doubt have seen the familiar color bars used as a standard reference for video signal calibration. Below are two examples of the color bars used in NTSC countries, the image on the right is a PAL example, common throughout European nations.
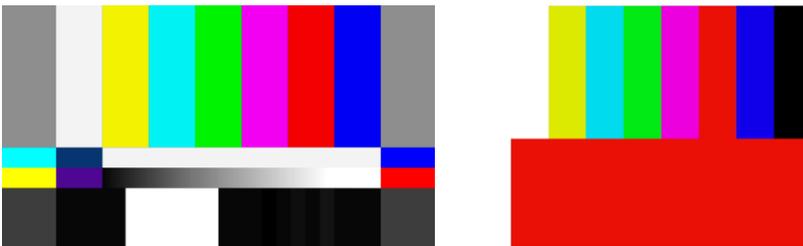
You can use color bars in conjunction with *Waveform* and *Vectorscopes* to make sure the video supplied to is consistent, accurate and broadcast legal. Most video cameras are capable of displaying color bars – check your camera manual to see how to display these (given a choice, use 75% bars). Then look at the *Vectorscope* to see how it traces the individual colors comprising the image.

The *Vectorscope* graticule has six distinct rectangular *targets*, one each for Yellow, Red, Magenta, Cyan, Blue, and Green. The targets are small rectangles with a crosshair superimposed on them.

When a source is properly calibrated, the trace from the different colored segments of the color bars displayed will fall right inside their individual targets.
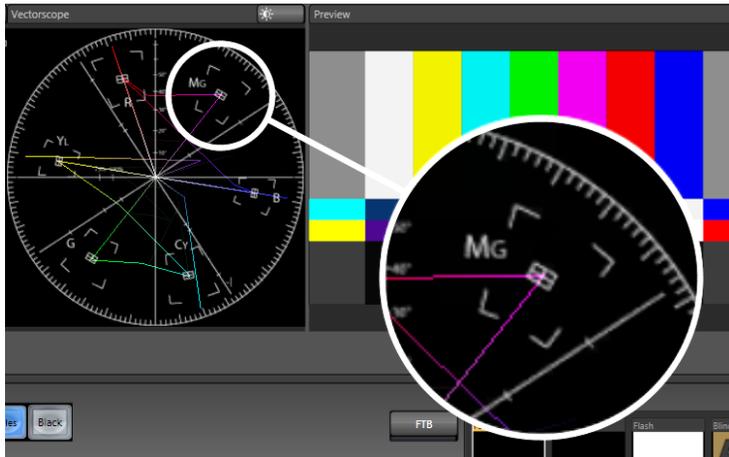
If the trace vectors do not line up as they should even after performing a white balance at the camera, you can use *Proc Amp* controls to tweak the signal.

Adjust the *Hue* control to rotate the vectors around the center point to line them up correctly on their respective targets. Increasing *Saturation* will move the trace further out towards the edge of the scope. Decreasing Saturation lowers color intensity, bringing the trace back closer to the center.

> Hint: Naturally, you should repeat the steps above for each connected source, to ensure a perfect match when switching from camera to camera during your live productions.

At this point, your video signal should be reasonably accurate, and broadcast legal. Naturally, there are other devices between that signal, you, and your viewers. Let's discuss ways to calibrate downstream video monitors to ensure that you see your video at its best.

E.6 CALIBRATING YOUR MONITORS

In most cases, you will use a computer monitor of one type or another to display your system's controls – the user interface. Even though the television monitors you likely use for final program output may look somewhat similar to your computer monitor, they do differ in a number of important respects. For this reason, we will approach their calibration separately.

E.7 COMPUTER MONITOR

This is a subject that could (and does) easily fill multiple volumes, but which we will sadly give short shrift. It may not be *quite* as important to achieve 'spot-on' color calibration for the monitor used for the user interface. Not surprisingly, video output color is best judged on larger downstream video monitors.

Nevertheless, you may find a trip to one of any number of websites providing test imagery and calibration hints useful. A search for "computer monitor calibration" yields an endless list, along with some commercial utilities for those who feel the need.
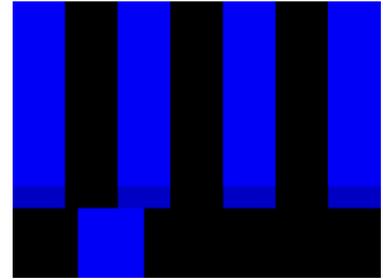
E.8 PROGRAM OUTPUT MONITOR

Again, a search of the Internet for "video monitor calibration" will yield many resources, both free and commercial. If you have television monitors connected to your outputs, though, you can make further use of the color bars. The approach is somewhat similar to what we did for our video sources, in that the first adjustments are to ensure that black and white levels are correct. Color calibration is performed afterward.

First, warm up your monitor for at least 10 minutes (some sources recommend a half-hour), to stabilize its output. Dim room lights and window light, to eliminate light sources that might skew your color perception. Pass the color bars from your camera through to program output (or use a color bars image in one of the *Media Players* for this purpose.

E.9 COLOR ADJUSTMENTS

Having set the black and white levels earlier, let's continue.

NTSC

1. If your monitor has a "Blue-gun only" setting, enable it. Depending on the brand of your monitor, the alternating bars will appear either as light gray and black, or blue and black.

2. If the monitor lacks a "Blue-gun only" feature, you can obtain a colored filter such as a Kodak Wratten #47B gel and hold that between your eyes and the monitor for a similar result.

3. Tweak the *Color* (or *Saturation*) knob until the small rectangular patches at very bottom of the tall upper bars on the extreme right and left of your screen merge with the tall bars above.

4. Tweak the monitor's *Hue* control until the small rectangles beneath the third and fifth tall upper bars likewise blend into bar above.

5. You may need to redo the last two steps several times, balancing the adjustments of these two controls until all four of the lighter bars evenly match the smaller rectangles just beneath them. (Note that a perfect match simply may not be possible on some monitors.)

6. Check your results with some familiar imagery and make any further tweaks you feel are required.

PAL

1. If your monitor has a "Blue-gun only" setting, enable it. Raise the *Color* or *Saturation* setting until the three right hand bars all appear to be the same shade.

2. If the monitor lacks a "Blue-gun only" feature, you can obtain a colored filter such as a Kodak Wratten #47B gel and hold that between your eyes and the monitor for a similar result.

3. Turn off the "Blue-gun only" feature (or dispense with the filter if you used one) and examine the red bar. It should appear not to be so vivid that it bleeds onto the nearby bars.

4. Check your results with some known familiar imagery and make any further tweaks you feel are required.

Appendix F: KEYSTROKE SHORTCUTS

F.1 SWITCHER…

Program Row, Inputs 1 to 24	F1 – F12 plus [Shift + F1-12]
Preview Row, Inputs 1 to 24	1 – 0, -, =, and [Shift + 1-0, -, =,]
Transition Delegate – select BKGD	[key (left square bracket)
Transition Delegate – multi-select BKGD	Shift + [
Transition Delegate – select DSK 1	] key (right square bracket)
Transition Delegate – multi-select DSK 1	Shift +]
Transition Delegate – select DSK 2	\ key (backslash)
Transition Delegate – multi-select DSK 2	Shift + \
Transition Delegate – select DSK 3	Backspace
Transition Delegate – multi-select DSK 3	Shift + Backspace
Transition Delegate – select DSK 4	Insert
Transition Delegate – multi-select DSK 4	Shift + Insert
Transition Delegate – select FTB	b
Transition Delegate – multi-select FTB	Shift + b
Select FTB Delegate and perform Fade	Ctrl + b
Auto DSK 1 On/Off	a
Auto DSK 2 On/Off	s
Auto DSK 3 On/Off	d
Auto DSK 4 On/Off	f
Take DSK 1 On/Off	Shift + a
Take DSK 2 On/Off	Shift + s
Take DSK 3 On/Off	Shift + d
Take DSK 4 On/Off	Shift + f
Select Transition (prev/next)	, and . (comma and period)
Select Fade Transition	Ctrl + f
Restore Last Transition	Shift + Ctrl + f
Transition – Slow … Medium … Fast	z…x… c
Transition – Increase Speed	Shift + c
Transition – Decrease Speed	Shift + z
Toggle Reverse Transition On/Off	e
Ping Pong Transition (off/on)	Alt + e

F.2 T–BAR

Take	Return Key
Take T-bar Back to Top	Shift + Return

Transition … Go/Pause	Spacebar
Auto Reverse	Shift + Spacebar
Adjust T-bar… Down/Up	t / Shift + t (faster add Ctrl)
Halfway T-bar… Take	h

F.3 RECORD, GRAB, AND STREAM

Record on/off	r/ Shift + r
Grab (still image)	p
Stream Start	Ctrl + /
Stream Stop	Ctrl + Alt + /

F.4 TABS

Show (DDR, PTZ, Mixer, etc.) tab	Ctrl + (F1 to Fn)
Select M/E 1- 8	Ctrl + Shift + F1-F8
Show M/E pane	Ctrl + m
Hide M/E pane	Alt + m
Toggle M/E pane	m

F.5 WORKSPACE

Show Interface A	Alt + Numpad 0
Show Interface B	Alt + Numpad 1
Show Interface C	Alt + Numpad 2
Show Interface D	Alt + Numpad 3
Show Multiview A	Ctrl + Numpad 0
Show Multiview B	Ctrl + Numpad 1
Show Multiview C	Ctrl + Numpad 2
Show Multiview D	Ctrl + Numpad 3

F.6 MEDIA PLAYERS

Stop	k
Play	l (lower case L)
Go to previous playlist item	j
Go to next playlist item	; (semi colon)
Autoplay On/Off	u
Loop On/Off	' (apostrophe)
Single On/Off	q

Navigate through Playlist items	Up/Down/Left/Right Arrows
Set In Point for current Playlist Item (Clip or Audio file)	i
Set Out Point for current Playlist Item (Clip or Audio file)	o
Split clip at current frame	/
Reset In and Out Point to the file's first and last frame	g

F.7 GENERAL

F.8 EDIT TITLE PANE

Save the current title page	Ctrl + Shift+ s
Save the current title page, and duplicate it in the playlist	Ctrl + Shift+ s
Save the page and move to the previous playlist item	Page Up
Save the page and move to the next playlist item	Page Down

F.9 SELECTION AND NAVIGATION

Select All	Ctrl + a
First/Last Item	Home/End
Navigate through Playlist items	Up/Down/Left/Right Arrows
Select All Previous/Following Items	Shift + Home/End
Playlist - select to Top/Bottom	Shift + Home/End
Playlist – add to selection (Up/Down)	Shift + Up/Down arrow

F.10 MISC.

Cut	Ctrl + x
Copy	Ctrl + c
Paste	Ctrl + v
Delete	Delete Key
Show version	Alt + b

Appendix G: CUSTOMER SUPPORT

It is frequently said that "All good things must come to an end" … but your live production system is designed to work as well on any day as it did on the day you bought it. Vizrt Customer Support features and options are meant to help you achieve that goal. This chapter identifies the many assets and services available to you.

G.1   PRODUCT SUPPORT

Product support is available for as long as you own your TriCaster system. Find complete details on our main Vizrt support page or request a ticket with customer service support at www.vizrt.com/support/vizrt-protek/.

- Training:
  - **Vizrt University**: Our new online training will help you take advantage of the countless creative possibilities your unit offers (you can also become a Certified Operator once you pass the exam) – see Viz Univeristy
  - **Discover:** Watch our online videos to learn the benefits and features of Vizrt professional video production systems Vizrt's YouTube channel
- **Software Updates**: Visit Product Updates
- **Knowledge Base**: Our extensive online knowledge base will help you troubleshoot issues and clear up any misunderstandings – see Vizrt Knowledge Base
- **User Forums**: Join the conversation, get answers, learn techniques, and share ideas with users like yourself at User Forums

G.2   THE PROTEK℠ ADVANTAGE

The option ProTek plan goes far beyond basic service, offering you Vizrt-provided priority service for however long you own your product. ProTek enhances your support experience—every step of the way.

- With ProTek coverage, you're part of a select group of customers whose needs are our first priority.
- Every ProTek Ultra customer gets the white-glove treatment by their local Ultra Service Provider.
- ProTek Ultra customer calls and emails are answered first.
- ProTek gives you priority access to the people who can answer your questions, help you with configuration, and walk you through solutions, step by step.
- And if disaster should strike and your Vizrt product needs repair, we're standing by ready to provide the best access. You get free overnight shipping.
- If you opt for a repair rather than a replacement, you get a guarantee that within three to five days of receiving your product it will be on its way back to you.

- If your product needs to be back in service immediately ProTek Ultra customers can usually get a replacement shipped right to your doorstep the very next day. Find full details of the ProTek program at www.vizrt.com/support/vizrt-protek/.

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CREDITS

Special thanks to each member of the hard-working R&D team who made this product possible.

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