TriCaster®

Advanced Edition v.3

Live Video Production
8000 | 860 | 460 | 410 | Mini SDI | Mini

User Guide

TABLE OF CONTENTS

PART I (GETTING STARTED)

Connections and registration, a top-level overview of primary features, and a hands-on tour to get you started.

This manual tells you everything you need to know to perform common operations with your NewTek™ live production system. 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.

Even if you are the hands-on, 'I never-ask-directions!' type, please peruse this page. If any questions about your NewTek product arise later, you may find that the information here allows you to jump directly to the details you need with a minimum of reading.

➢ *PART I – GETTING STARTED*
Introduction – connecting devices (cameras, monitors, etc.) and registration, ending with Chapter 4, Web Features, which also includes an overview of online resources provided 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*
Informative sections dealing with deeper and extended topics, shortcut keys and a comprehensive keyword index.
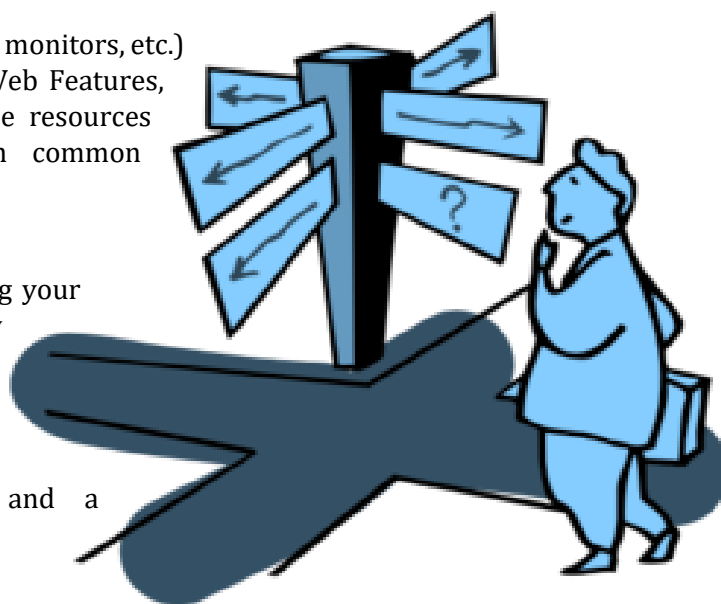
Chapter 2 INTRODUCTION

Thank you for purchasing this NewTek™ product. As a company, NewTek is extremely proud of its record of innovation and its commitment to excellence in design, manufacture, and product support. You will find your NewTek system exceptionally powerful and versatile. This chapter provides a quick tour of its basic components and features.

SECTION 2.1 MEET THE FAMILY

All TriCasters bear a strong family resemblance. The user interfaces of TriCaster Mini SDI, Mini, 410, 460 and 8000 have a great deal in common. Most aspects of the workflow and user software are intentionally very similar. Among other benefits, this makes it easy for TriCaster users working with multiple machines to feel right at home and avoid errors.

SECTION 2.2 OVERVIEW

NewTek's innovative live production systems have repeatedly redefined broadcast workflows, providing new creative possibilities and also cost savings. In particular, NewTek has been a leader in introducing integrated devices providing a complete set of tools related to program creation and broadcast, along with web streaming and social media publishing.

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. The live production systems considered herein let you produce and distribute live video programs from diverse sources in high definition formats up to 1080/59.94i.

Support for NewTek's innovative NDI® (Network Device Interface) protocol places your system squarely in the forefront of IP technology solutions for the video broadcast and production industries. And thanks to NDI's versatile architecture, it does not isolate you in a proprietary 'walled garden'. NDI's overwhelming adoption rate, support for interchange with other IP standards, and extensibility ensure your investment will *extend* your production horizons, rather than limit you to restrictive (and expensive) alternatives.

SECTION 2.3 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* allows you to create (and re-open) *sessions*. A sessions is essentially a custom preset for an individual production or other purpose.
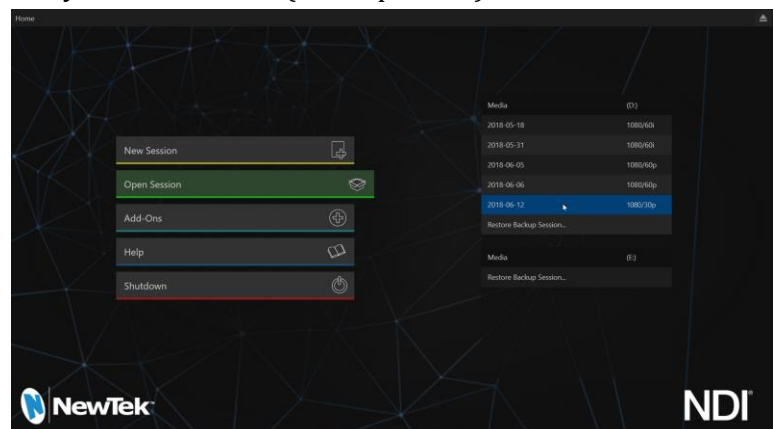
FIGURE 1

Later, when you re-enter an existing session, all of its assets and settings are remembered. Selecting a session takes you 'into' the session. Next, TriCaster shows you the *Session Page*, where you can prepare *Graphics* (title pages), *Manage* content, and more – or launch the *Live Desktop* to begin production.

SECTION 2.4 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 in Figure 2.

- 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 can be re-sized, even completely hidden when outboard monitoring is in use; or the display can be customized to complement the external *Multiview,* or for numerous other purposes.

- The central *Live Control* section is home to the *Switcher*, *Transition, DSKs* (overlay channels*)* and *M/E* controls (*M/E* panes can be minimized, and are hidden from view in Figure 2).

- The bottom third of the *Live Desktop* holds tabbed control modules, including *Media Players* (*DDRs* and *Graphics* players, and a *Sound player*) and *Buffers*, *PTZ* camera controls and the *Audio Mixer*.

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

2.5.1 MULTI-TIER FAILSAFE

'Always on Air' features provide multi-tiered redundant failsafe mechanisms in both hardware and software.

To name just a few:

- Multiple software failsafe systems continually monitor and safeguard the live performance. Any recoverable software error conditions are quickly and unobtrusively dealt with.
- Video pass-through (not a Mini or Mini SDI feature) ensures that as long there is AC power, audio and video from *Input 8* or *Input 4* (some models) are routed to *Output 1* in a case of catastrophic software condition.
- If at all possible, streaming output and recording also continue even if all else fails.
- Your NewTek live production system also has a comprehensive integrated system restore feature. You can quickly restore the system to factory defaults, or create and use custom restore images on external drives to restore the system, or even use the backup drive to boot from if a complete hard drive failure ever occurs.
- If a control surface connection should fail, the system attempts to reconnect automatically without user intervention.

2.5.2 A/V INPUT AND OUTPUT

It's worth taking a moment to consider that each and every NDI output potentially substitutes for multiple traditional outputs.

For example – it is not unusual to need multiple physical outputs from a traditional video switcher for a single source – one for recording, another to broadcast, one for local monitoring and so on, with each destination consuming precious hardware connections. This is not the case with NewTek production systems, which allows multiple downstream connections to a single NDI output.

Thus, it requires no hyperbole to state that your NewTek system provides virtually unlimited outputs, without expensive additional hardware. And if you do require more standard SDI outputs than the four provided, the system is easily extended using any number of rack-mountable output modules.

- Live switch up to 12 external video sources (varies by model), and nearly as many internal sources. Various models support SDI, HDMI or analog video input and output, internal and network video sources, and analog audio input and output.
- Connect popular video routers to greatly multiply input options.
- Professional BNC video connectors provide increased durability and reliability for camera connections.
- Control supported *PTZ* cameras via NDI (or other common IP control protocol) or serial connection.
- Freely mix multiple video formats, and output HD and SD sessions simultaneously.
- Multiple *Media Player* modules allow you to insert pre-recorded video, music, sounds and imagery into your live presentations.
- Select Microsoft Windows® or Apple Macintosh® computers on the same network as *Switcher* inputs for your live productions using NewTek's NDI® Scan Converter clients.

- Update *Buffers* in 'watch folders' from networked graphic workstations, even when these are displayed live.
- Transmit output to other NDI-enabled systems across the network.
- Create complex *M/E* effects and compositions using multiple sources and versatile virtual sets with live (virtual) camera moves.
- TriCaster 8000, 860 and 460 *M/Es* are reentrant, allowing you to cascade unbelievable effects in endless creative ways.
- Use switcher row grouping to automatically harmonize video sources for multiple *M/E* s, etc.
- Mix and route internal and external audio sources, including analog or SDI Embedded audio.
- Multiple video outputs, including streaming, can supply unique video feeds; designate output mixes or individual sources for output in various formats up to 1080/59.94i.
- Send main or custom audio mixes independently to a variety of physical and IP audio outputs.

2.5.3 ALPHA CHANNEL I/O

- Alternate video inputs can be configured as key channels for Fill + Alpha sources (not a TriCaster Mini SDI or Mini feature).
- NDI sources, including those from third-party applications, can support embedded alpha channel.

2.5.4 TIMECODE

- Default QuickTime® recording format includes full 'per frame' time-code.
- IsoCorder™ recorded clips from multiple sources are easily aligned for synchronized post show editing using embedded timecode (external timecode is not supported on TriCaster 410 or TriCaster Mini).

2.5.5 MONITORING
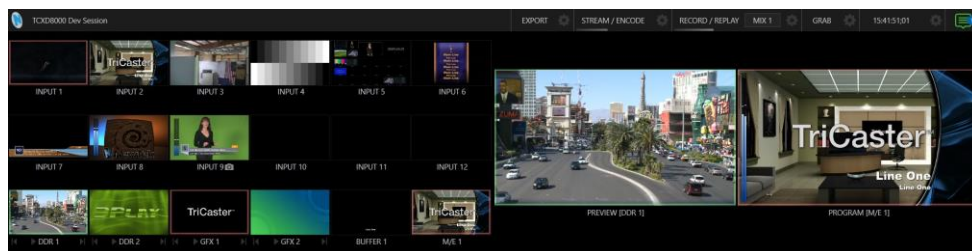
FIGURE 3

- The *Live Desktop* includes a large *monitoring pane* with multiple and easily customized *Workspaces.* By default, this area includes *Program* output and *Look Ahead Preview* monitors with associated controls, along with all inputs.
- The monitor array at left allows you to keep an eye on all live and internal video sources, including *Media Players* and *Network* sources.
- External *Multiview Workspaces* offer many alternatives, including numerous multi-bridge layouts, overlays and *Event Clocks.*
- Monitor sources on both *Live Desktop* and *Multiviews* are user-configurable, and include *Media Player* clip timecode counters, and custom logo display*.*
- *Waveform* and *Vectorscope* monitors help you calibrate your signal to ensure your output meets broadcast standards and looks great.

2.5.6 VIDEO PROCESSING

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

2.5.7 THE SWITCHER

The powerful Switcher module, which provides native support for popular professional video routers and NewTek's unbeleivable NDI™ (Network Device Interface) protocol, puts countless sources at your fingertips in a familiar *Program/Preview* row control interface.
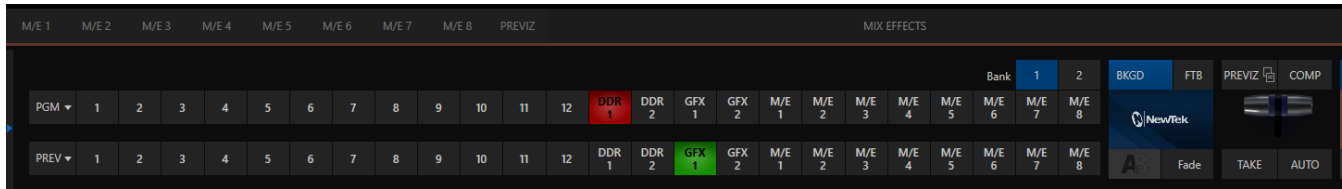
FIGURE 4 (TCXD8000)

For less complex productions, the *Switcher's* convenient *Express mode* simplifies the process (Figure 6). This one-button operating mode will be especially welcome in environments where volunteers or less experienced operators are involved.
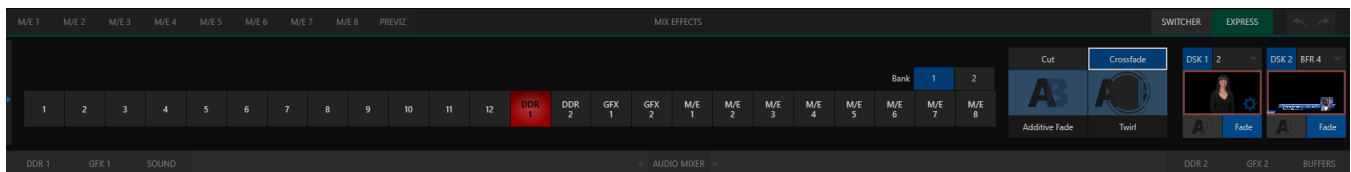
FIGURE 5 (TCXD8000)

Additionally, support for switching using a touchscreen has been provided. See something interesting on a viewport in the monitoring section? Just *tap* the corresponding viewport to instantly send that source to *Program* output, using the current *background transition* (if any).

VIDEO LAYERS AND TRANSITIONS

The *Transition* section of the *Live Desktop* provides powerful tools for arranging and displaying the numerous video and graphic layers contributing to your ultimate program output.
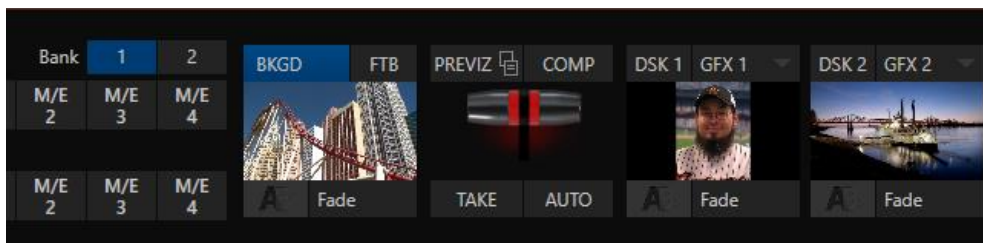
FIGURE 6

- Freely *hot-punch* or *transition* between external sources, internal *Media Players*) and *M/E effects*.
- Latch selected *Switcher* and *M/E* source rows in color groups to synchronize switching operations.

- Four *DSK* (Downstream Key) *Switcher* channels and four independent *KEY* channels for each *M/E,* permit endless creative possibilities.
- *DSK* and *KEY* sources are always represented in small full motion 'confidence monitors'.
- Use any of the hundreds of transitions supplied to reveal either *Background* or *DSK/Key* channels with animated wipes, trajectories and dissolves, or select colorful and dynamic *Animation Store* transitions with overlays, sound and *TransWarp™* effects.
- Create an unlimited number of custom transition effects with embedded sounds, dynamic cloth effects, and full color overlays using the integrated *Animation Store Creator* application.
- Create eye-popping animated graphics using your favorite software (e.g., Adobe After Effects®), and convert them to animated *Buffer* effects that you can display without tying up a *Media Player*.
- Reveal combinations of video layers with one operation of the *T-bar* or click on *Take/Auto* buttons.
- Or use *per-layer* controls to independently control display of any layer with or without transitions.
- Select individual transition effects for any layer and adjust *Speed*, *Reverse* and *Ping Pong* options.

DSK CHANNELS
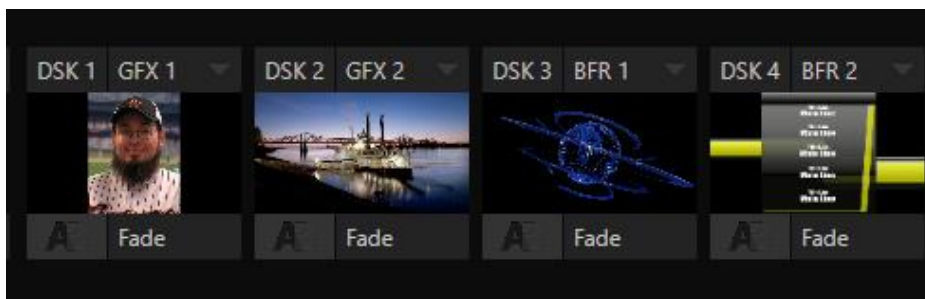
DSK layers support downstream overlays (*M/E Keys* are *upstream* overlays, i.e., ahead of the main *Switcher*).

- Display *DSK* channels independently, and swap them during a switch with custom transitions.
- Use *Media* Players to overlay title pages, including scrolls, crawls and lower-thirds, or assign a *Camera* feed or *Network* source to an overlay channel.
- Alternatively, use the *Buffer* channels to assign a specific title, still image or animation effect to any overlay channel.
- Independent *Crop*, *Position, 3D Rotation*, and *Scale* controls for each *DSK* channel permit you (for example) to configure multiple sources as 'Picture in Picture' elements, revealing them with individual custom effects.

2.5.8 M/ES

Four or eight (TriCaster 8000) color-coded Mix/Effect banks provide stunning effects.

These include secondary video mixing capabilities, switching (with traditional wipes or *Animation Stor*e transitions with *TransWarp* capabilities), full alpha channel support and best in class *LiveMatte™* realtime keying technology for green/blue screen effects, jaw-dropping dynamic virtual sets, and much more.

Each *M/E* bank supports:

- Up to four primary video sources per effect (number varies by model).
- Mutliple *KEY* (overlay) channels with individual transition capabilities (number varies by model).
- *S*ub-mix functionality, with individual transitions for A/B *Background* layers and *KEY* channels.
- Individual *Scale*, *Position*, *Crop* and *Rotation* controls and motion *Tracker* support for all channels.
- Specified models include powerful *Comp* (composition) preset features that let you animate layer and overlay position, rotation and other attributes in full motion.
- Convenient *MEM* system allows instant access to pre-configured *M/E* setups.

2.5.9 VIRTUAL SETS

FIGURE 9

- Achieve the look of large, sophisticated studio sets in a very small space with NewTek's *LiveSet*™ virtual set technology.
- Virtual sets support either two or four keyable primary video sources, by model.
- *Zoom* and *pan* the virtual 'camera' during live production (without touching the physical camera).
- Or use a *Holographic LiveSet* to freely rotate and zoom the camera view.
- Set up custom virtual set animation targets even while live.

2.5.10 RECORD AND STREAM

- Record your live-switched production at full resolution to a high quality QuickTime® format.
- Captured Quicktime files include embedded timecode (on supporting models).
- IsoCorder™ technology supports multiple a/v recordings at once (number varies by model), chosen from among local hardware camera inputs, all four outputs, and supported external recorders.
- Easily grab still images from Switcher input sources, or batch capture selected outputs.
- Simultaneous output for broadcast, projector and live web stream to in-house and remote audiences.
- Stream live to multiple Internet destinations for redistribution, and archive your stream locally.
- Perform instant replays with custom transitions and playback speed with just one button press.
- Or use NewTek's TimeWarp™ instant replay control surface to mark, replay and manage highlights.

2.5.11 MEDIA EXPORT

Export support makes it easy to distribute content to multiple targets in one pass. This module stores credentials for social media and upload sites, and provides a queue for uploading and file conversion. Clips and stills from live sessions can easily be added to the *Export* queue without interrupting production, for distribution to multiple hosting services and social media sites (including Twitter®, Facebook®, YouTube®, and more) all with a single click – even when live production recording is still underway.

This is great for concerts, galas, sport events, game shows and more. The *Export* feature directly addresses FTP sites and network locations too; transfer media to multiple locations at the same time to meet post-production needs or other collaborative and archival requirements.

2.5.12 AUTOMATION

Record, edit, and play back macros, whether simple operations or involved sequences at the touch of a button. Use integrated automation systems to trigger these, simplifying complex tasks and ensuring consistent operations.

2.5.13 HOTSPOTS, TRIGGERS AND TRACKERS

Define multiple onscreen *Hotspots* for different (chromakeyed) sources, and *trigger* macros automatically whenever something opaque enters the hotspot. This live interactivity opens up countless creative applications.

Trackers provide motion data from selected color regions as they move about the frame in realtime. Lock other video sources to *Tracker* output using *Position* tools in *M/Es* banks and *DSK*s and they will follow obediently.
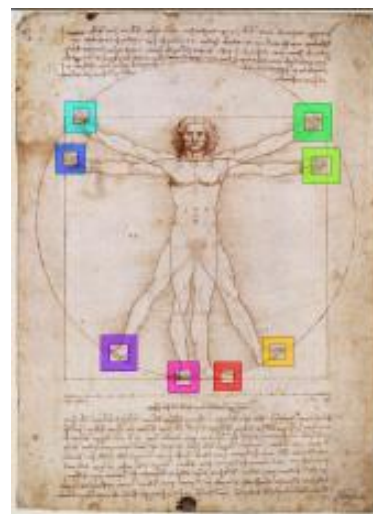
2.5.14 IMPORT

The integrated *Import Media* feature provides a convenient one-stop approach to gathering productions assets.

- Batch import media files for use in *Media Players.*
- Imported files are automatically categorized as stills or clips, and can be pre-assigned to the specific players, making them easy to find and use during live productions.
- When necessary, imported files are transcoded to formats that ensure smooth playback.

2.5.15 AUDIO MIXER

The integrated *Audio Mixer* provides extensive multi-channel control and management.

- Adjust numerous internal and up to 16 *external audio sources; introduce them into your program manually or automatically. (*supplied by SDI, analog, NDI, or other supported network protocol.)
- Control output levels for program, headphones, auxiliary outputs, recorders, and stream separately.
- Convenient *Audio Mixer MEM* system allows single-click access to prepared setups.
- Automation allows complex 'video follow audio' options and more, including 'threshold macros'.
- Exclusive or latched *Solo* controls
- Independent 7-band *EQ*, *Compressor/Limiter* and *Noise Gate* for each source and output.

- Complete multi-bus matrix routing options.
- Configurable *VU meters*: Show calibration on digital (dBFS) or analog (dBVU or dBu) scales.

2.5.16 INTEGRATED MEDIA PLAYERS

Numerous *Media Players* and title system serve up graphics, titles, video clips and audio files quickly and easily during your live productions.
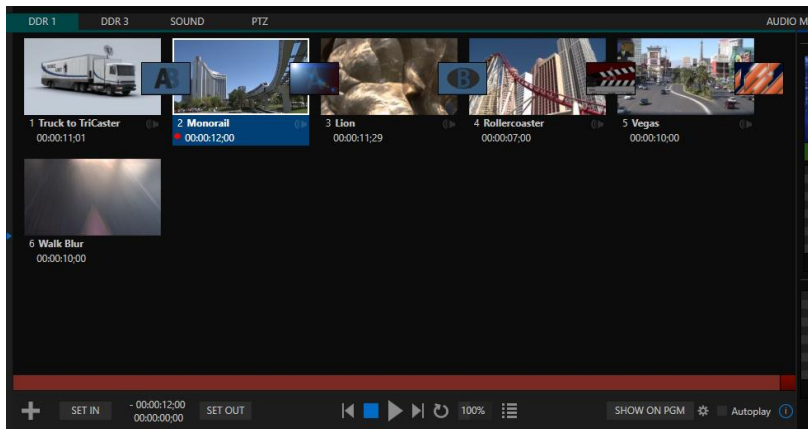
FIGURE 10

- Add a/v clips, sound or still images to *Media Player* playlists.
- Trim and re-order playlist entries.
- Add colorful transitions between clips.
- Flexible playback controls include variable *Speed* and *Loop* options.
- Each *Media Player* has its own volume and other advanced audio controls in the *Audio Mixer*.
- Convenient 'per clip' audio level and playback *Speed* control.
- *Autoplay* feature starts and stops playback automatically based on *Switcher* activity.
- Control *Media Players* with *macros* triggered by other events.
- Assign titles, graphics, clips or buffers to multiple *DSK* or M/E *Key* channels.
- Edit titles live, even while 'on air'.
- The powerful *Show* button instantly transitions a selected clip to the *Main Switcher* or an *M/E*, plays it, and then restores the target's original source.
- Store playlists and player configurations in *MEM slots* for easy recall.

2.5.17 BUFFERS

The *Buffers* module provides quick review and management of the internal media buffer system, providing combined playback and asset management tools, and is fully supported by the *Macro* system.
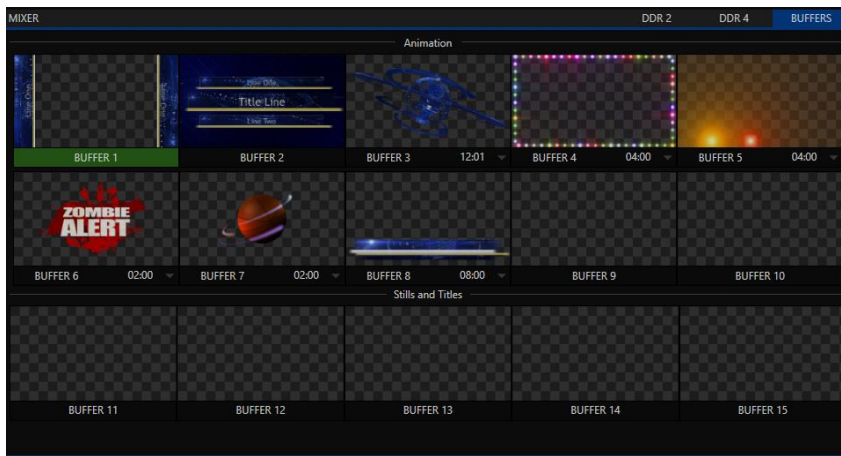
Buffers can be applied in any video channel, including all main *Switcher* and *M/E* rows, or as overlays in the countless *DSK/KEY* channels. *Buffer* 'slots' can contain animated effects (compiled from your own clips using the supplied A*nimation Store Creator* application), still graphics or title pages, all with full alpha channel support.

Buffer effects are resident in reserved *Switcher Memory*, making it possible to use them all at once without tying up *Media Players*. Thus *Buffers* effectively substitute for *many* additional *DDRs*.

2.5.18 TITLES AND GRAPHICS

An extensive set of live-editable static title pages in various theme packs are supplied, all ready for immediate use in your productions. Also included in the software suite is a special 'offline' version of LiveText™, NewTek's professional titling and graphics application. This allows you to create your own great looking custom title pages and motion graphics, including scrolls and crawls that can be played back in *DDRs*.

2.5.19 OPTIONAL CONTROL SURFACES

Several different control surface options have been designed to complement to your system, making your live production operations even more convenient. Once you get your hands on one you'll never want to let go. Beyond primary control surfaces, NewTek offers an optional instant replay control surface called TimeWarp™. Talk to your local reseller for a demonstration of these powerful extensions to your system.

In summary, your NewTek live production system gives you more combined production power than any other single broadcast appliance. Let's jump in now. First, we'll get you connected; following that, we'll explore some of the system's foremost features.

Chapter 3   SETTING UP

This chapter explains how to connect power, monitors and audio visual sources, and external control devices to your NewTek live production system. It also reviews the registration process. After completing this short section, you'll be all set to begin using your new unit.

SECTION 3.1 COMMAND AND CONTROL

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

1. Connect an external computer monitor to a suitable video output port on the system's backplate.

Note: The user interface runs on the monitor selected as "main display" in the Windows control panel Display applet. See Section 3.8.2 regarding supplemental monitor connections.

A word about UPS devices:

2. Connect the *mouse* and *keyboard* to USB ports.
3. Connect the *power cord(s)* to an A/C power receptacle.
4. Turn on the computer monitor.
5. Press the *Power* switch (typically located on the front panel, behind a flip-down door on some models).

'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.

At this point, the *Power LED* illuminates and the device will boot up. (Othwerwise, check your connections and retry). Though not a requirement, we strongly recommend using an uninterruptable power supply (UPS) for 'mission critical' systems.

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.

Likewise, please do consider using A/C "power conditioning", especially in situations where local power is unreliable or 'noisy'. Surge protection can be especially important in some locales. Power conditioners can reduce wear on power supplies and other electronics, and provide improved protection from surges, spikes, lightning and high voltage.

SECTION 3.2 WINDOWS™ LOGIN

Although the system can be operated without a password requirement, it is recommended to use one to secure your system from unwanted use or intrusion.

Important note: The default password for new (or 'newly restored') systems is simply "newtek", entered without the quotation marks, of course.

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* and *Product ID* for your system.

NOTE: IF YOU LEAVE THE SERIAL NUMBER FIELD BLANK, AND PRESS CONTINUE, SYSTEM WILL RUN; HOWEVER, OUTPUT WILL DISPLAY A WATERMARK UNTIL THE SOFTWARE HAS BEEN UNLOCKED.

> *Hint: If the Serial number doesn't appear automatically and you can't find it on your unit, contact NewTek's Support center at https://www.newtek.com/support/get-support/*

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

> *Hint: Information on connecting to a network can be found in Section 3.15.*

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

3.3.1 REGISTERING BY TELEPHONE

NewTek's Support center can also handle registration requests by telephone, if that is more convenient (you should still visit the website as discussed above to check for software updates when possible).

Please have your serial number (from the *Registration dialog* mentioned earlier) handy when you call. The phone numbers for Customer Support follow:

Telephone:

- (US) 1-800-862-7837
- (Outside US) +1-210-370-8452
- (Europe) +33 (0) 557-262-262

> *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. Jot down the registration code too; it could come in handy if you ever need to restore the system's software to as-shipped state when you don't have access to the Internet.*

UPDATES

It's a great idea to check for recent free software updates for your system at this time, too – visit https://www.newtek.com/downloads/ to do so.

ENHANCED SUPPORT (PROTEK)

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

SECTION 3.4 RACK MOUNTING

Many NewTek systems are designed for convenient mounting in standard 19" racks (mounting rails are available separately from NewTek Sales). Please keep in mind that adequate cooling is a very important requirement for virtually all electronic and digital equipment.

We recommend allowing 1.5 to 2 inches of space on all sides for cool (i.e., comfortable 'room temperature') air to circulate around the chassis. Good ventilation at the front and rear panel is important, and most systems also require ventilated space above the unit (1RU minimum is recommended).

Hint: When operating your system in a 'road case' for mobile production, it's best to do so with both the front and back covers (of the road case) removed.

When designing enclosures or mounting the unit, supplying good free air movement around the chassis as discussed above should be viewed as a critical design consideration. This is especially true in fixed installations where the unit is installed inside furniture-style enclosures. See Appendix E for more detail.

SECTION 3.5 INPUT CONNECTIONS

3.5.1 CONNECT A/V SOURCES

External audio and video sources are connected to the appropriate inputs on TriCaster's backplate.
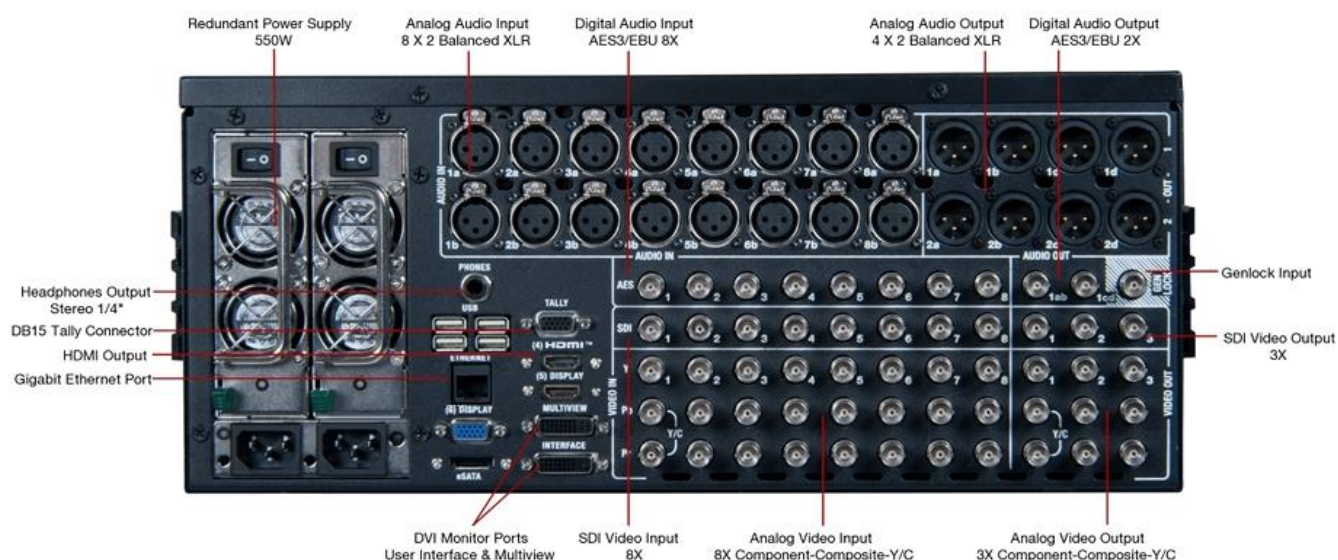
FIGURE 12 – 4RU MODELS
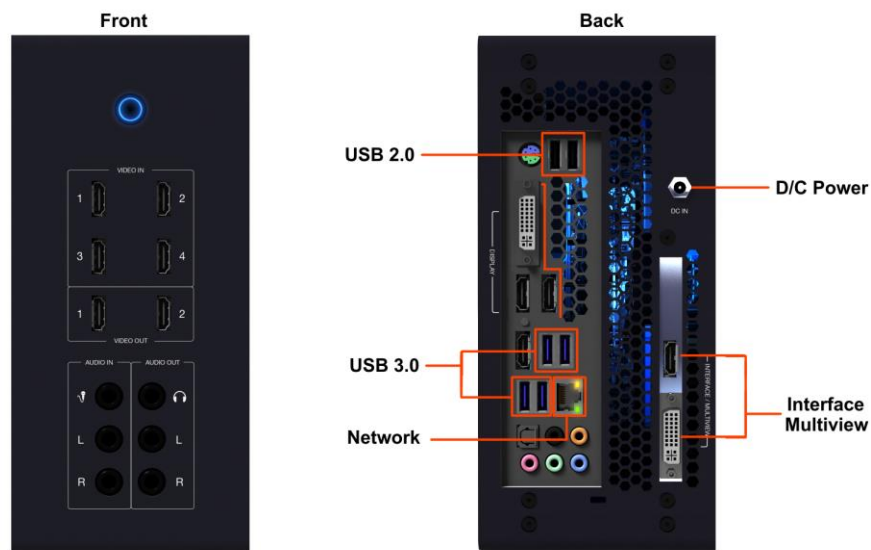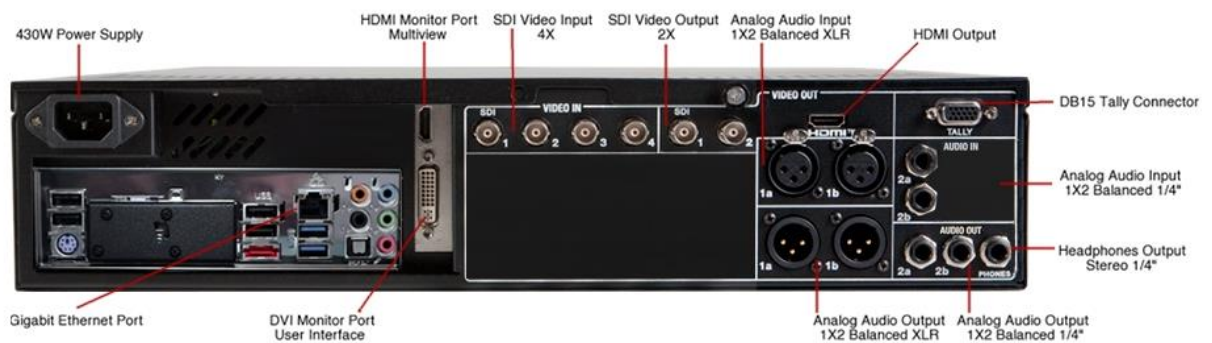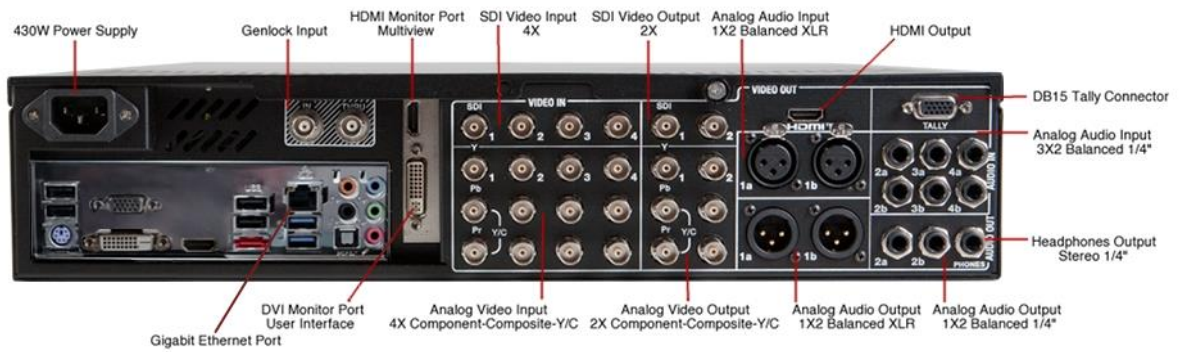
Note: Hardware details as depicted are subject to change without prior notice.

If your equipment supports SDI, this is the best quality option.

1. Connect sources to suitable connectors in the *VIDEO IN* section: *SDI*, *HDMI* (TriCaster Mini only), *Component*, *Y/C* (S-Video), or *Composite* (may require RCA> BNC adapter).

   a. *SDI* – Attach SDI source connectors to one of the BNC connectors in the *Video In* group marked *SDI*.

   b. *HDMI* (TriCaster Mini only) – Connect your HDMI source cables to HDMI inputs on the front of the unit.

Note: The analog video input connection options listed next are not provided by TriCaster 410 or Tricaster Mini.

   c. *Component* – Attach the appropriate BNC connectors from your sources to all three analog BNC connectors (labeled *Y*, *Pb* and *Pr*) in a column of the *Video In* group.

   d. *Y/C* – If your S-Video equipment and cabling has the usual 4-pin mini-DIN connectors, you will need an *S-Video to dual BNC* adapter.

   To connect Y/C sources, attach the *Y* (luma) connector of your source to the second analog BNC connector (labeled *Pb*). Attach the source's *C* (chroma) connector to the *bottom* connector (labeled *Pr*).

   e. *Composite* – Attach the composite source's connector (may require use of an RCA to BNC adapter) to the connector in the input row labeled *Y*).

SDI Recommendations:

It's worth mentioning here that SDI, while ideal for many purposes, does nevertheless have some limitations.

We do not recommend cable runs exceeding 100 meters (for HD; or double that for SD). Transmission over greater distances may result in signal losses, and call for measures to boost levels, which may in turn introduce added latency into the signal path before TriCaster.

Note: The broadcast video standard (such as NTSC, NTSC-J or PAL) of all video sources connected for a given session must match.

2. To input *analog* audio along with the video, connect the desired audio sources to the (XLR or ¼") connectors as provided in the *Audio In* group.

   We'll discuss audio *Connection Type* options a bit later, in Section 3.13.

Note: SDI or HDMI video sources with embedded audio do not necessarily require separate analog audio connections.

3.5.2 CONNECTING A CONTROL SURFACE

Please refer to Chapter 21 regarding connecting and configuring control surfaces.

3.5.3 CONNECTING A VIDEO ROUTER

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* at right.

- In the *Administrator Mode* panel, click *Exit to Windows.*

- Navigate to the appropriate folder below:

  o C:\ProgramData\NewTek\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 NewTek system may be able to access that name and use it for *Switcher* buttons as appropriate.
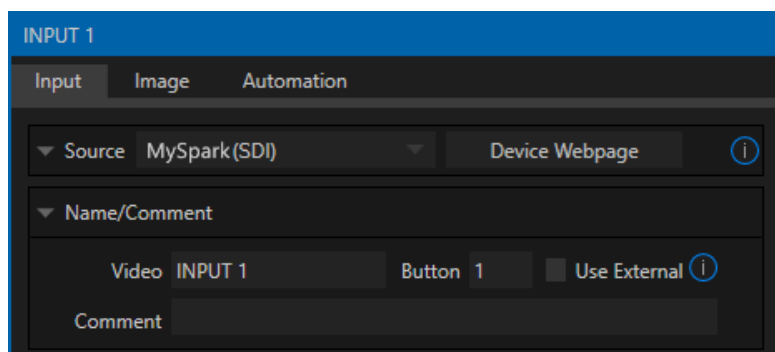
To enable this behavior, checkmark the *Use External* (name) switch in the *Input Configuration* panel (Figure 16) – see Section 8.1.1 for more detail.

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"/>

SECTION 3.6 GENLOCK CONNECTION

The *Genlock* input (not a TriCaster 410, Mini SDI or Mini feature) 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* the NewTek system. To connect the genlock source, supply the reference signal from the 'house sync generator' to the *Genlock In* connector. (See Section 3.14 regarding genlock configuration.)

SECTION 3.7 TIMECODE CONNECTION

Most TriCaster systems support external linear timecode (LTC) input. Connect the cable from your timecode generator to one of the connectors in audio *Input 7* (4RU models) or the 1/8" motherboard line input connector (all other models). External timecode is automatically recognized when present, but there are some related settings in the *Live Desktop* (see also Section 7.5.1).

SECTION 3.8 OUTPUT CONNECTIONS

Next we'll discuss the audio and video output connectors along with relevant settings. We'll start with video output, not only so you can view your results but because certain items are best considered before beginning a live production session.

3.8.1 A/V OUTPUT

Your NewTek system provides multiple video and audio output connector groups, and very flexible display options. Here are some of the possibilities:

- Output a huge number of different sources – including up to four different mixed compositions, a huge number of NDI outputs, internal recorders, local monitors, and Internet streaming.
- All hardware inputs and all outputs are always presented to your local network as NDI sources, ready for varied utilization at any convenient place where your network extends.
- Send program output, secondary mixes, or custom 'monitor bridge' layouts to a supplemental *Multiview* monitor.

- Stream program output to the multiple CDNs (Content Delivery Networks) on the Internet via a suitable network connection.

Each of the main outputs, termed *MIX 1-4* in the interface, can be configured independently (video format settings for these outputs are provided in the Live Desktop's *Output Configuration* panel – see the callout HD and SD Options.

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

2. NDI and Streaming outputs obviously require a network connection, and in the latter case, an Internet connection.

> **HD and SD Options**
>
> As mentioned earlier, *simultaneous* output of both SD and HD (High Definition) video is supported.
>
> The video format of the *MIX 1* output is determined by the session (see Section 5.1). When the session is SD 4:3 or 16:9, output is likewise SD 4:3 or 16:9. When the session is HD, output is HD.

THE VIDEO FORMAT FOR NDI OUTPUTS IS HANDLED AUTOMATICALLY. THESE OUTPUTS MERELY REQUIRE A NETWORK CONNECTION TO COMMUNICATE WITH NDI-ENABLED SYSTEMS ON THE SAME NETWORK.

3. Connect audio outputs.

   a. *Analog audio* – Connect external audio devices to the connectors in the *AUDIO OUT* section.

   4RU TriCasters offer two pairs of four audio output connectors:

      i. Connectors *1a-(1b or 1d)* provide sound from the mix assigned to *Output 1* (defaults to *Master* in *Output Configuration*)

      ii. Connectors *2a-(2b* or *2d)* provide sound from the mix assigned to *Output 2* (defaults to *Aux* in *Output Configuration*)

      Note: These two output groups are treated by TriCaster as four independent stereo outputs, each configured and controlled separately; see Chapter 15, Audio.

   b. *Digital audio* – A separate digital audio connection is not necessary for SDI or HDMI output with embedded audio. AES/EBU connectors are provided for *Output 1*(channels a-d) on 4RU models.

   Hint: TriCaster's SDI and analog output sections can be used simultaneously.

3.8.2 SUPPLEMENTAL VIDEO OUTPUTS

As mentioned back in Section 3.1, 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 embedded multiview) appears.

Hint: You can choose which monitor is the "main display" by choosing Administrator Mode, then clicking Display under the Settings heading.

Several of the other monitor ports on the backplane are available to connect to additional monitors, or projection devices (etc.) for various purposes, including program output for IMAG (Image Magnification) installations.
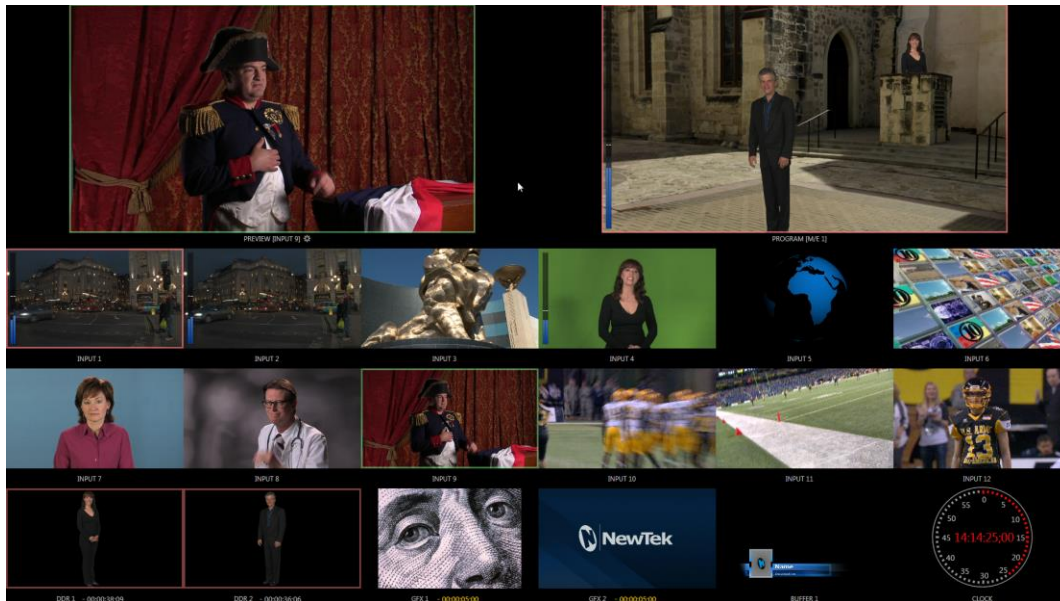
A variety of optional layouts can be selected and configured in the *Live Desktop* for the embedded or external *Multiview* outputs.

1. TriCaster's external *Multiview* output is supplied by a connector located near the main *Interface* monitor connector (RU models) or a neighboring HDMI port (2RU models). Again, connect a suitable monitor or display device. The new device should be recognized and enabled by the system automatically.

   The *Multiview* output offers a variety of optional monitoring layouts that can be selected at any time in TriCaster's *Live Desktop*.

2. Some *TriCaster* models also provide an additional, assignable video output on a labeled *HDMI* connector. Simply connect a suitable external monitor or device to the connector on the backplane.

3. *Stream* and *Network* both require only a network connection.

> *Note: A mismatch of output format and connection type is possible at times. For example, a Graphics player can display imagery that does not correspond to the current output resolution or is not supported by the selected connection type. TriCaster will attempt to display the output despite mismatches, but may not always succeed.*

Tally Light support lets you 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.)

FIGURE 18

> *Note: Some third party tally solutions are listed at:*
>   *https://www.newtek.com/solutions/newtek-developer-network/*

3.9.1 CONNECTION DETAILS

Here are pin-out listings for TriCaster's HD15 Tally connector:

4 RU Models		
• 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 – LED	• Pin11 – GPI1	

2 RU Models		
• Pin1 – LED1	• Pin6 – reserved	• Pin11 – GPI1
• Pin2 – LED2	• Pin7 – GPI3	• Pin12 – GPI2
• Pin3 – LED3	• Pin8 – GPI4	• Pin13 – NC
• Pin4 – LED4	• Pin9 – GND	• Pin14 – 3.3V
• Pin5 – reserved	Pin10 – GND	(20 Ohms current limit)
		Pin15 – NC

ENGINEERING NOTES

- 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 inside TriCaster.

- 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 in TriCaster at this time.

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

If TriCaster is not already running, power it up now to reveal the *Startup Screen*. (If TriCaster is already running, and is in the *Live Desktop* or another area of the interface, you may need to click the small [x] button at upper-right to exit, or click the *Back* arrow at upper-left in the *Session Page* to return to the *Home Page*.)

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

THE HOME PAGE

When no previously created sessions exist, the icon ring dominating the *Home Page* defaults to *New*, inviting you to create a new session.
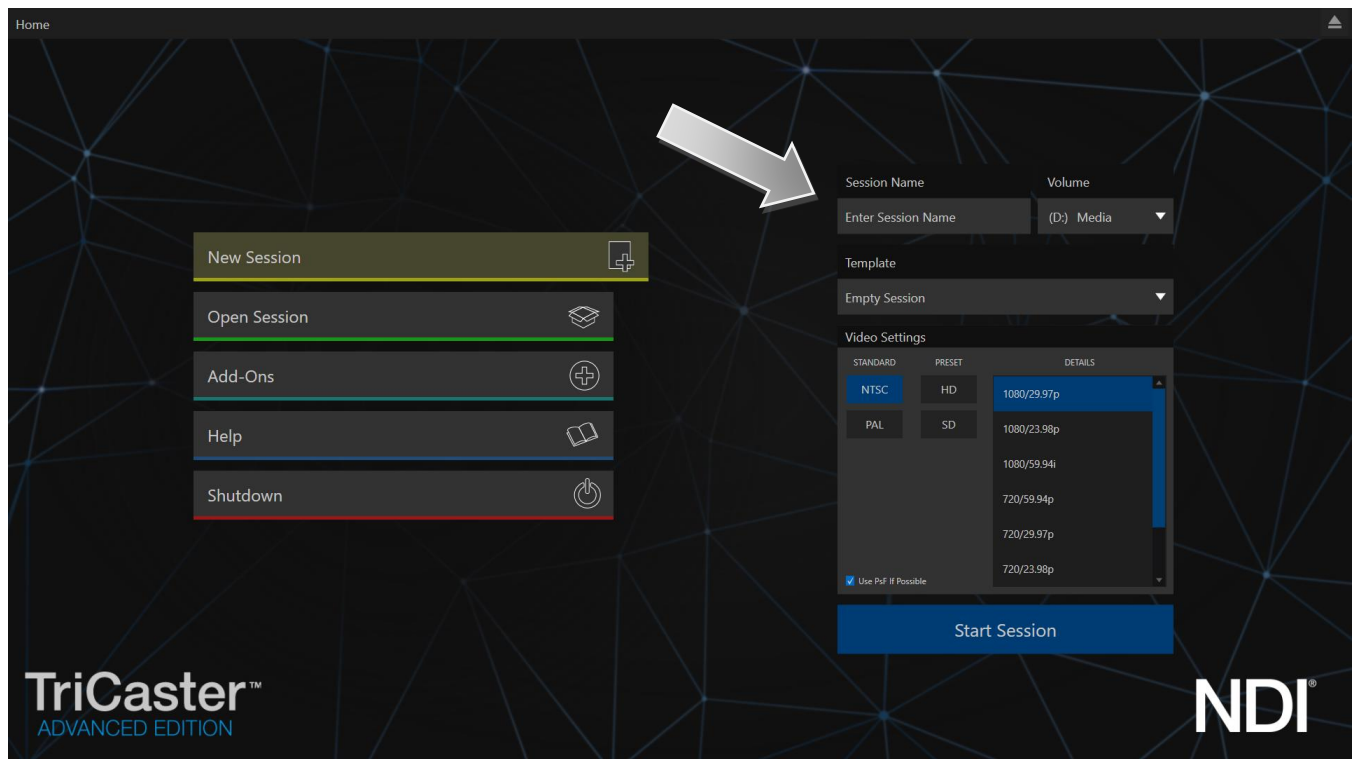
FIGURE 19

A link initially containing the text "*Enter Session Name*" is shown at the top of the right-hand pane when the *New* Session link is selected at left. Click in this area to modify the name using the keyboard if you like (the default name is the current date).

> *Note: A variety of optional session configurations are provided for your live production needs. You can choose either 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.*

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, which establishes *1080/59.94i* as the session resolution and framerate, then click the *Start Session* link below.

By default, new sessions are created on the D: (Media) drive (see Section 5.2.2 for a discussion of session *Volume* options).

THE SESSION PAGE

Clicking *Start Session* opens the *Session Page*, providing access to a number of other possibilities. For now, as our intention is to configure our connections in the *Live Desktop*), please click the *Live* link at left.
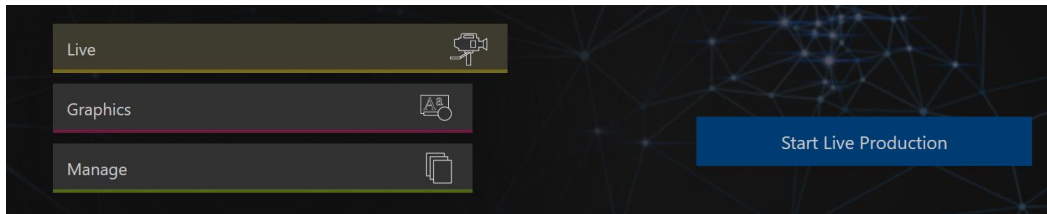
FIGURE 20

Simply click the link labeled *Start Live Production* to launch the *Live Desktop*, which is where you will spend all of your time during live production.

THE LIVE DESKTOP
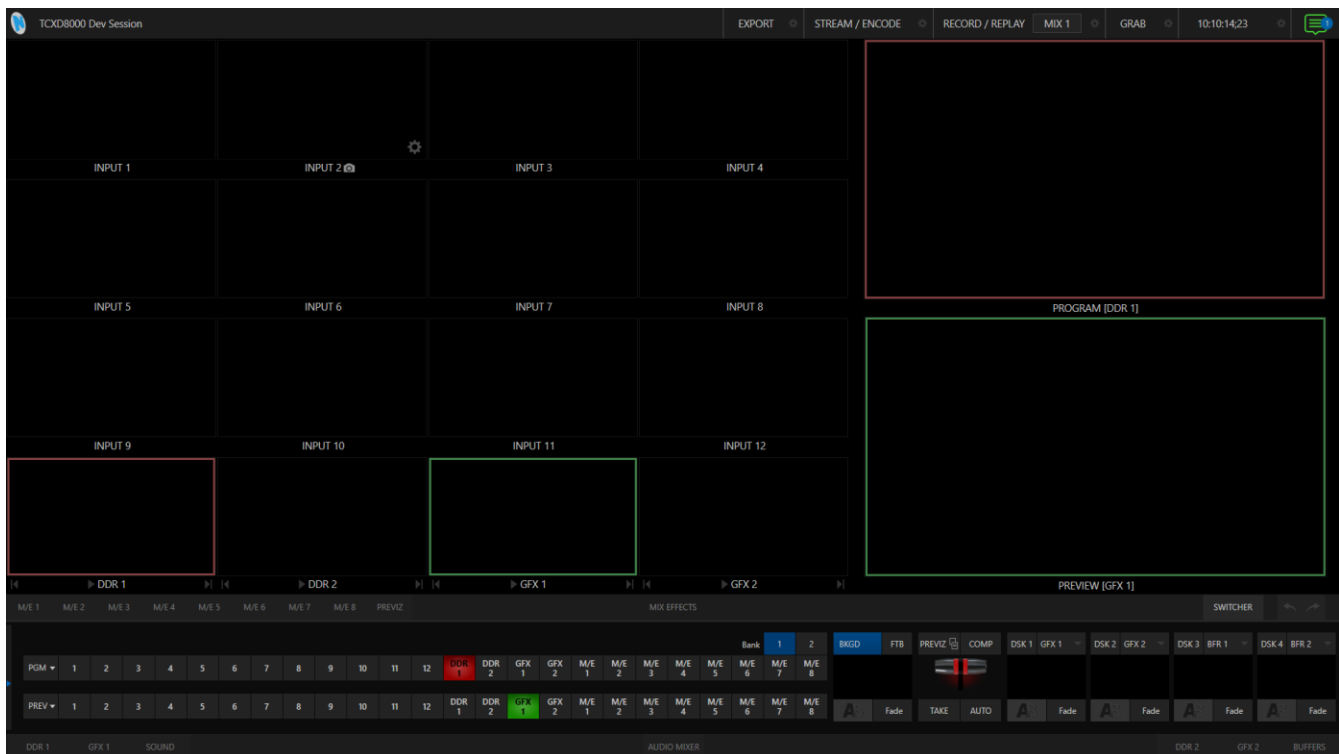
FIGURE 21

Initially, as you have yet to configure input devices or add content, the *Live Desktop* will look a bit barren (Figure 21). 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 Section 2.4, but we'll examine it further in Chapter 4, Web Features, coming up soon.)

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3.11.1 PRIMARY OUTPUTS
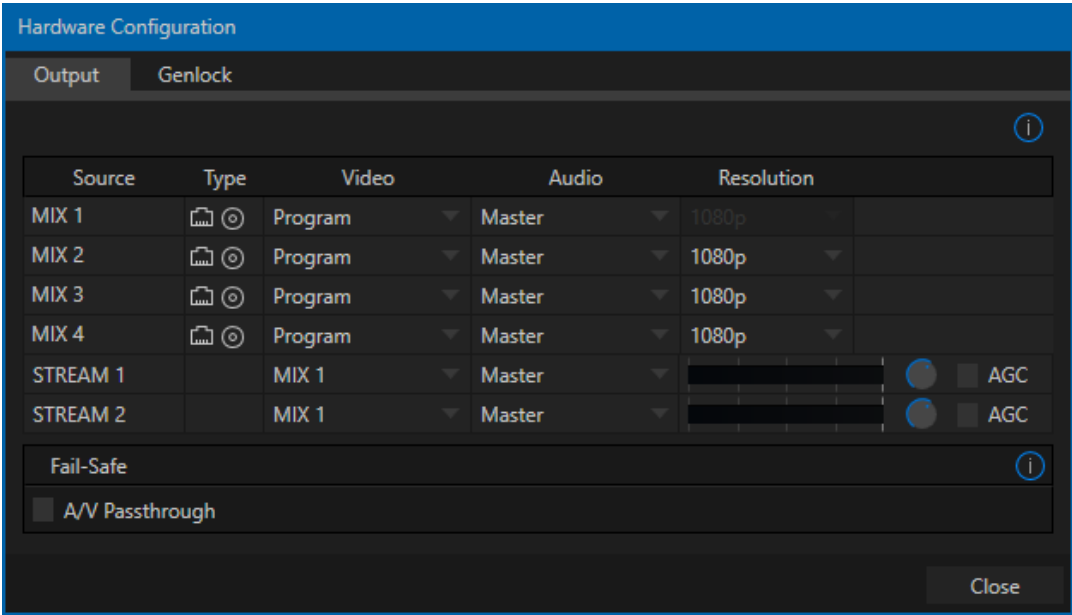
FIGURE 22

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 *SDI OUT* backplane connectors (see Section 3.8). In either case, you will be faced with decisions about output formats, and audio and video sources provided to downstream systems.

Actually, the primary 'mixed' a/v outputs are presented to downstream, devices by numerous different means, as depicted in the following table.

	Video Output				Audio Output				
Name	**Source**	**Format**	**SDI**	**NDI**	**Source**	**SDI**	**NDI**	**Master ch.1, 2**	**Aux ch.1, 2**
Mix 1	Selectable	Session	✓	✓	Selectable	✓	✓	Analog Out 1	Analog Out 2
Mix 2	Selectable	Selectable	✓	✓	Selectable	✓	✓	Dante DVS 1, 2	Dante DVS 1, 2
Mix 3	Selectable	Selectable	✓	✓	Selectable	✓	✓	n/a	n/a
Mix 4	Selectable	Selectable	✓	✓	Selectable	✓	✓	n/a	n/a

Let's take a closer look at output configuration options.

1. Move your mouse pointer to the large *Program Output* monitor on the *Live Desktop*.

2. Click the *Configure button* (gear) that appears at lower right over the viewport to open the *Output Configuration* panel (Figure 22).

This panel hosts two tabbed panes, one labeled *Output*. This is where the signals sent to each of the video output busses designated *MIX* 1-4 (as well as the *Stream* output) are configured. There are various decisions to make for each output:

- What video source will you assign to that output?
- What audio source will accompany it on digital connections that carry both signals?
- For Mix 2-4 only, which video format will be transmitted?

And so on …

OUTPUT CHANNEL OPTIONS

Let's review video *Source* selection first. A drop-down menu by that name permits you to select sources for the four principal video outputs, referred to as *MIX 1-4*. The primary output connectors are identified by number in the output group, usually on the system backplane (except for Mini models); they also appear on your network as NDI sources.
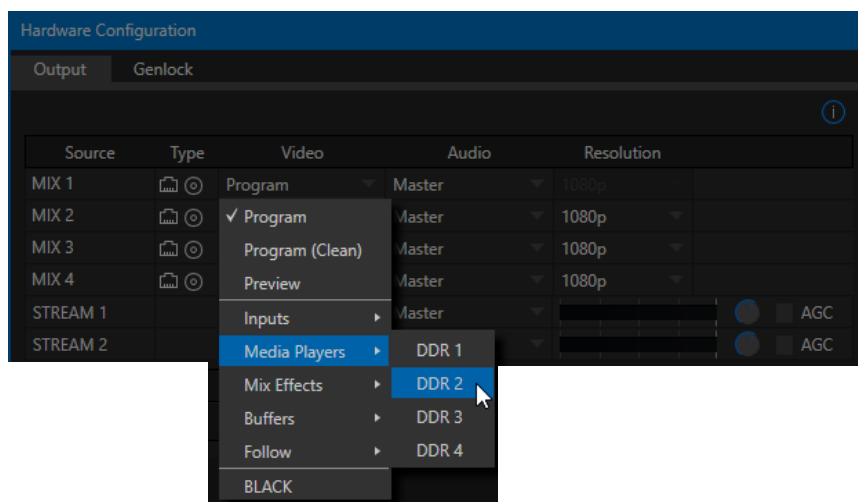
FIGURE 23

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*
- Direct output from any *M/E*
    - Clean output from any *M/E*
- Output from any *Buffer*
- *Follow* selected *M/E Program* or *Preview*, or a *Switcher* color group
- *Black*
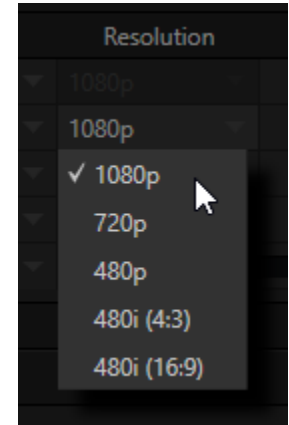
It's worth mentioning that, for TriCasters with analog outputs, SD formats offer different A*nalog Out* options than HD. HD is always presented on *SDI* and *Component* connectors, but in addition to these, *Composite* and *Y/C* connections are still in common use for SD.

Composite and *Y/C* can even be used simultaneously, allowing three different devices to be connected to outputs in one row for SD output formats – one digital (SDI) connection along with two analog connections (see the example at right).

Audio menu options include any of the *Master* or *Aux* mixes, or the sound from a selected audio input. The video format (*Resolution*) for *MIX 1* always matches the current session format, so its menu is locked. The *Resolution* menu lets you independently configure the format for *MIX 2-4* (Figure 24).

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

3.11.2 SUPPLEMENTAL OUTPUTS

The 'mixed' outputs mentioned above are just the tip of the iceberg. Direct support for internet streaming, *Multiview*, and recorders drastically reduce the need for 'outputs' as they are traditionally defined in this space. But this is just the beginning. Extensive NDI (Network Device Interface) options provide NewTek systems with more powerful and plentiful output capabilities than any other video mixer on the market.

FULLTIME NDI OUTPUTS

In addition to primary outputs being provided as network sources (NDI), there are secondary NDI outputs to discuss. Other NDI sources provided (automatically, without any configuration steps required) to outboard systems over the network are the following:

- **Local Hardware sources** – any hardware input source in use.

SECTION 3.12 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 (Section 3.5.1).

1. Click *Workspace* in the *Dashboard* (at the top of the *Live Desktop*).

2. 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).

3. The monitoring pane shows individual monitors for various inputs internal sources by default.

4. 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.
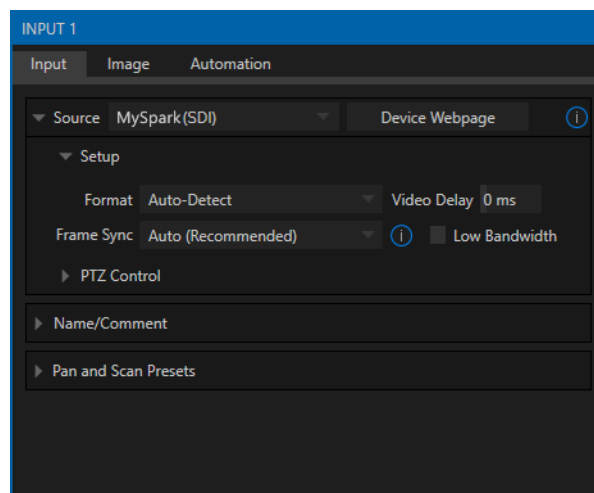
   Move your mouse over the viewport for *INPUT 1* and notice that a *Configure button* (*gear* icon) appears at lower right. Click this to open a tabbed settings panel (Figure 25).

FIGURE 25

> *Hint: As a quicker way to access the Input configuration panel, simply double-click the viewport; or, for a touch-screen, tap the viewport with two fingers.*

5. Click the *Source* drop-down menu to see a list of sources you can select. The four SDI inputs and *Black* 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 making a selection completes the connection. If you choose an SDI source, further selections may be required.
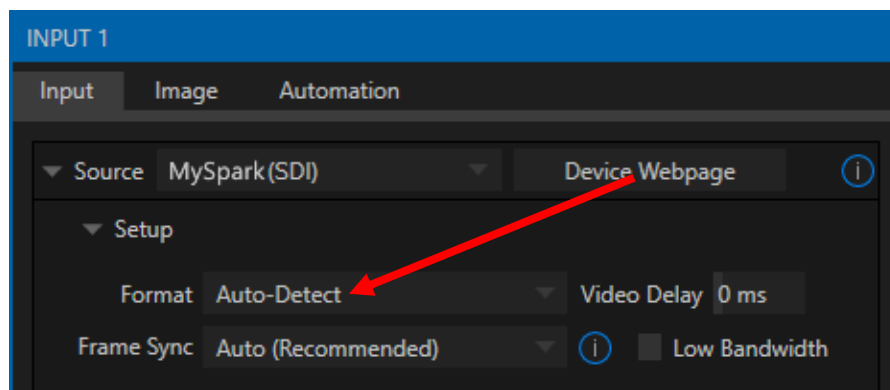
FIGURE 26

6. The *Format* menu for SDI inputs defaults to *Auto* (Figure 26). Generally, this setting will suffice. Otherwise, you can manually select the correct *Format* for the source you wish to connect to *SDI IN 1* on the system's backplane.
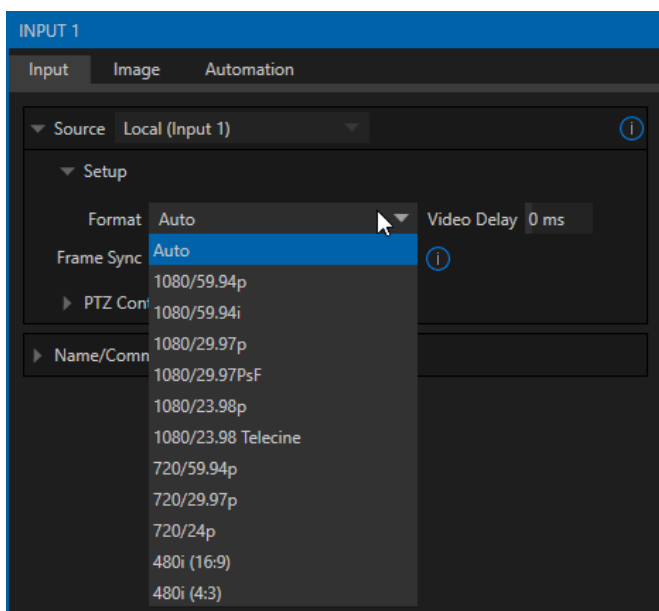
7. Close the *Output Configuration* panel for now (click the *Close* button, or simply 'click outside' the panel to close it).

8. 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.

3.12.1 CONFIGURE A VIDEO ROUTER INPUT

Right-click on the *Switcher* row button for the video input where the router is connected (see Section 0 for more detail) to select which router input will be transmitted to the *Switcher* input.

SECTION 3.13 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.

In addition to internal sources and outputs, the *Audio Mixer* supports up to twelve independent external audio source connections (varies by model), each of which can be assigned to a nearly endless list of audio source types.

Each input and output has 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 (Figure 29).

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

Any of these four local connections can be assigned to 'listen' to either the SDI embedded audio source connected to the corresponding video input, or to the associated analog audio input on the backplane.
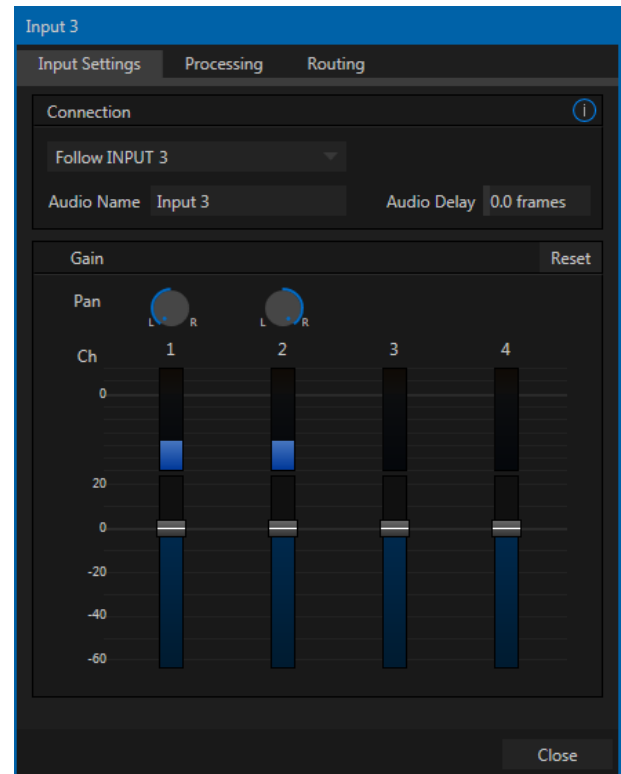
Choosing a local hardware audio source causes another menu to be displayed at right, which is where you can choose whether to connect to sound from the *Embedded* (SDI) or *Line* (analog) hardware input.

FIGURE 29

> 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.

> Note: Analog hardware audio inputs and outputs (including those using XLR connectors) are all 'line level, balanced' connections.

Returning to the audio *Input Configuration* panel, note that it holds both basic and advanced audio features. In the former category, volume sliders are provided below *VU meters* for each audio source and output. Source sliders default to their 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 defaults using Shift + double-click on the 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 without risk.

This range above between nominal level and the highest *possible* level is commonly referred to as 'audio headroom'. What is considered a suitable headroom allowance can vary from one locale to another, in different industry applications, and even in individual studios. NewTek systems follow well-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 dBFS (Decibels Full Scale) with 0dBFS – the absolute maximum signal level that can be recorded – at the top. NewTek VU meters have selectable indexing, allowing you to view a traditional dB VU scale or dBFS as you please (see Section 15.7.1).*

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 15.8.

SECTION 3.14 *CONFIGURE GENLOCK*

Genlocking is supported on TriCaster 460, 860 and 8000. Enable and configure this feature as follows:

1. If the *Live Desktop* isn't already open, launch a live production session from *Startup*.

2. Access the *Output Configuration* panel by double-clicking the (*Live Desktop*) PROGRAM viewport.

3. Click the *Genlock* tab (Figure 30).

4. The default *Reference Type* in the *Genlock* settings group is *SD (Bi-level)*, as this is currently the most common reference signal type. However, if you supply an HD reference signal to the Genlock input, you may want to change the setting to *HD (Tri-level)*.

5. With the aid of downstream *Waveform* and *Vector Scopes*, adjust *Horizontal* and *Vertical Position* and *Phase* settings in the *Genlock* section of the *I/O Configuration* panel.
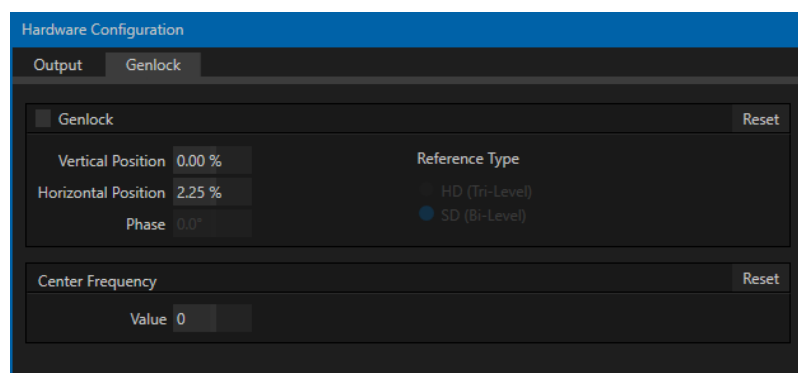
FIGURE 30

Ideally both the cameras and your NewTek 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.) When genlock is active and properly configured the timecode in the *titlebar* will display in green.

START 00:00:00 11:03:04;12
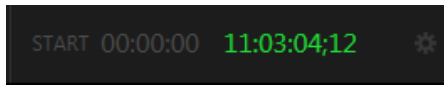
FIGURE 31

Note: For a deeper discussion of genlocking, please see Section 8.2.4.

SECTION 3.15 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. ☺

Generally, simply connecting a suitable cable from the Ethernet port on the 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.

You can access the system *Network and Sharing* control panel to accomplish more extensive configuration tasks – see *Settings: Configure Network* under the heading *Administrator Mode* in Section 5.2.3. If further help connecting is required, please consult your system administrator.

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.

Note: NDI Input supports dual network cards allowing for an even greater degree of quality when using NDI sources across your network. For XD Series systems with USB3 connectors, you may consider adding a USB3 network adapter for this purpose.

Chapter 4   WEB FEATURES

This chapter provides a little information designed to guide you to other resources that will introduce the major components and functions of your NewTek system.   This includes extensive online training resources, friendly and helpful online communities, web-based external control, and more.

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 the ideal time for us to introduce you to a special feature of your system – it has its very own webpage.

SECTION 4.1 PASSWORD PROTECTION

First though, let's note that - for security reasons – web features are under password protection by default (initially, the username and password are both set to "admin").
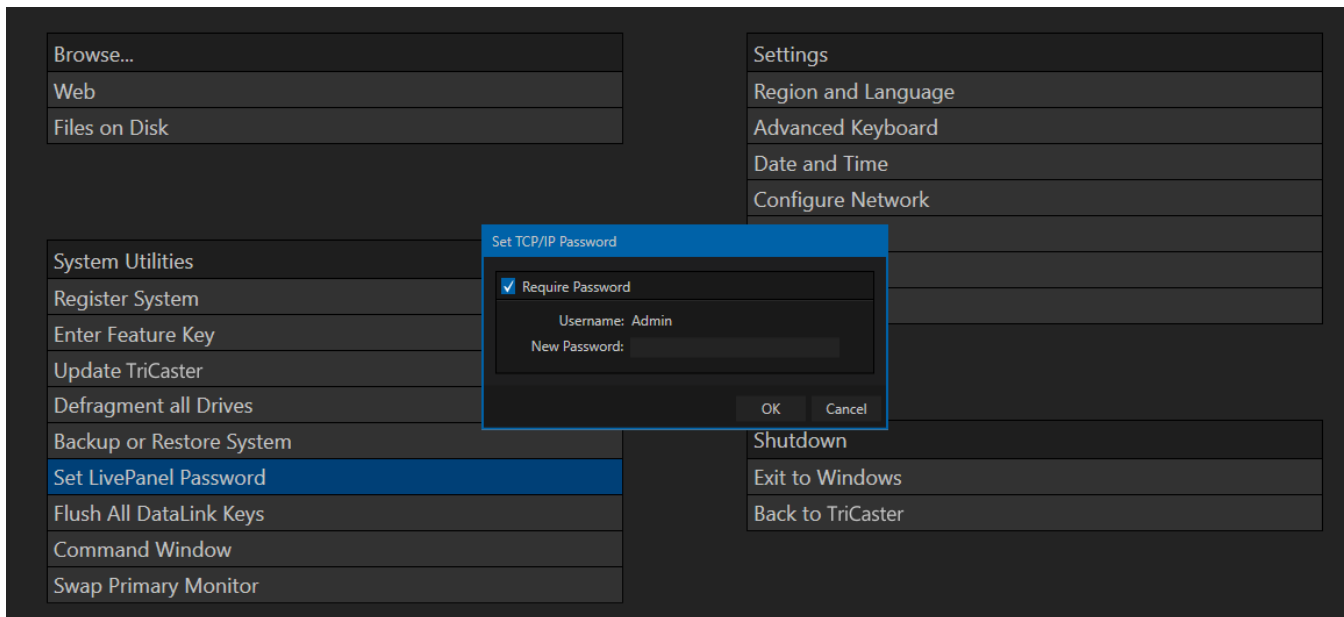
FIGURE 32

To enable or disable this security feature, or to modify the password, select *Administrator Mode* from the *Shutdown* menu on the *Home Page* main menu in the *Launch Screen*.

SECTION 4.2 HOME PAGE

Having launched a session (refer to Section 3.10 if you need a refresher), click the *Notification* button at extreme upper-right in the *Dashboard* at the top of the *Live Desktop*.

Click this to open the *Notification Pane*, and then click the *Web Browser* button in the footer of that panel to preview webpages in the integrated web browser.

To view the 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 in the Notification panel (beside the *Web Browser* button).

Hint: Access to TriCaster's webpages 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 – is also always up to date and relevant. You can also, for example, access the *Resources page* from an iPad® or other mobile device to follow along with the steps outlined in an online video tutorial, or to view details of a feature in the *User Guide* while live.

4.2.1 VALUABLE CONTENT

You'll notice different types of content grouped under the following headings on the *Resources* page:

- **Documentation**
  - *Version Introduction* – a brief overview
  - *User Guide* – the document you are reading
  - *Automation and Integration Guide* – provides a wealth of information pertaining to all aspects of macros and automation features, along with discussions of third-party solutions and topics related to integrating NewTek live production systems into your studio pipeline
  - *Animation Store Creator™* and *Virtual Set Editor™* guides
  - *Shortcut Commands* – a listing of commands available for use in macros or for external control (as discussed in the *Automation and Integration Guide*)
- **Training** – online video tutorials and Operator Certification programs.
- **Extras** - updates, codecs, utilities, and the NewTek *DataLink™* browser extension.
- C**ommunities** – forums, blogs, YouTube™ videos, Facebook®, and more …
- **Support** –Customer Service (including live chat) and product protection programs.

SECTION 4.3 VIDEO TRAINING

NewTek is in the video production business, and nothing could be more appropriate than for us to provide introductory lessons using that easy to understand and follow medium.

The link to online videos mentioned in the previous section takes you to a long list of tutorials for NewTek products designed for all users, novice or adept. From initial product registration to live production, streaming and exporting to social media services, to advanced topics such as *M/E*s, *Tracking, Hotspots* and *Automation*, 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 NewTek systems by viewing these videos. When you need deeper knowledge, you will find Part II of this guide, the Reference section, helpful.

Hint: Generally, thanks to the considerable consistency across the NewTek family of products, you will be able to benefit from tutorials prepared for any model.

SECTION 4.4 OPERATOR CERTIFICATION

NewTek's official Operator Certification program 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 NewTek system. Every button, menu item, feature and control is 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 as well as maintenance and management features 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.

The Launch Screen's *Home Page* appears whenever you launch your NewTek™ live production system.
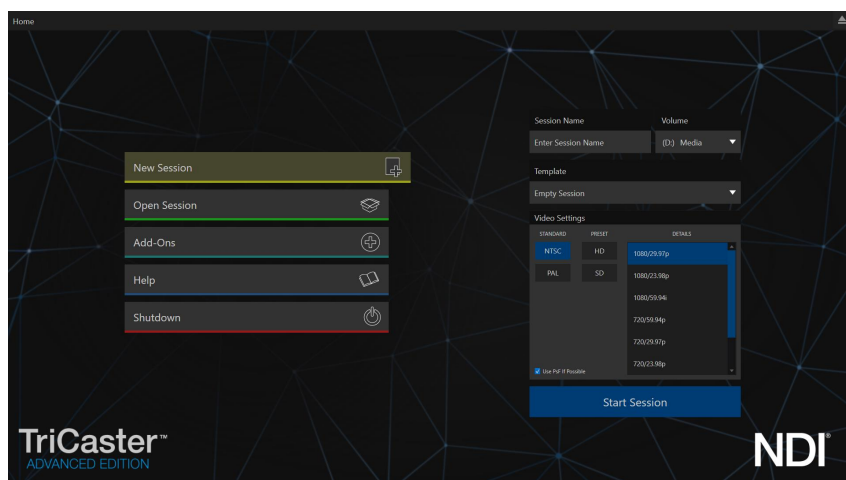
From this screen you will create and launch *sessions*, then choose what sort of operations you wish to perform within it by selecting a link on the (similar) *Session Page*. Your intention may be to begin a new live production, or to produce another episode of a live series. Perhaps you wish to prepare 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. For NewTek systems, the *session* is where the details of that environment are stored. 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?

- If your task includes SDI cameras or similar SDI sources, what video format are these sources supplying?

- Are cameras connected using SDI connections, 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 probably adjust the *LiveMatte* settings for one or more cameras to provide optimal keying.

- Perhaps you will use the *Display Proc Amps* to adjust the preview monitor color characteristics.

- What are your output device connection preferences?

    o What video mixes and other internal sources do you want to route to which outputs?

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

- You could grab a series of still images from *Program Out*.
- Capture clips from the production for replay later.
- And archive the network *Stream* output as a file.

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

Finding your files – automatically.

Typical sessions include many media clips, along with graphics, titles and buffers. Naturally, users must ensure make sure 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).

SECTION 5.2 THE HOME PAGE

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 in the *Home Page*.

This primary screen is the first thing you encounter after launch. It is dominated by the main menu shown in Figure 34.

> *Hint: You can also use the left and right arrow keyboard keys to cycle through the icons on the ring.*

Choosing a link from the menu updates the right-hand pane of the *Home 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 *New* icon is automatically pre-selected whenever there are no existing sessions. This results in the relevant session options being displayed at right, as shown in Figure 35.
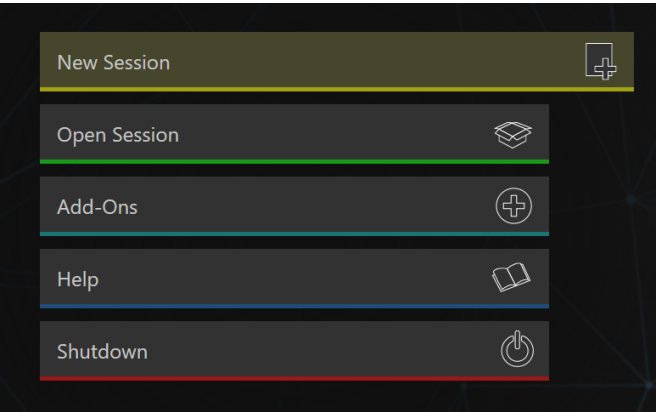
FIGURE 34

5.2.1 TITLEBAR

EJECT

An *Eject* button at the top-right corner of the page allows you to safely disconnect external drives. (Drives can also be ejected from *the Live Desktop.*)

5.2.2 NEW (SESSION)

As just mentioned, clicking *New* on the link populates the pane at right with related options.

Principally, for each session you must designate (by selecting switches) your local video standard.

- Select NTSC or PAL
- Select a session format, whether by clicking one of the convenient Preset buttons, or making a manual selection at right (such as 1080/59.94p)

SESSION NAME

You will see a name field for your session listed above the options pane at right. You can click in this field to modify the default name (which will be the current date) using the keyboard.

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.
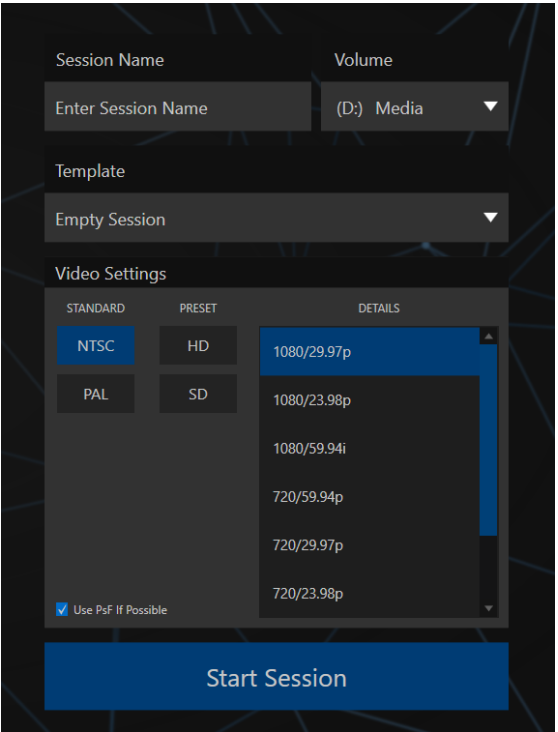
FIGURE 35

A menu labeled *Volume* appears just right of the *Session* name. This selection designates a primary hard drive for the session (and its associated content) to be created and stored on.

> *Note: When using internal IsoCorder™ capture modules to record multiple sources, you may assign more than one volume to capture duties. Sessions track recorded clips too, providing easy access to them for live use.*

Suitable storage volumes that are detected are listed in a drop-down menu when you click on the *Volume* control. You can select any volume shown as the session drive, though external drives are not recommended for active use as session drives.

FORMAT AND OUTPUT CONSIDERATIONS

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.*

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

OPEN (SESSION)

If there are existing sessions on the system, the main menu at left on the *Home Page* will default to *Open* (Figure 36). Clicking *Open* causes the *Sessions List* to appear at right. This pane lists all sessions stored on currently mounted storage media.
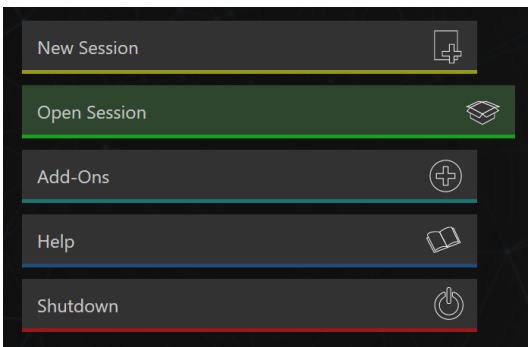
FIGURE 36
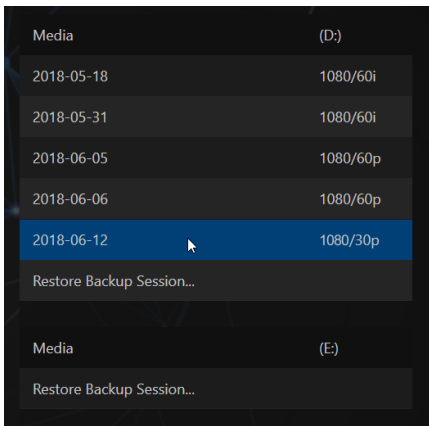
FIGURE 37

Available sessions are grouped under the names of the storage volume they are located on (Figure 37). The listing shows the *Session Name* and *Format* for each session, on each drive. Let's look at the *Sessions List* briefly before we open a session.

> *Note: Media configured as Read Only is not shown for the New or Open (session) features, since they cannot be used for sessions. However, Read Only media can be used for import purposes.*

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 persons, as the system can be rendered inoperable if this is done improperly.*

If you add a new value named *auto_launch_session* with its value data set to the name of an existing session, that session will auto open on launch instead of the last open session. If the session does not exist, the auto-launch feature will not proceed; hence, by setting *auto_launch_session* to "_Disabled" or some other suitable string rather than a real session name, you can effectively disable auto-launch.

Context menu

Right-click a session name to open a context menu with two items listed in it: *Rename* and *Delete*. Be aware that the *Delete* 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 and titles, any clips captured to the default session folders, and even *LiveText* project files created within the session (unless you have deliberately saved the projects and related files to locations outside the 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.*

Restore Session Backup

In another section of the *Launch Screen* (*Session Page>Manage*) there is a feature that allows you to back up the current session to another storage volume.

The *Restore Session Backup* link at the bottom of the *Session List* (for each drive) is provided to compliment this feature. To restore a session you have previously archived, click *Restore Backup Session* (Figure 37), and use the file explorer provided to select a *SessionBackup* 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.

Administrator Mode – the *DMZ...*

It's worth considering why this mode is provided. Your NewTek system plays a central role in your video productions. Though technically 'a computer', it is un-wise to expect it to serve 'dual-duty' as both a live production system and a general purpose computer.

Administrator Mode serves as a demilitarized zone between the live production system and host operating system.

It is important not to burden your system with software or accessories that compromise its performance or reliability. The Administrator Mode screen provides access to key settings and options, while limiting exposure to system options that could have that sort of negative impact.

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

Click or tap a name in the *Session List* to launch that session and display the *Sessions Screen*.

5.2.3 SHUTDOWN

This selection provides *Restart, Shutdown,* and *Administrator Mode* links. The first two options are presumably self-explanatory, but the latter deserves a bit more discussion.

ADMINISTRATOR MODE

Selecting *Administrator Mode* from the *Shutdown* menu on the *Home Page* icon ring exits the live production environment, and takes you to a new screen (Figure 38) that offers various functions and settings having to do with system maintenance and management.
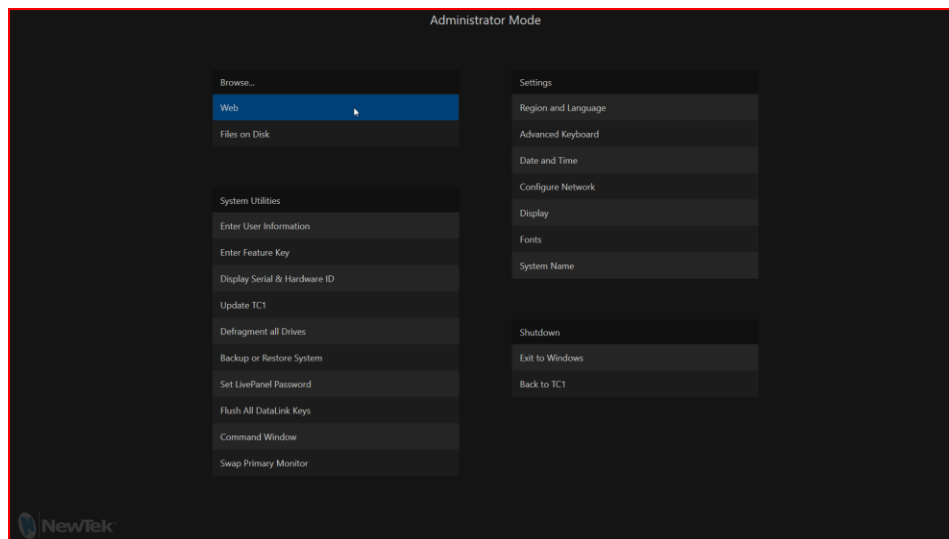
FIGURE 38

*Administrator Mode o*ptions are grouped under several headings, as discussed next.

BROWSE

- *Web* – Opens the default system Internet browser.

- *Files on Disk* – Opens a system file window.

SYSTEM UTILITIES

- *Enter User Information* – the system shows a watermark on output before registration, so we encourage you to register early. Among other reasons, doing so will serve to identify the unit to NewTek as yours in case of theft, and will also allow you to check for software updates that may have been recently released. (The steps in the registration process were outlined back in Section 3.2, so we won't repeat them here.)

- *Enter Feature Key* – This link allows you to enable optional features.

- *Display Serial and Hardware ID*

- *Update* – NewTek 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* 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 NewTek live production system.

- *Defragment all Drives*

  Over the course of lengthy use, data on hard drives devoted to audio and video storage tends to become fragmented, which degrades playback performance. Defragmenting will correct this condition.

  You could think of your hard drive as being like a shelf in your library. As time goes along, the shelf fills with books. Some are quite large, others smaller – just as media files may be larger or smaller.

As time goes along, you decide to remove books you have finished using from the shelf, in order to make room for new additions. You remove a book here, another there, opening up gaps between the remaining books.

This makes some shelf space available by creating gaps between the remaining books. Sadly, another large new book may be too big to fit in any one of the gaps.

A foolish librarian might tear the new book into smaller sections, just big enough to fit into the open spaces on the shelf. This would obviously be unwise. When you wish to refer to the book later, you will waste a lot of time locating and assembling its sections before you can access it.
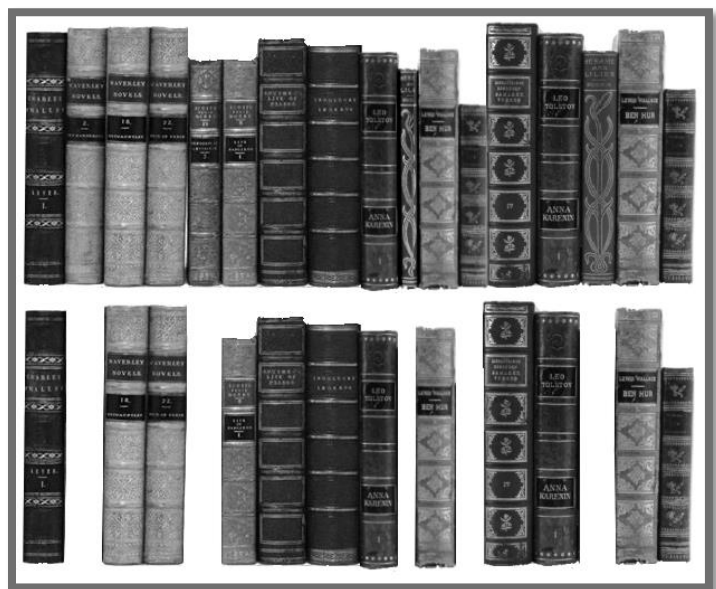
How much better it would be to slide the remaining books closer together, combining all the free space first. Unfortunately, computers are 'foolish librarians'. They tend to want to fill in all the gaps in their storage areas, even if this requires literally shredding your 'book' (in reality large video files from your sessions) into tiny fragments.

Defragmenting the storage volume has the same effect as sliding the books together, resulting in one or more larger gaps. The end result is that the system doesn't have to frantically search in many different places to assemble the video streams from your recorded session.

Hint: Defragmentation can sometimes take considerable time, so it's not something you want to begin just before an important event.

- *Backup* or *Restore System* – A complete set of *Backup* and *Restore* features are available to help in the event of an unforeseen problem. We strongly encourage you to protect against any unforeseen occurrence by using the *Backup* feature soon after registering.

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

- *Command Window* – Open a system command line window, allowing you (among other things) to use advanced commands to manage your system and network settings.

- *Swap Primary Monitor* – The *Live Desktop* will appear on the monitor designated as primary.

SETTINGS

- *Regions and Language* – Open the system language control panel.

- *Advanced Keyboard* – Open the system keyboard controls panel.

- *Date and time* – Open the system keyboard controls panel.

- *Configure Network* – Open the system network controls panel.

- *Display* – Open the system display controls panel (useful for configuring multiple monitors, among other things).

- *Fonts* –Open the system font management console, allowing you to add that new font your client wants you to use for their title pages.

- *System Name* – It can be very useful to modify the default name by which your system is identified on the network. This is especially true when more than one unit might be on the same network.

  The *System Name* feature opens the System Properties console's Computer Name tab. Click the *Change* button to modify the current name.

SHUTDOWN

- *Exit to Windows* – Leave the *Administration Mode* screen and display the standard system desktop.

- *Back to TriCaster* – Exit *Administration Mode*, and return to the *Launch Screen*.

5.2.4 HELP

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

The primary User Guide is found here, as well as documentation for other software (such as the LiveText™ manual).

Click the *License Agreement* link to review the end user license requirements, or the *About* link to list software version information, credits and acknowledgments.

| New Session |
| Open Session |
| Add-Ons |
| Help |
| Shutdown |
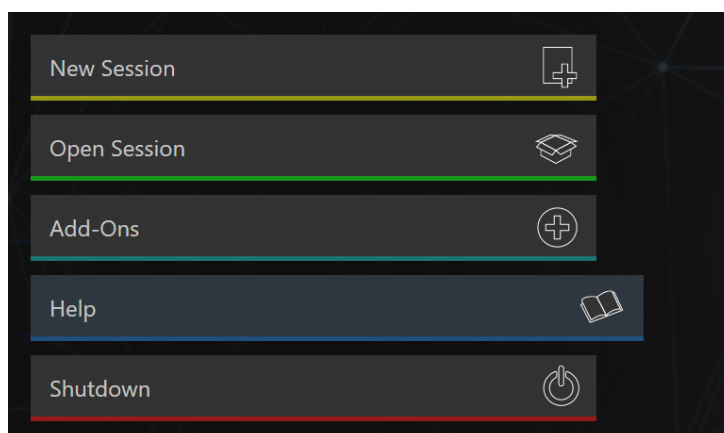
5.2.5 ADD-ONS

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

Add-Ons

Animation Store Creator Advanced Edition

NewTek Control Surfaces

NewTek DataLink Sources

NewTek NDI Access Manager

Novation Launchpad

Panasonic Cameras

Virtual Set Editor Advanced Edition

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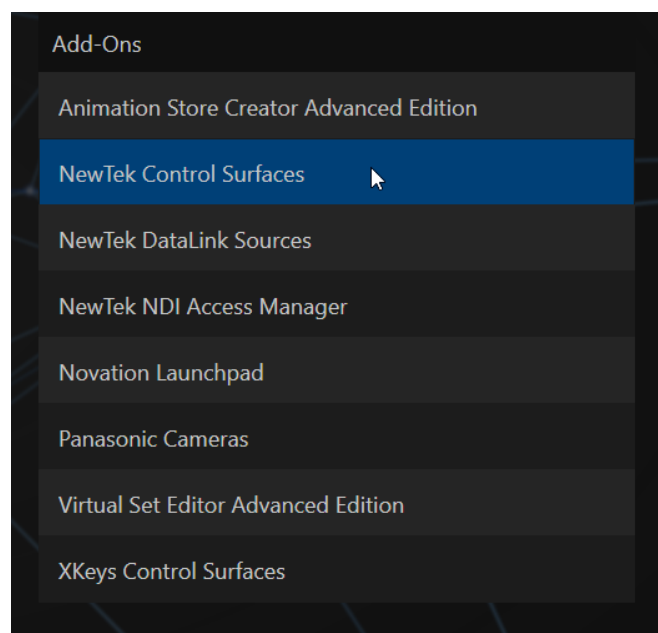
When you select the *Add-Ons* icon, links are displayed at right for installed software applications, allowing you to launch them.

For example, you will see links to the included *Animation Store Creator* utility as well as a demo version of the optional *Virtual Set Editor™* program, the very useful *DataLink Configuration* applet (see also Section

5.3.3; please refer to the accompanying *Automation and Integration Guide* for full details on DataLink's many powerful source options), and much more.

SECTION 5.3 THE SESSION PAGE
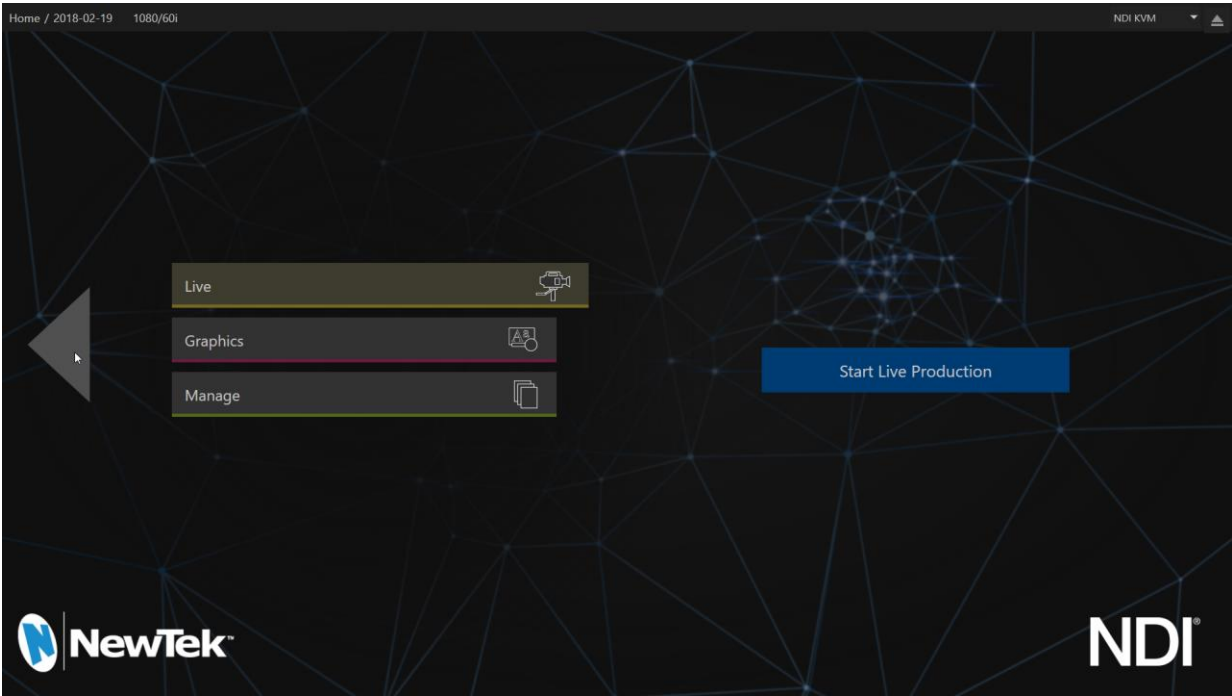
Opening a session from the *Home Page* (whether using *Open* or *New*) takes you to the *Session Page*, providing a new set of selections on the main menu. The name of the current session is shown in the top-left corner of the screen (Figure 41). The current session is displayed in the form "Home/*session name*".

If you wish to leave the current session and return to the *Home Page*, you can click the large *Back Arrow* displayed at left, or the word "Home" in the session name label.

The main menu on the *Session Page* offers three selections. These are discussed next.

5.3.1 LIVE

The icon labeled *Live* represents the *Live Desktop*, your live production center. Selecting it (by clicking or tapping the link), presents a *Start Live Production* link button in the *Session Page's* right-hand pane; click this link to launch the *Live Desktop*.

5.3.2 GRAPHICS

An offline variant of LiveText™, NewTek's standalone titling and CG application, is provided. This version cannot be accessed during live production, but lets you author title pages with text entries and images that *can* be updated while live. These pages are displayed from *Media Players* or *Buffers* during live production.
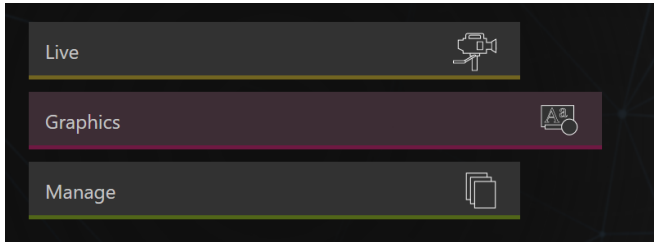
Selecting the *Graphics* icon displays a number of related items on the right-hand side of the *Session Page*.
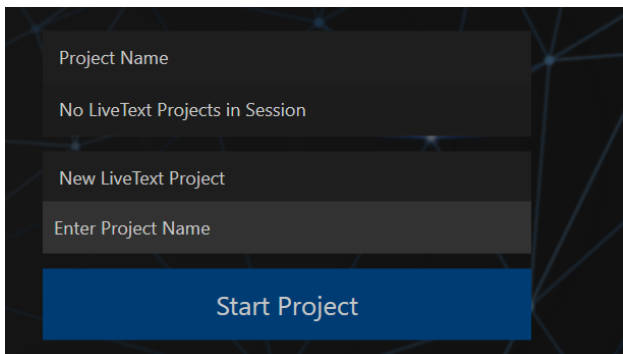
When you first enter a new session, no LiveText projects are listed in the area under *Project Name*. After you create one or more projects, the name(s) will appear here and, as you would expect, you can re-open the project by clicking its name.

> *Note: New LiveText projects, by default, are stored inside a folder named for the session, for example, you might find a project at D:\LIVETEXT PROJECTS\sessionname\projectname.cg.*

LiveText's internal *File* menu and *Save As* functions default to the same location. However, it is possible to use *File>Save As* to store a project in another location outside the session structure.

Be aware that projects stored outside the session structure are not shown in the project list on the *Sessions Page*. To re-open them, you'll need to navigate to the project file using *File>Open* in LiveText.

> *Note: Similarly, external projects will not be backed up by the Backup Session function (or be deleted by the Delete Session function)*

To create a new *LiveText* project, click in the default project name field (just above the *Start New Project* link) and modify it, then click *Start New Project*. When you finish working in *LiveText*, click the [x] button in its upper-right corner (or select *Exit* in the *File* menu) to return to the *Session Page*.

Complete LiveText documentation is available from the *Help* link on the *Home* page of the *Launch* screen.

5.3.3 MANAGE
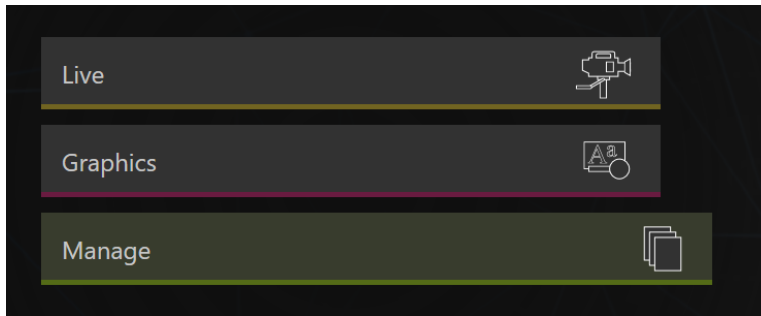
FIGURE 45

Various internal production modules provide filebins to permit you to manually administer files related to their projects, playlists, and so on. The *Manage* icon in the *Session Page* 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 *Manage* refreshes the options pane on the right-hand side of the *Session Page* with a number of convenient items.

BROWSE

Under the label *Browse*, 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.

FIGURE 46

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.

Several other important features are contained in the *Manage* group, discussed next.
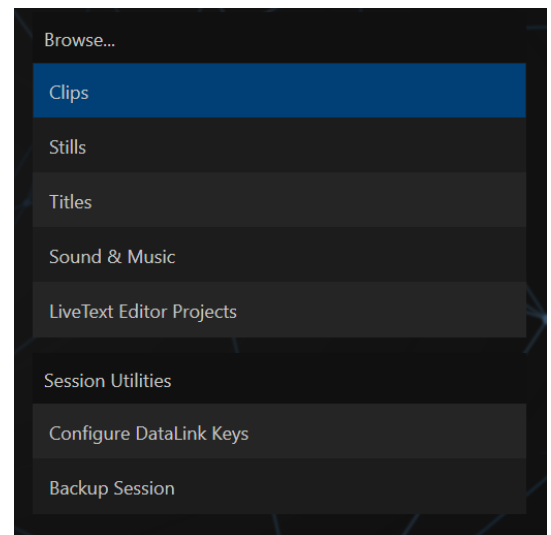
DataLink™ is an astonishingly useful NewTek exclusive, allowing the handling and updating of text and image data from both internal and external source for use in title pages in real time, as well as other purposes. Briefly, DataLink tracks variables (called *DataLink keys*) and their values, and updates these values on-the-fly when used as entries in title pages.
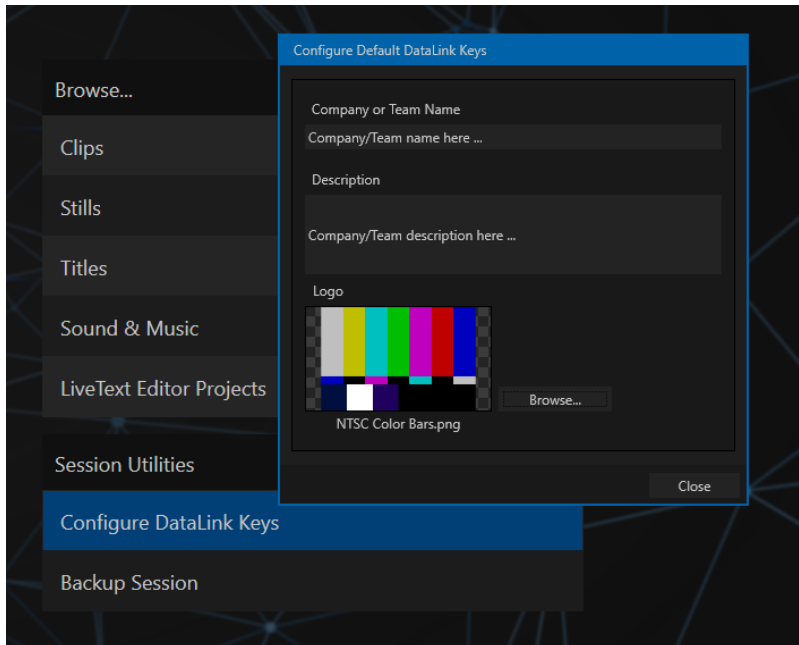
> *Hint: DataLink keys can serve in other ways, too, as for example to automatically insert information such as time or scores into labels and comments of social media uploads, or as instant replay clip metadata.*

Since *DataLink* falls into the general realm of automation and also has access to external sources, complete coverage of its features and capabilities is found in the companion *Automation and Integration Guide* included with this product; but we'll mention a few highlights as we go along as well.

> *Hint: If not today, we urge you to make definite plans to read the DataLink chapter in the Automation and Integration Guide. Without exaggeration, DataLink is a game-changer. It can save you a great deal of time, prevent embarrassing and potentially costly mistakes, and lift your productions to new heights.*

The *Manage* group link labeled *Configure Datalink Keys* opens a dialog that allows you to pre-assign values to three special *DataLink* keys.
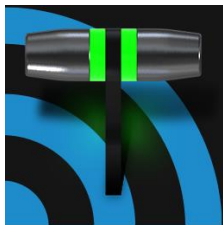
These *session keys* serve as the default first and second line text inserts and image used by many of the supplied template title pages. (By taking a moment to populate these keys with, for example, a company name, motto, and logo, you will find much of the included graphic content ready to use for a given production without ever having to type another line.)

Clicking the *Backup Session* button 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.*

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.

The *Live Desktop* is launched by creating (or opening) a session in the Launch Screen's *Home Page*, then selecting the *LIVE* icon and clicking *Start Live Production*.

SECTION 6.1 DISPLAY REQUIREMENTS

The *Live Desktop* requires a *minimum* screen resolution of 1920x1080.
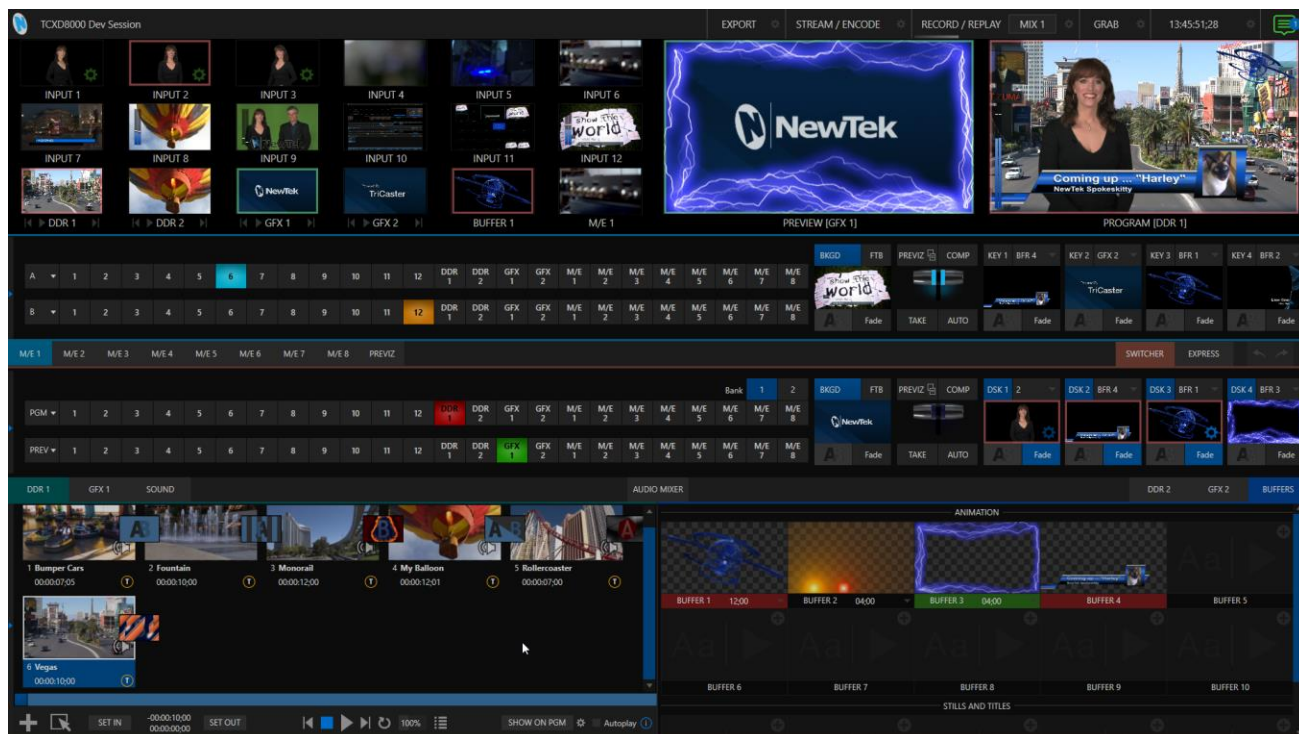
FIGURE 48

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 Figure 48, 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* 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 o*utput
• *Waveform* and *Vectorscope* monitors
• Embedded controls, including PTZ, Proc Amps. and more

3 - M/Es

• *Effect* mode – control up to four primary video layers (varies by model) plus 4 overlay channels
• *Mix* mode – secondary switcher controls plus overlay channels
• Each *M/E* includes dedicated an extensive complement of *Keyers*, transition generators, scaler/positioners, and more

4 - Switching
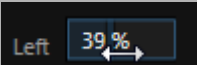
•*Switcher* rows – *Program* and *Preview* rows
•*Transition* controls – *T-bar* and *Delegate* buttons
• *DSK* video layer configuration and controls
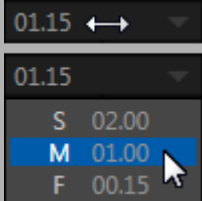
5 - Tabbed Modules

• Internal *Media Players* and *Buffers*)
• *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.

	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.
	Rotary Knob (single-value)	Audio Gain	Drag left-right to adjust the current value.
	Combo-Slider	Transition, Zoom Duration	• Drag left/right to raise or lower the current value. • 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 LIVE 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 3* 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 pane. You can use any of the methods described below to do so.

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

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

- 'Two finger tap' the viewport.
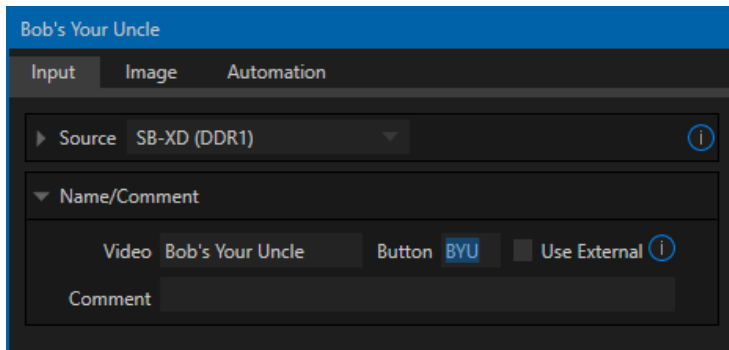
FIGURE 49

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. NewTek's DataLink™ feature can automatically update title pages as inputs are displayed by drawing on the information you enter here.

6.4.2 WORKSPACES AND MIN/MAXIMIZE

Various layouts and custom monitoring options for the *Live Desktop* (interface) and *Multiview* are provided in the *Workspace* menu.

When a *Multiview* 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 in the monitor areas. 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 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 the identical viewport layout 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*) for each viewport are fully independent.
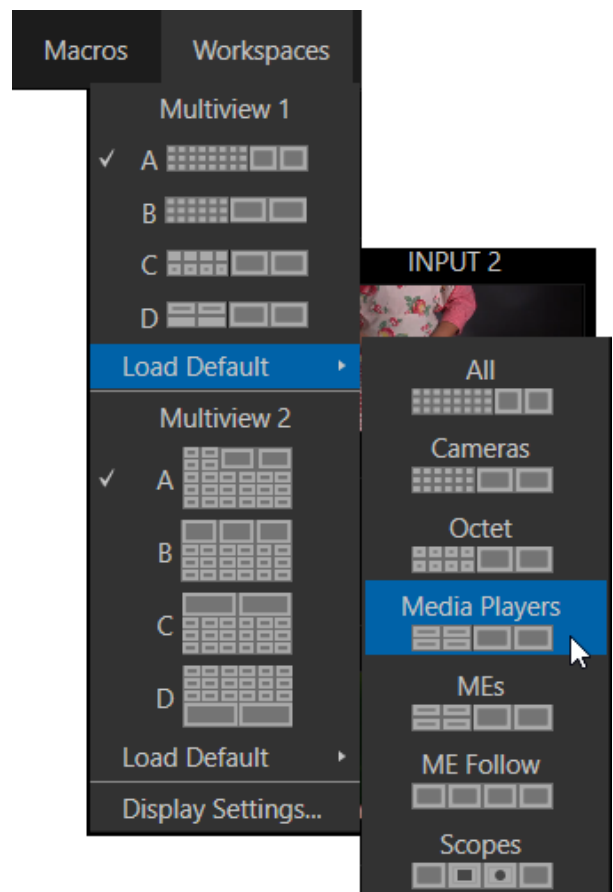
FIGURE 50
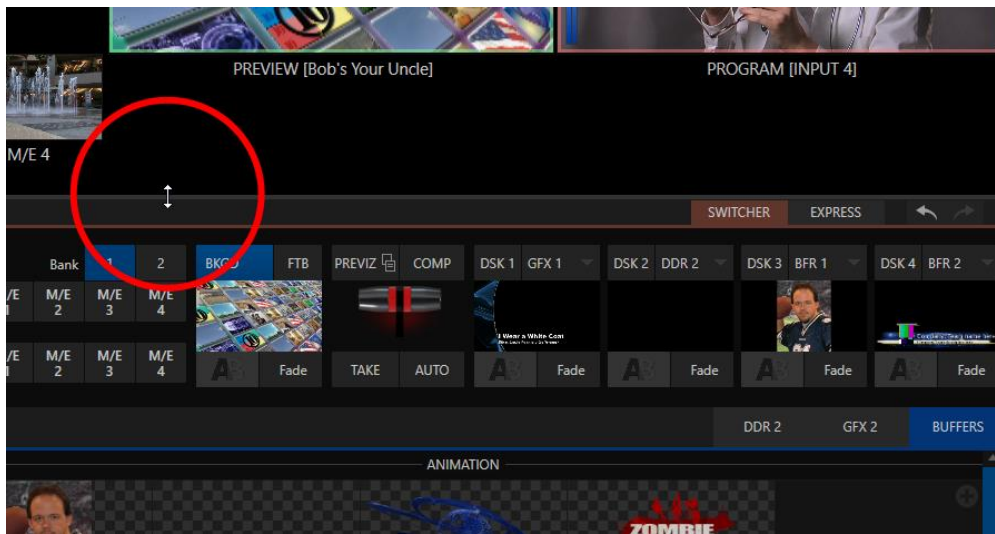
FIGURE 51

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.
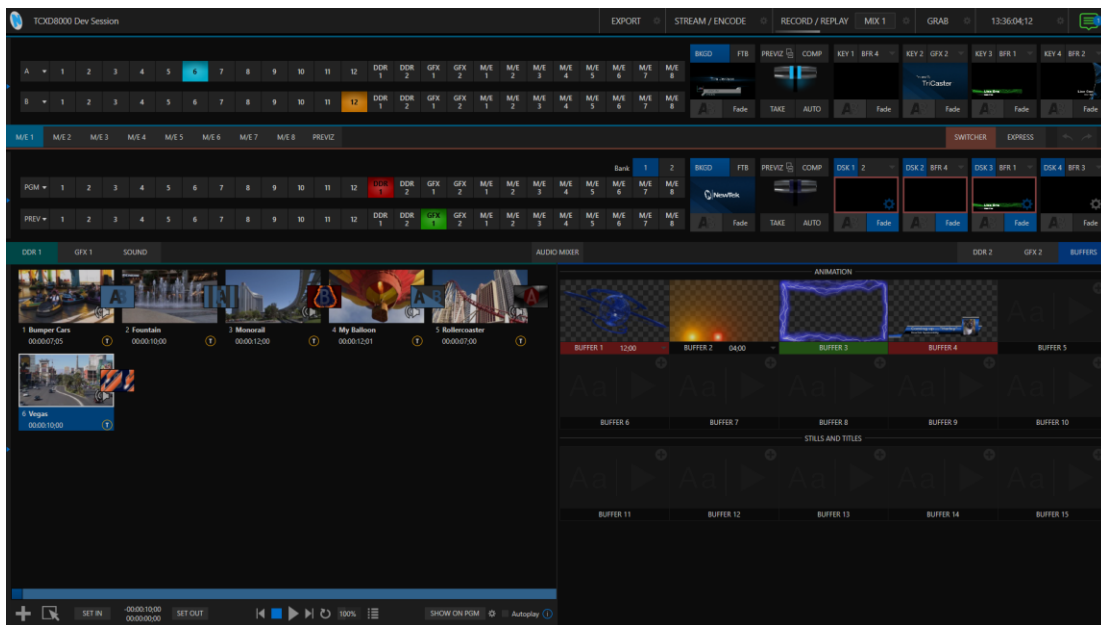
FIGURE 52

You can even move the horizontal divider all the way up to the bottom of the *Dashboard*, thus hiding the *Desktop* monitor pane entirely (Figure 52), providing much more room for other modules in the process.

> *Hint: Reset the horizontal divider to its default locations by double-clicking it. Also, note that a similar drag bar, which can be dragged left or right, is positioned just left of the* Program *and* Preview *viewports.*

Neither is it necessary to display modules you don't need at the moment (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

FIGURE 53

In a related innovation, an 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 (Figure 53) provides a simple 'single-click' workflow, ideal for less complex productions, as well as environments involving student or volunteer operators who may struggle with traditional switcher workflows.
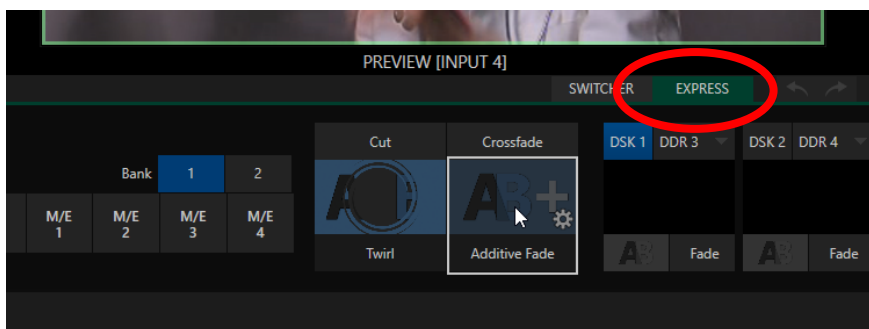
FIGURE 54

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 7.1).

Chapter 7   THE DASHBOARD

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

The *Dashboard* is home to a number of important displays, tools and controls. Prominently located at the very top of the *Live Desktop*, the *Dashboard* occupies the full width of the screen.
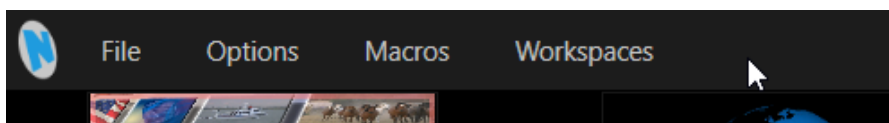
FIGURE 55

Initially, in the interest of not overwhelming users, 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 shown in Figure 55.
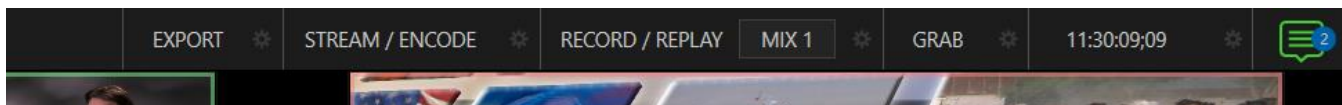
FIGURE 56

The right half of the *Dashboard* (Figure 56) contains a number of features and tools which are more frequently used, 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*
2. *Options menu*
3. *Macros menu* – see Chapter 16
4. *Workspaces* menu – see Chapter 10
5. *EXPORT button* and Configuration (gear) – see Chapter 18
6. *STREAM/ENCODE* button and *Configuration* (gear) – see Chapter 17
7. *RECORD/REPLAY* buttons, *Replay Pad*, and *Configuration* (gear) – see Chapter 19
8. *GRAB* button and *Configuration* (gear) – see Chapter 19
9. *Clock(s)* and *Configuration* (gear) – see Section 7.5
10. *Notification List*

Of these items, some 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.

<div align="center">SECTION 7.1 FILE MENU</div>

This menu drops down to reveal the following items:

- *Eject* – opens a sub-menu that lets you safely disconnect selected storage volumes
- *Import* – easily add media files from external sources to the appropriate session folders, and automatically transcode them to friendly formats for optimal playback if necessary. (*Import Bin* features are similar to those of the *Publish Bin*.)
- *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)

<div align="center">SECTION 7.2 OPTIONS MENU</div>

A number of very useful interface and workflow options are presented in the *Options* menu.

- *Tabs Follow*

    o 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 in order to see the *M/E* tab update).

    o 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*).

    o *Tabs Follow All Delegates* will update the *Desktop* in sync with any control surface delegate changes.

Hint: Control surface 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 surface Delegate button again to re-display the tabbed pane you are interest in.
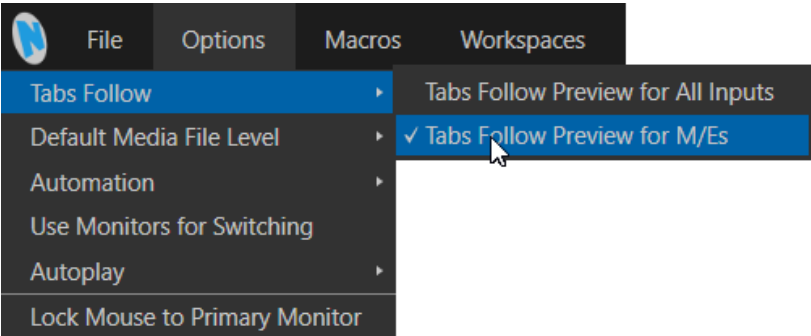
FIGURE 57

- *Default Media File Level* – the default 'per-clip' audio level applied to imported media files is controlled by this option.

- The *Automation* menu offers the following options:
  - *Tally* – Enables *State Change* macros configured in the *Automation* tab (*Input Configuration* panel) for any video source.
  - *Audio Levels* – Enables the *Run Macro at* (threshold dB) feature for *Audio Mixer* sources.
  - *Disable Hotspots* – Disable macro triggering based on *Hotspot* activity (see Section 8.1.3).
  - *Hotspots on PGM (only)* – When this is on, *Hotspot* macros are only triggered if the source is visible on *Program* output (including via an *M/E* shown on *Program* output, or a *DSK*).

- *Use Monitors for Switching* – When this feature is enabled, clicking a viewport (or tapping a viewport on a touchscreen) will select the corresponding video source on the main Switcher's *Preview* row and perform the current *Background transition* to display it on *Program* output.

Hint: Some older TriCaster systems running Windows 7 may require a software hotfix to properly support touch features. In such cases, download the hotfix installer from this link: http://new.tk/TCAE3TouchFix

Afterward, run the installer and reboot on completion when prompted. This should remedy most common touch issues (in some cases, a monitor may require a specific driver provided by its manufacturer).

- *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.

- Enabling *Lock Mouse to Primary Monitor* prevents the mouse from traveling into the external *Multiview* display.

SECTION 7.3 MACROS

Macros provide are an extremely important production benefits. Sufficiently so, in fact, that not only have we given them a place of their own in the User Guide (Chapter 16), but they are also discussed in greatly expanded detail in the accompanying *Automation and Integration Guide*.

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* features are discussed in Section 10.1.

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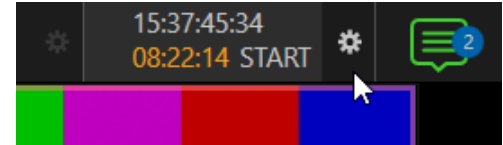
Hint: You can set the system clock, as for any computer; simply exit to the Windows® Desktop to do so.

7.5.1 LTC TIMECODE
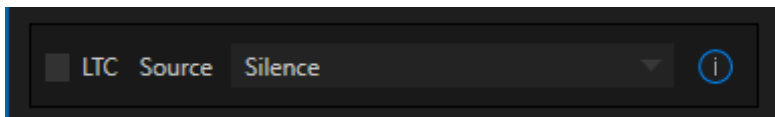
FIGURE 59

TriCaster 460, 860 and 8000 support 'LTC'. 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
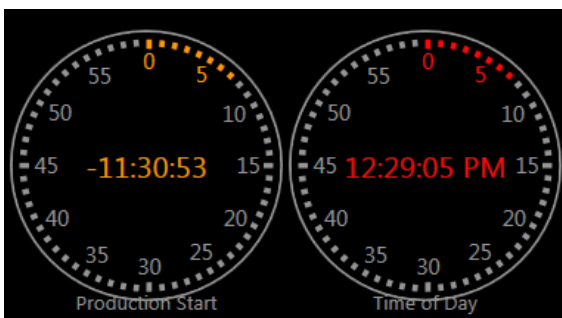
FIGURE 60
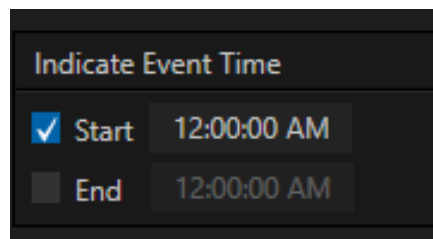
FIGURE 61

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, and 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 sine *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.

The last item at right on the *Dashboard* is the *Notification* icon (Figure 62). A 'number bubble' indicates how many un-viewed entries have accumulated. Clicking the icon displays the *Notification Pane*, which provides both helpful information and also 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:

FIGURE 62

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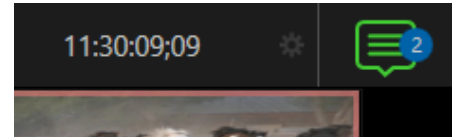
The highest priority (un-viewed) item in the list at the moment determines the *Notification* icon color. After you open the panel to review the notifications in the list, the icon turns white.

Individual items can be cleared from the list using the context menu opened with the triangle gadget shown at 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:
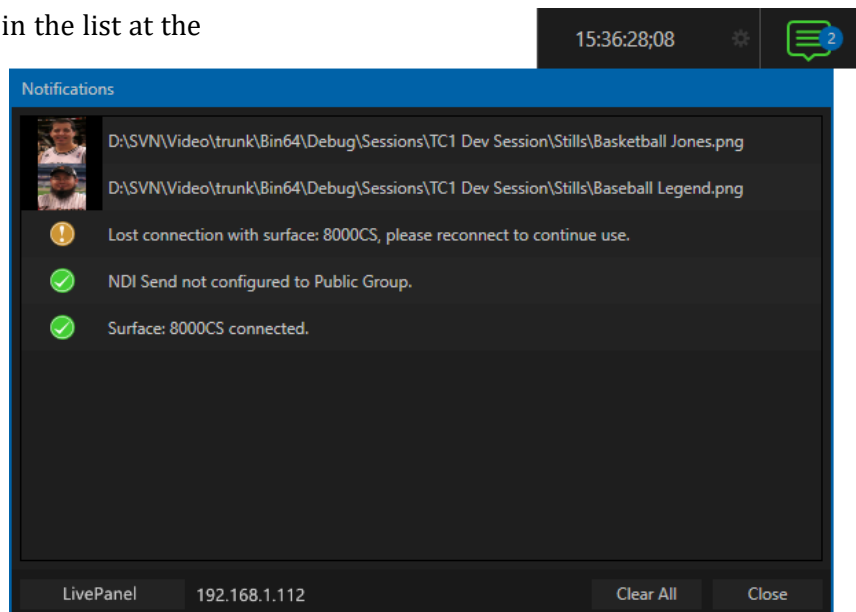
FIGURE 63

- 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 surface has been lost is given an icon with an amber color. A higher priority warning triggers a message with a red icon.
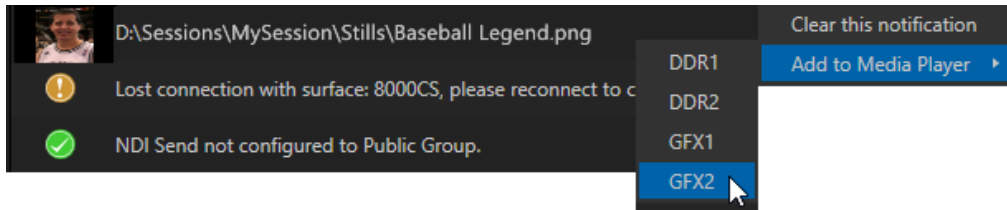
FIGURE 64

- 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 shows a thumbnail icon at left, along with the filename and path. In this case, the item's context menu includes an *Add to Media Player* option (Figure 64), 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 NewTek system provides extensive control over video sources, along with endless creative features. Each source has Proc Amp, keyer (LiveMatte™) and Crop ('garbage matte') features. Input Configuration panels are also home to realtime Hotspot and Tracker features. The number and flexibility of outputs supplied is astonishing, too, and we'll discuss these fully in this chapter.

The addition of NDI™ (Network Device Interface) support provides you with virtually unlimited input and output possibilities. Generally, an NDI source needs little if any configuration, but other sources may require you to choose between optional connection methods and settings.

SECTION 8.1 INPUT CONFIGURATION

8.1.1 INPUT TAB
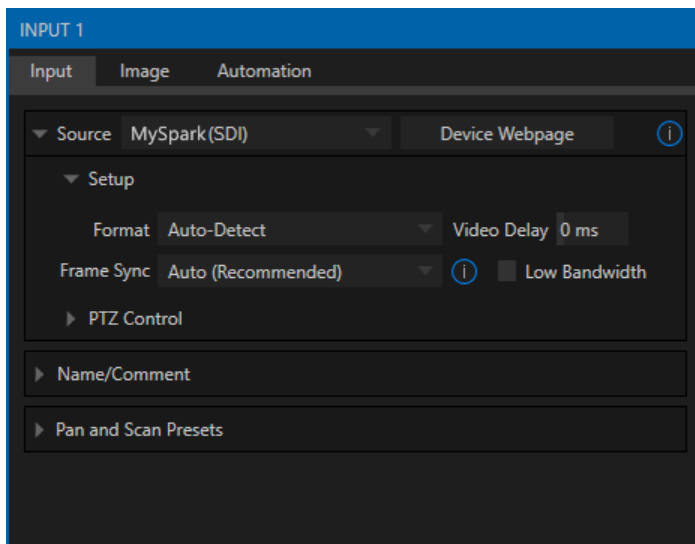
- Any external NDI source or one of the local hardware sources connected to one of the system's input connectors can be flexibly assigned to any *Switcher* input.

- This also means that sources can be 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.)

FIGURE 65

The assignment of one of the various types of source to a *Switcher* button (e.g., "Input 1" on the *Switcher*) is made in the *Input Configuration* panel (Figure 65), introduced to us back in Section 3.11.2.

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

- Double-click the monitor viewport for a *Switcher* input.
- Click the *Configuration* (gear) icon shown at lower right when the mouse pointer is rolled over above the viewport.
- If you have a touch-screen, you can two-finger tap the viewport
- Or, right-click a *Switcher* input button and select the *Configure* menu item.

Use the *Source* 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.
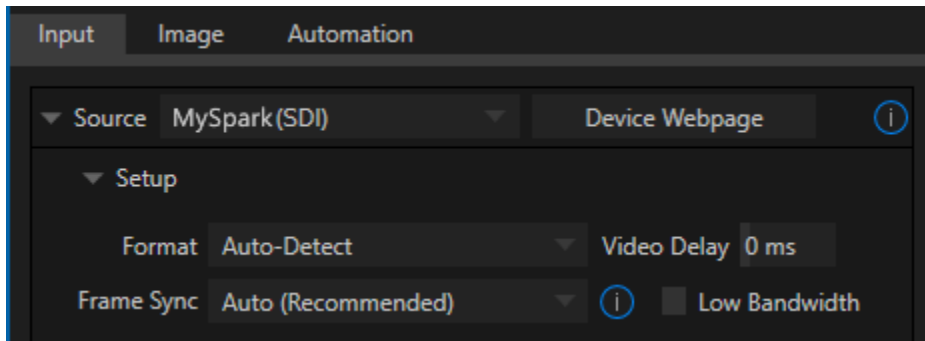
FIGURE 66

The *Local* group in the *Source* menu includes those sources connected locally to the system's backplane (i.e., the SDI inputs numbered 1-4), any other local hardware sources detected (such as a webcam), and *Black*.

SETUP

FORMAT

If you use the twirl-down triangle gadget at left to expand the *Source>Setup* control group (Figure 66), you will see that the *Format* for these diverse source types defaults to *Auto*. In the case of an NDI source, and often for hardware sources, 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 fails to detect the format. Let's explore other features located in the *Input Configuration* panel.

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, typcially 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.

FRAME SYNC

By default, *Frame Sync* is set to *Auto* for all source types, allowing you to work with a wide array of potential video sources without concerns about video timing.
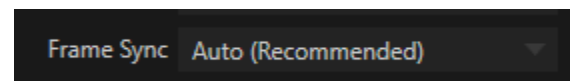
FIGURE 67

This option *(Auto)* 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 synchronizing, 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 <u>for genlocked sources</u>. Note that sources with *Frame Sync* disabled *must* be genlocked, and in phase (that is within 180° of the current *Switcher* output). Otherwise, video from the source will simply not seen. In practice, disable *Frame Sync* for genlocked sources only, then adjust the *Phase* setting (see Section 8.2.4) until video is displayed and you should be all set.

LOW BANDWIDTH
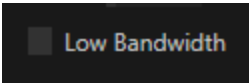
For NDI sources, a Low Bandwidth option is shown. This allows you to force the sending device to a lower quality setting that may nevertheless be quite useable if the source will never be displayed full screen, and which may be preferable in network settings with limited capacity (such as WiFi).

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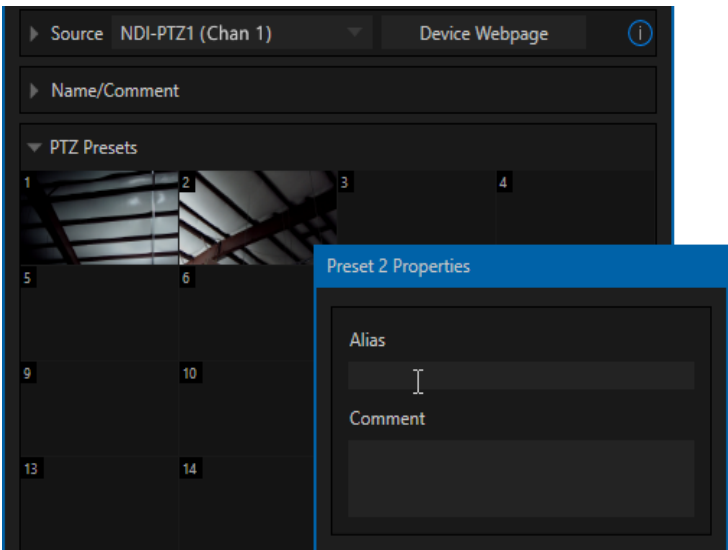
For many source types, a *PTZ Control* menu is shown in this control group. The default control type is *NDI*, which, assuming you are configuring an NDI source, makes life a lot easier – because there is nothing else to configure.

Otherwise, if you must select a 'legacy' control connection type 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.
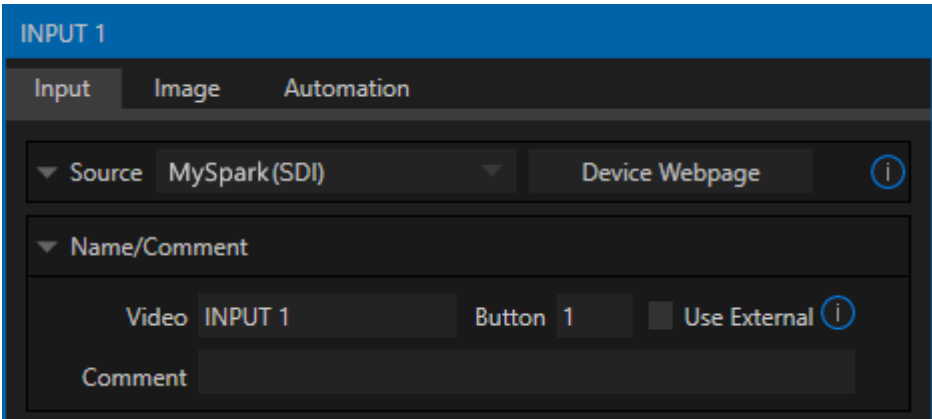
FIGURE 70

Expanding the *Name/Comment* control group reveals text entry boxes that allow you to provide labels for your video sources – specifically, the *Video* entry will appear beneath viewports in multiviews and some menus (where space permits), and the short *Button* text will be used to label *Switcher* buttons.

Enable the *Use External* switch to automatically pass the channel name for a remote source such as an SDI router input or NDI channel to the *Video* label field.

The *Comment* entry lets you enter memo text that can serve simply as a memory aid, but it's good to know that the *Video* and *Comment* fields serve other very valuable purposes, too. Specifically, 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.*

PTZ PRESETS

Another control group appears on the lower part of the *Input tab* when appropriate. This group (Figure 72) is labeled *PTZ Presets*.

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 (Figure 71), with two text boxes labeled *Alias* and *Comment*.
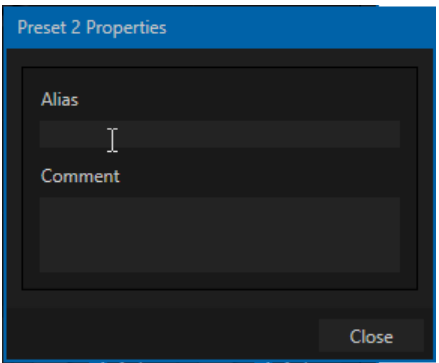
FIGURE 71

The entries in these two text boxes, like the *Name* and *Comment* values discussed earlier, provide the values for special *DataLink* keys that can in turn be used in various ways. For example, the *Alias* entry for the second preset of the second input will be assigned to the *DataLink* key %PTZ2_Preset2_Alias%.
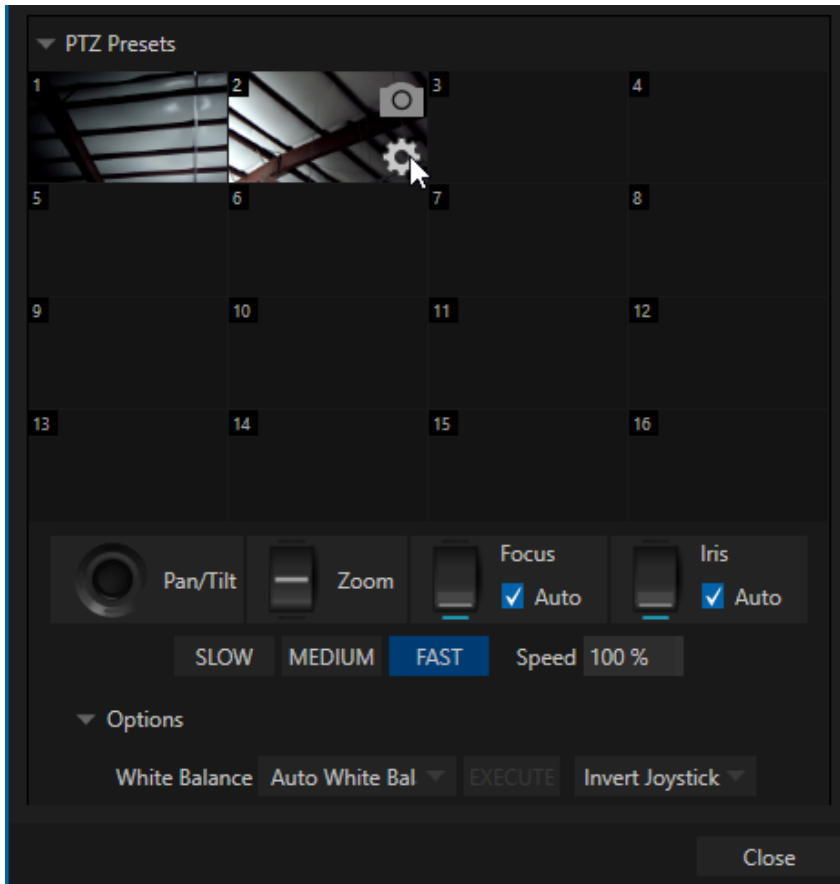
A set of controls located below the *preset bin* allows you to control connected PTZ cameras.

> Note: NewTek NC1 Spark sources connected by NDI will show Virtual PTZ (Pan and Scan) controls.

SLOW, MEDIUM, and *FAST* preset buttons complement the numeric *Speed* control slider at 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 surfaces).

> Note: Focus, Iris, and White Balance features are only shown when a PTZ cameras is connected to the input. However features in the Input Configuration panel's Image tab, discussed next, can provide similar functionality to White Balance automation.
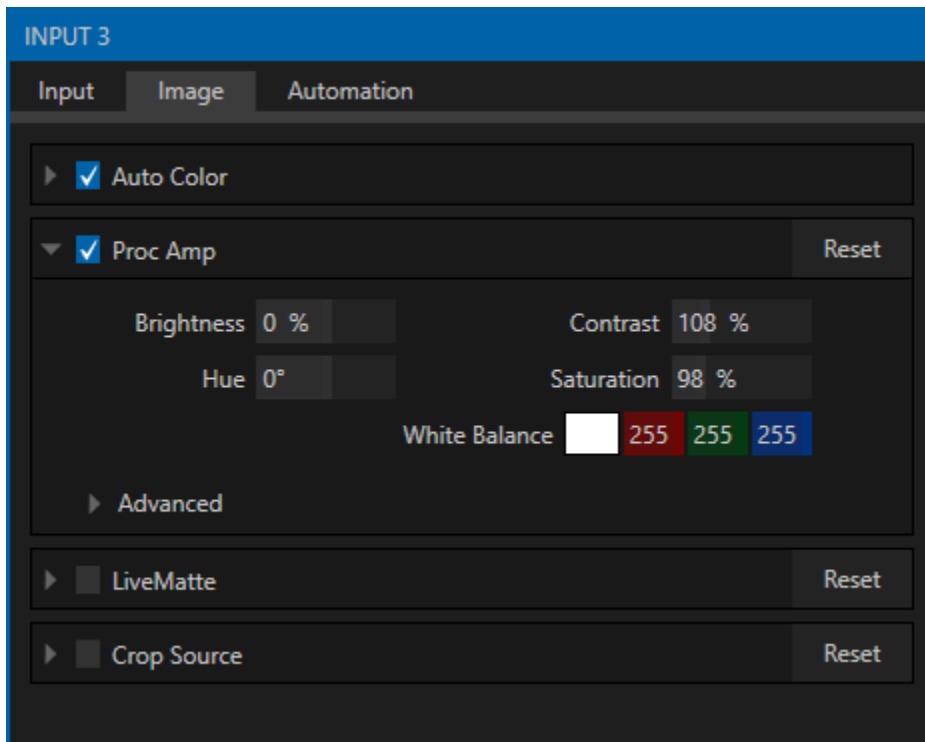
FIGURE 73

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.
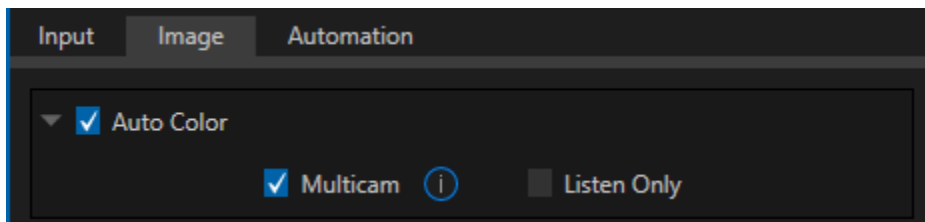
FIGURE 74

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.

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

LISTEN ONLY

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

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

PROC AMP
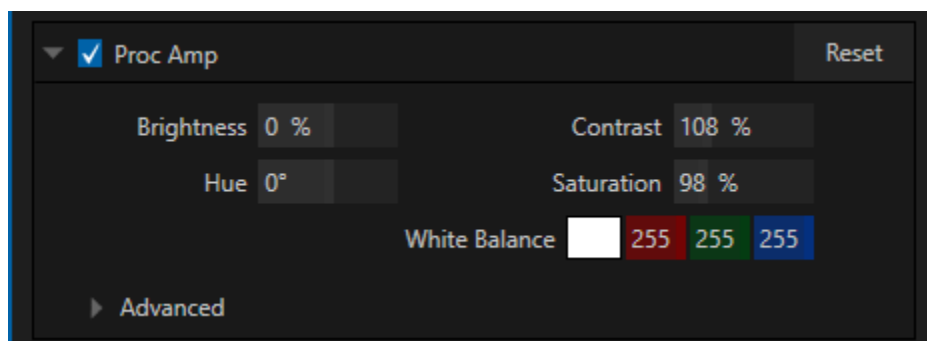
FIGURE 75

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

- *Brightness*: Adjustment range from -50 to +50 IRE (the default being 0).

  As reference, the full luminance range of the visible portion of a video signal can be thought of as '100 IRE units' (named for the Institute of Radio Engineers) – ignoring minor regional variations.

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

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

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

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

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

ADVANCED COLOR CONTROLS
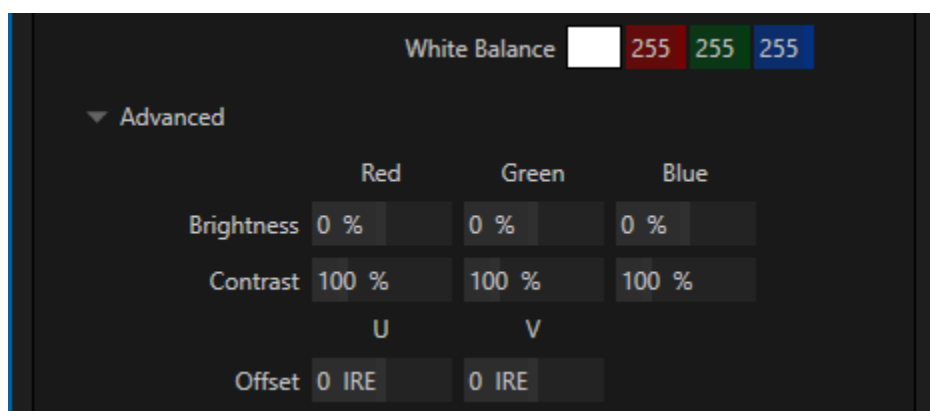
FIGURE 76

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.

LIVEMATTE

The next 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.

FIGURE 77

The process involves eliminating a portion of the 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*, NewTek's 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 13, 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.
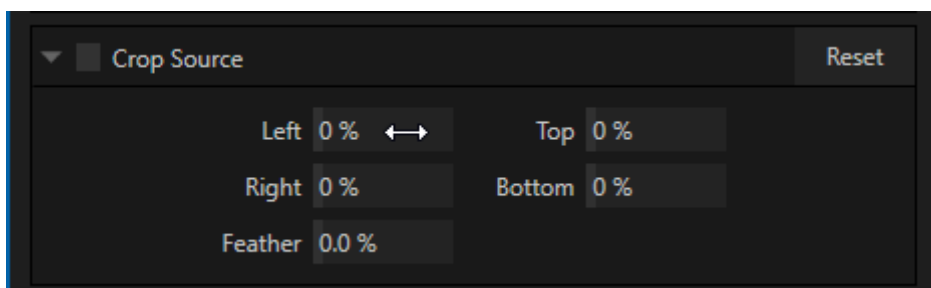
FIGURE 78

The settings in the *Crop Source* control group can be used to remove such unwanted 'garbage' from the scene, and 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.*

8.1.3 AUTOMATION TAB

Automation can 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 16, 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 surface button, or similar means; but that isn't really 'automation', is it? It's actually a manual operation.

Automation triggers action based on predetermined criteria. The automatic transmission in your car shifts when certain conditions are met. In similar fashion, the *Automation tab* controls let you predetermine what happens when certain conditions are met. Consider the *State Change* control group.

STATE CHANGE
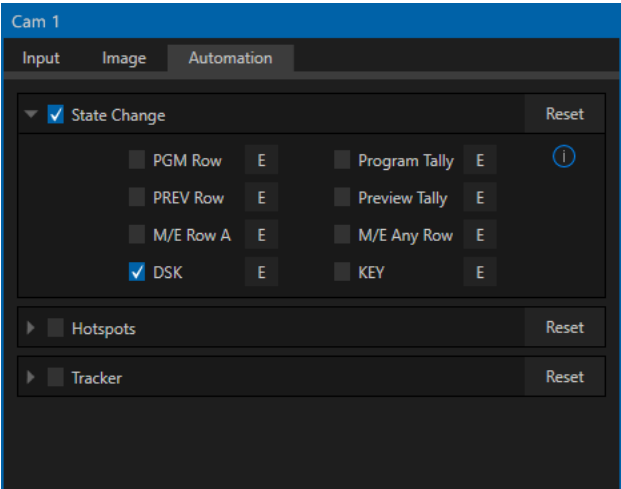
FIGURE 79
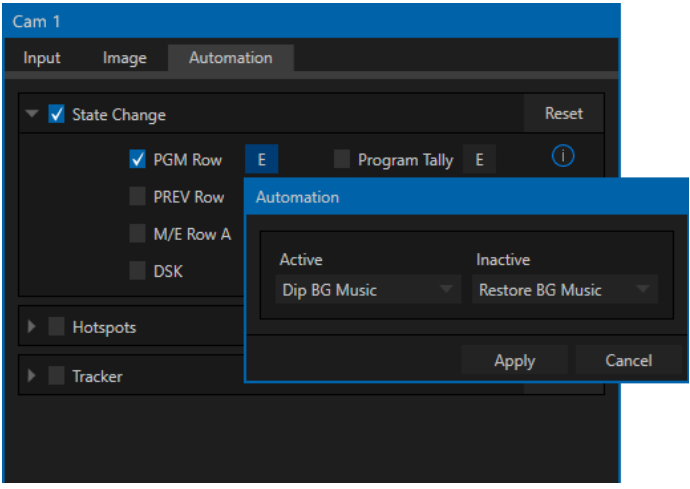
FIGURE 80

Click the [E] button next to a one of the 'state' options (Figure 79) 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 manner 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.

The possibilities are truly endless.

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

HOTSPOTS
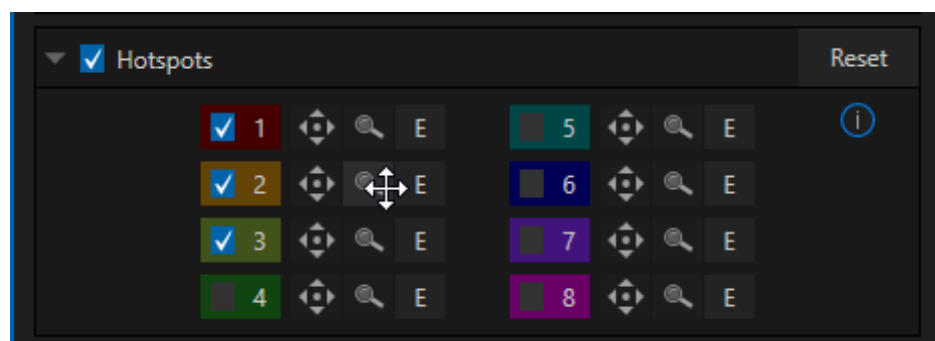
FIGURE 81

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 green screen 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 deinfed hotspot zone. All manner of creative implementations are possible.

 Hotspot setup, options and use are further discussed in Chapter 5 of the supplemental *Automation and Integration Guide*.

The *Tracker* control group provides real-time motion tracking features (TriCaster 8000 and 460 models only). 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 13).

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.

ADJUSTING TOLERANCE

Click the eyedropper and, while holding the mouse button down, drag the pointer over the monitor for the source you want to track (see Figure 82). The *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.
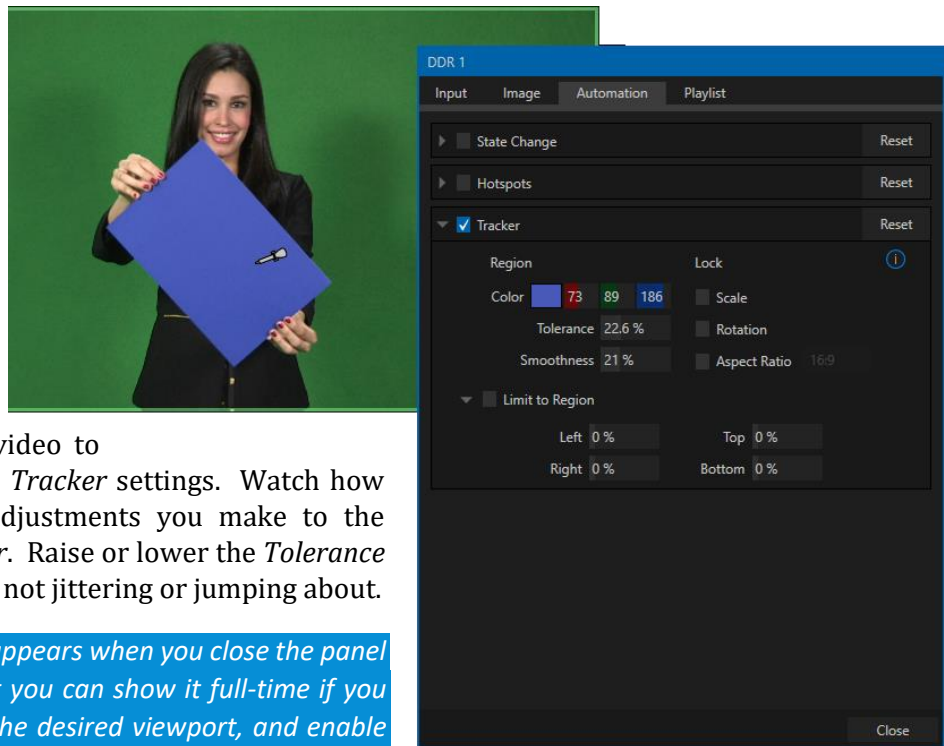
FIGURE 82

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 Section 14.2.2).

LOCK

At right are controls that permit you to *Lock* certain *Tracker* attributes (Figure 83), preventing them from changing in the scene.
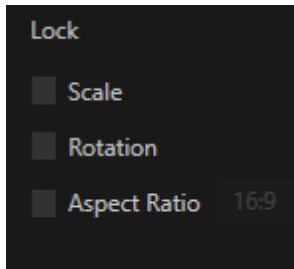
FIGURE 83

- 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.
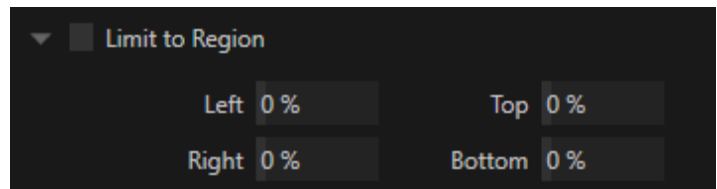
FIGURE 84

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

SECTION 8.2 OUTPUT CONFIGURATION

FIGURE 85

Roll the mouse pointer over the *Program* monitor to reveal a *Configure* button (Figure 85) at right in the titlebar below the display. Click it to open the *Output Configuration* panel.

Hint: As for other viewports, alternatively 'two finder tap' on a touchscreen or, if Use Monitors for Switching is disabled in the Options menu, double-click the mouse on the viewport to open this panel.
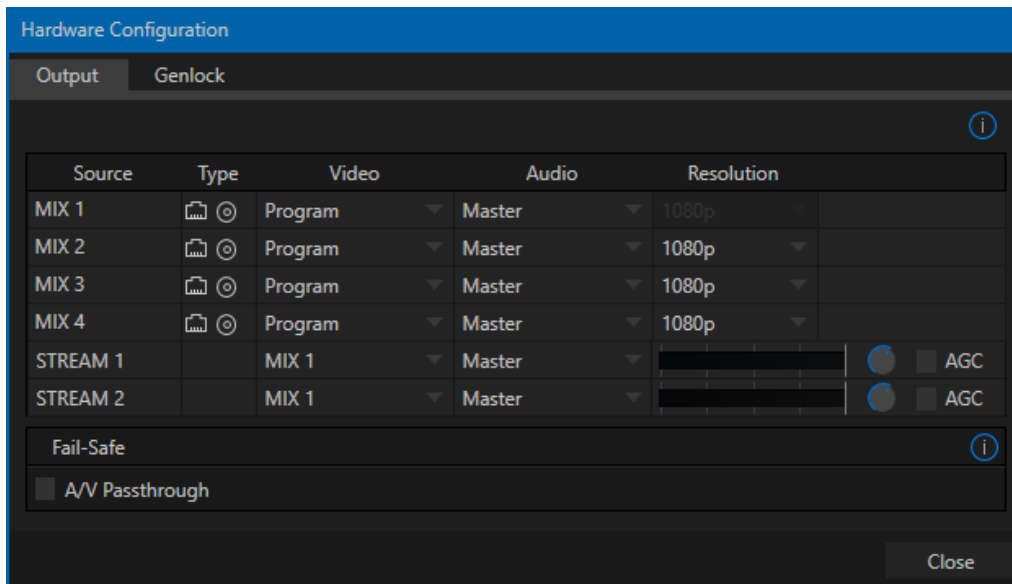
FIGURE 86

The *Output tab* in this panel contains controls governing the system's primary outputs.

8.2.1 PRIMARY OUTPUTS

We discussed *Primary* and *Secondary* outputs back in Section 3.11. The first four entries in this panel are primary outputs; typically these are also 'mixed' outputs, hence their default labels – MIX 1-4. All four of these video sources are sent to the corresponding SDI output connectors (1–4), and also as NDI (Network Device Interface) 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).

AUDIO

In similar fashion, you can choose which audio source accompanies any of the four primary outputs. Choose any individual audio mixer input, or any of the four mixed audio outputs (Master, and Aux 1-3).

RESOLUTION

The Resolution menu allows you to choose the video format for output 2–4 (Output 1 is always at *session* resolution). 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, according to whether the session is in PAL or NTSC mode:

- 1080i or 1080p – depending on the session format
- 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

Note: Output 1 always transmits video in session format, thus shows a Resolution display only.

Generally, source formats that are inconsistent with the current output resolution setting are automatically conformed 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.

8.2.2 STREAM

The *Stream* controls in the *Output* tab let you independently assign any of the four primary mixes to the streaming encoder. Likewise, you can send audio from the *Master* audio mix or any of the three *Aux* busses to either streaming encoder.
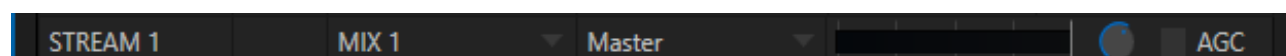
FIGURE 87

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 different 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 17.

8.2.3 FAILSAFE
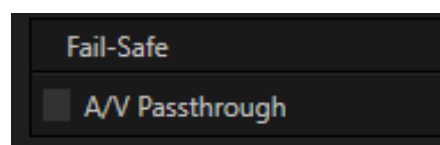
FIGURE 88

NewTek'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 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.

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.)

8.2.4 GENLOCK TAB

The *Genlock* feature allows your NewTek system to 'lock' its video output to a reference video signal supplied to its *Genlock* input connector.

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 definitely 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.

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

Genlock settings are hosted in a tab by the same name in the *Output Configuration* panel (Figure 89).

VERTICAL POSITION, HORIZONTAL POSITION AND PHASE

Hardware Configuration
Output
Genlock
Reset
Reset

☐ Genlock

Vertical Position 0.00 %
Horizontal Position 0.00 %
Phase 0.0°

Reference Type
○ HD (Tri-Level)
● SD (Bi-Level)

Center Frequency
Value 0
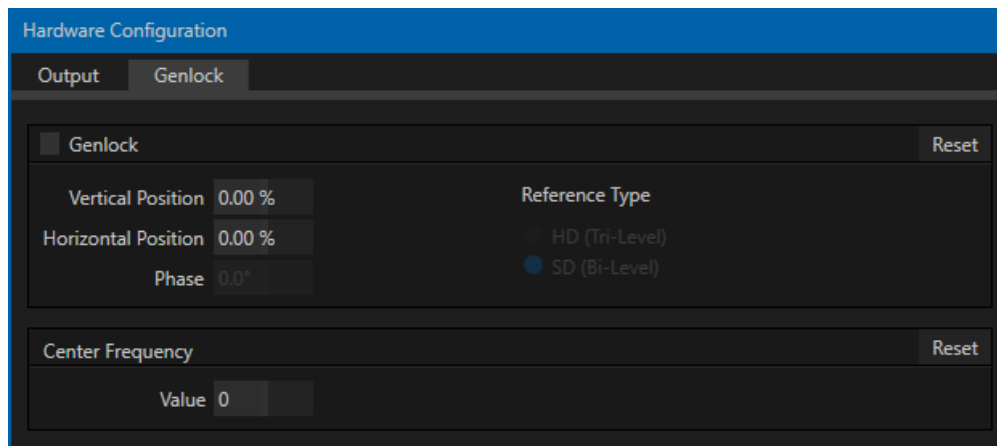
FIGURE 89

Locking all devices to house sync is important, but this alone does not actually ensure a perfect downstream match. Consider an army marching along: each step the soldiers take occurs at precisely the same moment, so we could say their timing is synchronized. Even so – problems result if one soldier leads with the left foot while everyone else is on the right. Or perhaps everyone is evenly spaced and perfectly aligned but for one misfit who 'tailgates' the soldier ahead of him and keeps stepping on his heels.

This is essentially why several adjustable settings are supported in the *Genlock* panel. The *Horizontal* and *Vertical Position* settings pin the image in the proper space in the frame, and in doing so could be likened to making sure each marching soldier is in position relative to his fellows (as viewed from above). The *Phase* setting ensures proper color alignment, corresponding to making sure everyone is on the left or right foot at the same time.

Together, the *Vert Position*, *Horiz Position* and *Phase* settings let you tweak synchronization to arrive at an optimum match between devices. Typically these settings are fine-tuned with the aid of a downstream vectorscope and waveform monitor. (A discussion of these adjustments goes beyond the scope of this manual, but a quick online search for the keywords "genlock" and "adjust" turns up a number of excellent references).

REFERENCE TYPE

The 'bi-level' reference signal long used for standard definition television is often used for genlocking both SD and HD installations. However, if you are supplying an HD reference signal to the *Genlock Input* (and your other equipment), select the *HD (Tri-level)* switch in the *Reference Type* area of the Genlock settings.

Note: Reference Type options do not appear for SD sessions.

8.2.5 CENTER FREQUENCY

This setting is applied when a genlock reference signal is *not* in use. To adjust the setting, supply color bars to an input and pass video output to a downstream vectorscope. The vectorscope display is completely stable when *Center Frequency* is properly adjusted.

Note: See also Section 8.1.1, Frame Sync .

Chapter 9   SWITCHER, TRANSITIONS AND OVERLAY

Live Desktop features replicate traditional video switcher controls in an easy to comprehend and use fashion. This includes transition controls, four independent 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 the *Layer Controls*, which include main and *DSK* channel *Transition* controls and configuration features (Figure 90).
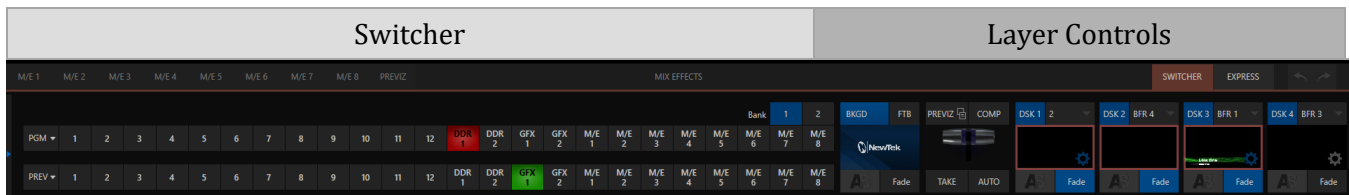
FIGURE 90

SECTION 9.1 SWITCHER MODES

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 (Figure 90) 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 (Figure 91; see Section 9.11).

This one-button operating mode will be especially welcome in environments where volunteers or less experienced operators are involved.
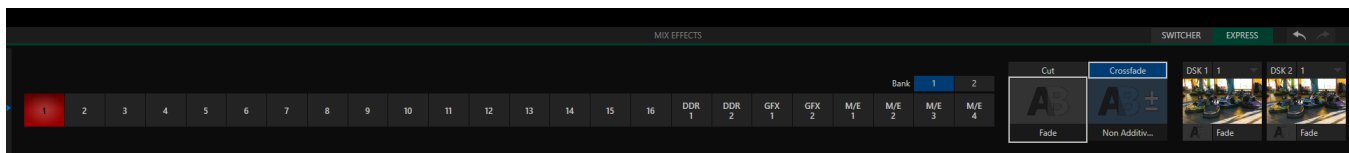
FIGURE 91

> Hint: Additionally, support for switching using a touchscreen has been provided. Just tap a Switcher button or viewport to instantly send that source to Program output, using the current background transition (if any).

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 (Figure 92).
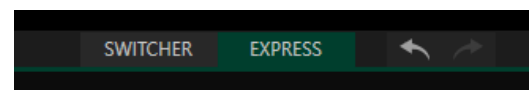
FIGURE 92

SECTION 9.2 SWITCHER ROW BANKS
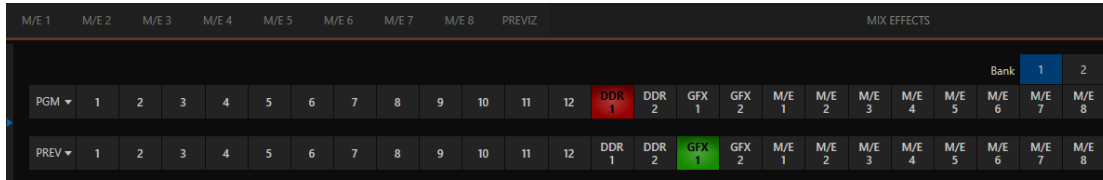
In standard *Switcher* mode, two *Switcher* rows labeled *PGM* (Program) and *PREV* (Preview) are shown (Figure 93). Clicking a button in the *Program* or *Preview* row selects the active video source for that bus (audio sources can optionally be affected by *Switcher* activity – see Chapter 15 Audio).

The *Program* and *Preview* rows represent all available video source in two "banks" of 24 buttons. The source names shown on the buttons in the rows update depending which bank of sources you wish to access.

Bank 1 is shown by default. Holding down *Alt* on the keyboard reveals *Bank 2*. On releasing *Alt*, *Bank 1* is re-displayed. It's also possible to 'latch' *banks*, either by clicking the *Bank* buttons on the screen, or by pressing the *Tab* key to cycle between banks.

> Hint: The main Switcher (and M/Es with transition effects assigned) are able to show 'selection hint' tags beneath their rows when the active selection is in the opposite bank. Click a tag to jump to the bank the source you clicked is hosted in.

SECTION 9.3 PROGRAM/PREVIEW ROWS

The optional video source selections for *Switcher* rows include all external (SDI and NDI) inputs, including video router sources; internal sources (*Media Players* and *Buffers*); and also the output from all M/Es, represented on the *Switcher* rows by buttons labeled *M/E 1-4* – see Chapter 14, Mix/Effect (M/E) Tools).
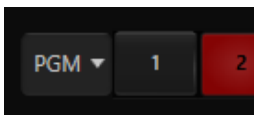
The *PGM* (Program) row selection determines the dominant video stream of the *Background* (BKGD) *video layer* – the bottom-most layer of the composition sent to the *Program* output.

Other sources may be mixed into the *Background* layer at times, as you apply *LiveMatte*, or see portions of an incoming *Preview* row video source during a transition.
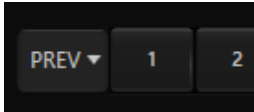
The *Preview row* appears in standard *Switcher* mode. Selections determine which source is queued up for display in the *Background* layer by a subsequent (BKGD) *Take* or *Transition* operation.

SECTION 9.4 BACKGROUND AND DSK LAYERS

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' 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.

On Models with 4 DSKs

BKGD → • Program • Preview → DSK 1 → DSK 2 → DSK 3 → DSK 4 → FTB → Program Out
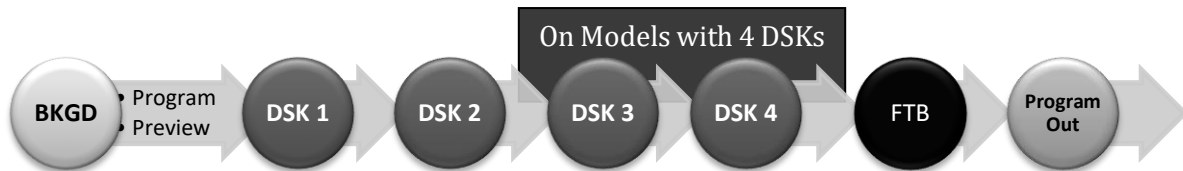
Recall, too, that the *BKGD* layer itself is often a composite of sub-layers:

- 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.

Note: Since M/Es are reentrant, the BKGD layer can at times reach astronomical 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. In *Express* mode, selecting a button on the single row has the effect of first placing the designated source on the (unseen) *Preview* bus, then immediately switching it to *Program* output.

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

SECTION 9.6 LINKING SWITCHER ROWS

It can be useful to link two (or more) *Switcher* or *M/E* source rows together, so 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.

Thus Figure 95 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.
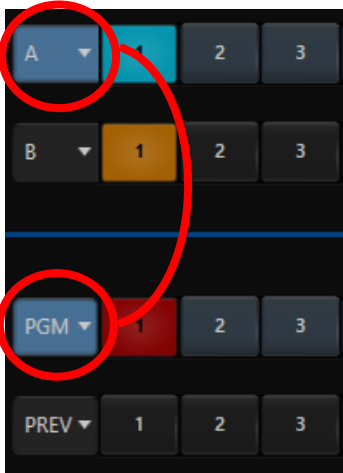
FIGURE 95

SECTION 9.7 TRANSITIONS AND EFFECTS

We discussed video layers in Section 9.4. With this in mind, it's easy to comprehend the layout and use of the *Transition* controls. Let's consider the *Transition* controls in the standard *Switcher* layout first.

9.7.1 STANDARD MODE

At left in 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.*
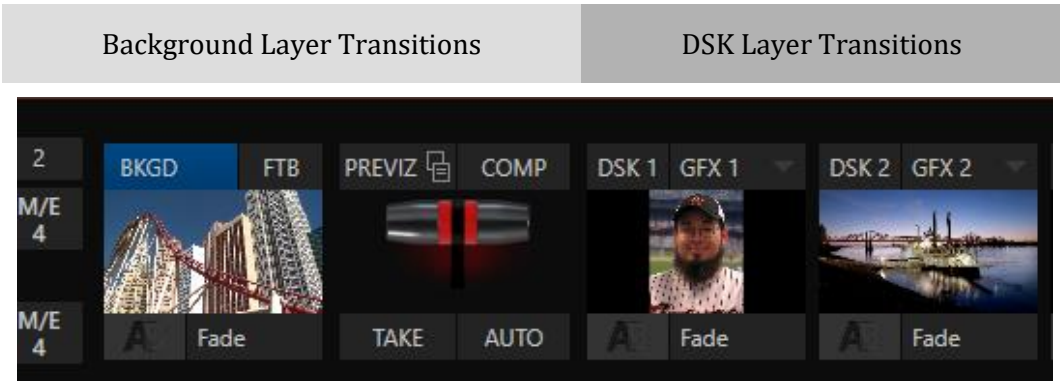
FIGURE 96

DSK CONTROLS

FIGURE 97

Each *DSK* layer has a live video viewport showing the current source assigned to it (using the menu at right above the viewport).

Each *DSK* has its own transition effect. Click the transition icon at lower left below the viewport to reveal a palette of different transition presets (Figure 99) 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 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 using 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 by clicking again during the transition. Click it again to continue performing the effect.

TRANSITION DELEGATES
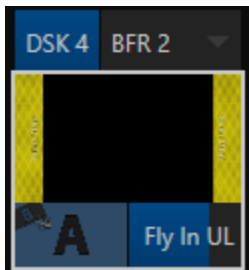
FIGURE 98

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 (Figure 98) 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

FIGURE 99

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. A number of *Animation Store transitions* are supplied, but you can generate your own using the supplied *Animation Store Creator* application and custom animation content you have access to or create using art software.

> *Note: The Animation Store Creator application is covered in its own manual, which can be opened from the Help menu on the Home page in TriCaster's Launch Screen.*

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 (Figure 100).

> *Hint: Touchscreen users can 'two-finger tap' the viewport to open the Configuration panel.*

FIGURE 100

Doing so will actually open the *Input Configuration* panel for the source assigned to the *DSK*, but with the addition of a supplemental tab labeled DSK (1-4).

The control groups in this new tab expand to reveal *Position*, *Use Source Tracker* and *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.
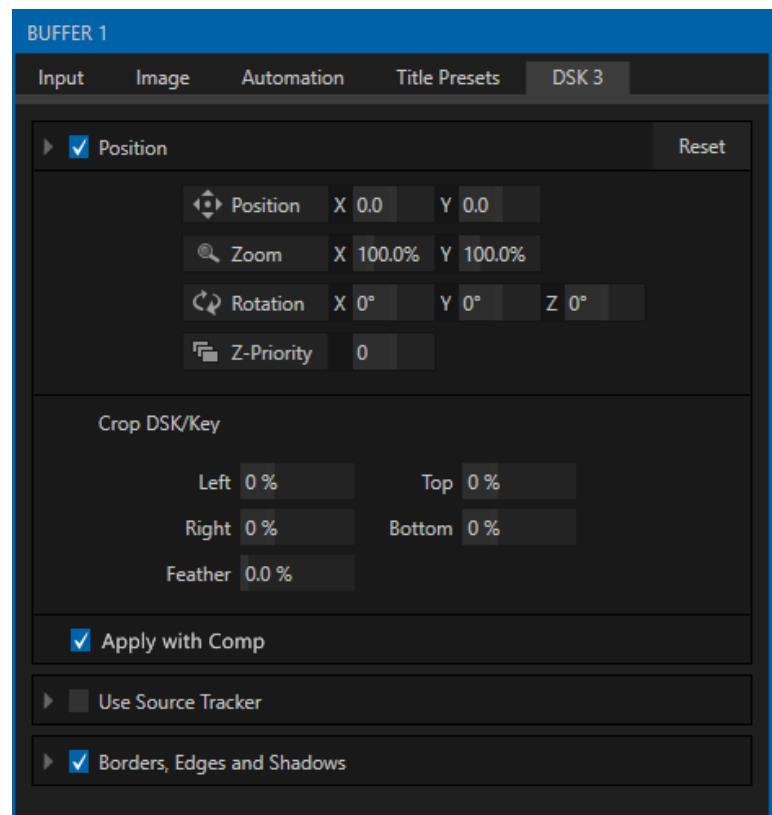
FIGURE 101

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.

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.

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 similar to those found 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 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*.
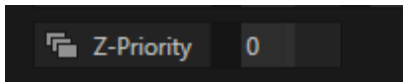
FIGURE 102

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 implemented especially 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 them in their natural (*DSK/KEY* layer) order.
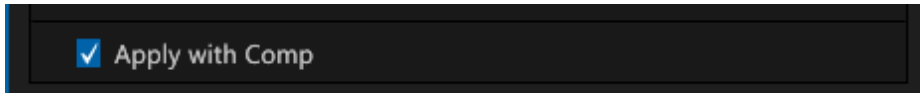
FIGURE 103

We will discuss the powerful *Comp* system a bit later (Section 9.9), but we'll mention it in passing here to highlight the *Apply with Comp* switch (TriCaster 8000 and 460 models only) 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

We discussed the video *Tracker* back in Section 8.1.3. 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 (TriCaster 8000 and 460 models only).
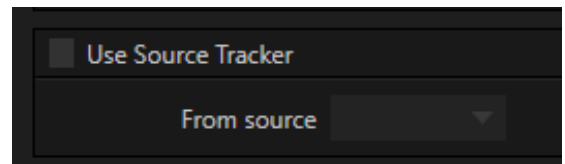
FIGURE 104

> *Note: 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
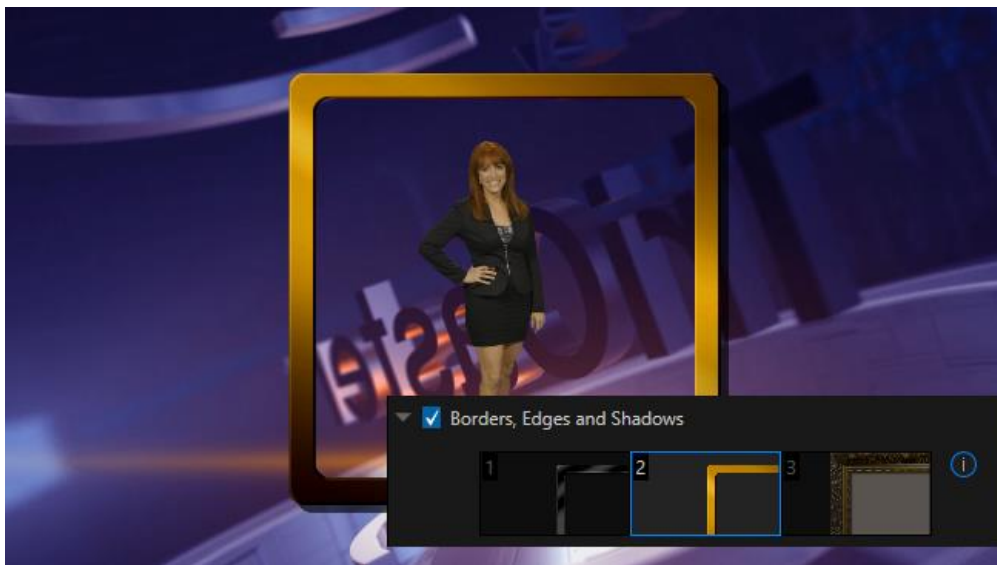
FIGURE 105

The *Borders, Edges and Shadows group* also provides each *DSK*, *KEY* and *M/E* layer with three quick access *Border* preset slots (Figure 105).

Hint: Since these are per-layer Position effects, and can be controlled – even animated – by Comps when supported on your TriCaster model, you can use Borders to create animated 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 Photoshop®. You need merely define a Photoshop™ format file with

FIGURE 106

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 to do this. You will find the multi-layer Photoshop® file in the Borders folder at C:\ProgramData\NewTek\TriCaster\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.

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 of these factors operating together.

In all of these cases, *DSK* layers automatically respects transparency 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 Media Players. Premultiplied files can yield incorrect results when overlaid on other imagery.

FIGURE 107

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 (Figure 107), or set up many other elaborate effects in this manner.

9.7.2 BACKGROUND CONTROLS
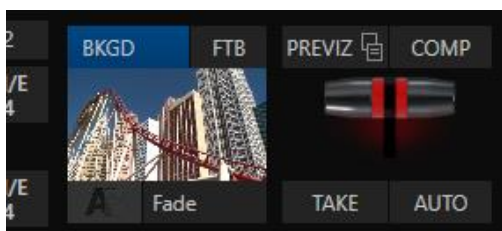
FIGURE 108

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.

FIGURE 109

FTB
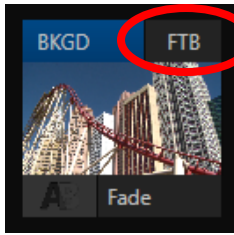
Let's discuss the *FTB* feature next. The acronym stands for *Fade to Black*. The result of clicking the *FTB button* will not likely surprise you very much. ☺

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.

FIGURE 110

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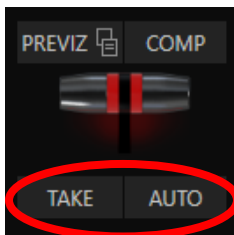
Clicking the *Background* layer's *Take* button (keyboard shortcut *Enter*) performs a straight cut for all video layers that are currently delegated.

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.

FIGURE 111

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.

Hint: Naturally, when the T-bar is dragged part way, a partial transition occurs. With certain transitions this can be useful for split screen effects.

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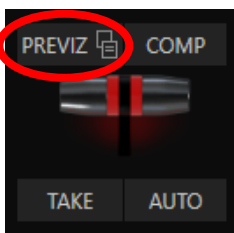
The *Look Ahead Preview* viewport above the *Switcher* shows the *outcome* of the currently configured transition before it is performed. *Previz* takes this capability further, allowing you to pre-visualize effects in motion, including T-bar operations.

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.

FIGURE 112

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.

Clicking the *PREVIZ button* copies 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 click the *Paste Previz* (clipboard) gadget located beside the *PREVIZ* button in the desired destination (*Switcher* or *M/E* tab) to send it to the target.

> Hint: This allows you to very easily transfer all of the settings 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
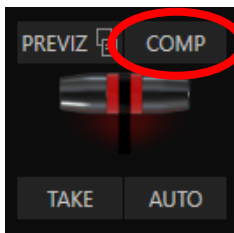
FIGURE 113

You'll also notice a button labeled *COMP* immediately above the *T-Bar* (TriCaster 8000 and 460 only). Clicking it opens the *Comp Bin*, which provides powerful layer and effect control features.

We're going to discuss the *Comp Bin* in detail soon (Section 14.8), but at this point we want to distinguish them 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 apply *all* settings in the *Switcher*, including source selection.

SECTION 9.10 UNDO/REDO

The *Undo/Redo* feature is a very useful innovation that stores multiple undo/redo states. You can easily revert to a prior *Switcher* state, providing another important 'failsafe' feature. Accidents happen. *Undo* is great for those times when you've inadvertently changed something with unwanted results, but lack time to figure out what went wrong.
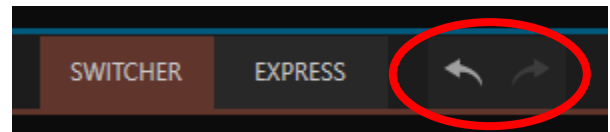
FIGURE 114

The system stores a fresh *Undo* state whenever the *Program* row selection is changed. If you encounter problems and don't have time to think about what may have gone wrong, a click (or keyboard Ctrl + z) can quickly get you back to the prior state.

SECTION 9.11 EXPRESS MODE
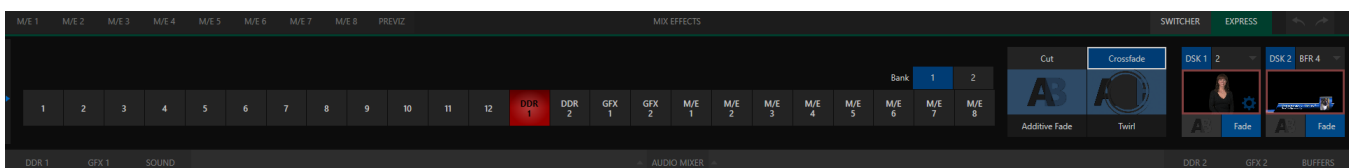
FIGURE 115

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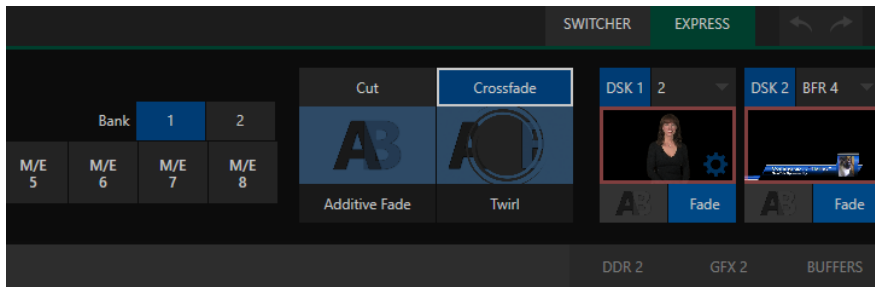
To open the *Express* mode *Switcher* view, click or tap the *EXPRESS* tab at right above the *Switcher*.

9.11.1 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 (Figure 116). Simply click or tap the *Cut* or *Crossfade* buttons to activate the corresponding *Background transition*. Just below these buttons you will see two selectable transitions, represented by labeled icons. Tap or click either of these to quickly select 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.

> *Hint: Although the gear is not visible in a touchscreen scenario, you can still tap the lower right corner of the icon to open the transition bin.*

9.11.2 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.

9.11.3 DSKS

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

> *Hint: If you have a touchscreen, remember that you can 'two-finger' tap a DSK or KEY layer thumbnail to open the layer's context-sensitive configuration pane.*

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 NewTek system 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, Hotspot, Tracking* 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

Really, the *Live Desktop* provides a number of 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.
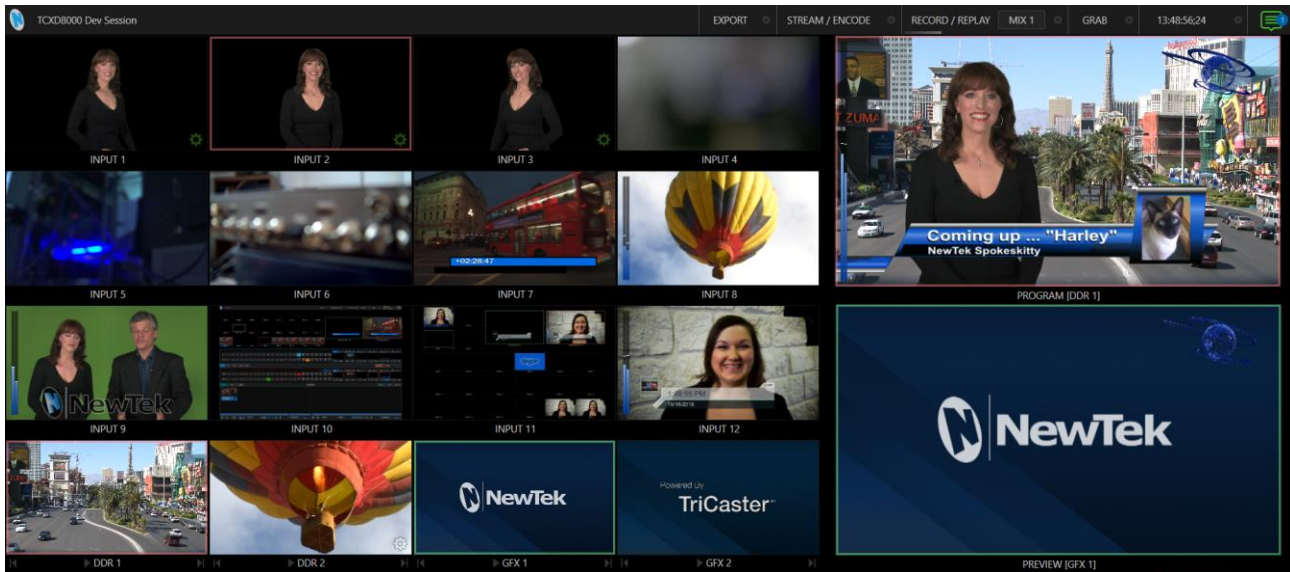
SECTION 10.2 LIVE DESKTOP MONITORS

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 the 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.

<div align="center">SECTION 10.3 WORKSPACE PRESETS</div>

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 provided for each *Multiview*. 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. The settings you select for individual monitors will be retained in the current *Workspace* preset.

Let's further consider an important *Workspace* layout option - *Scopes*.
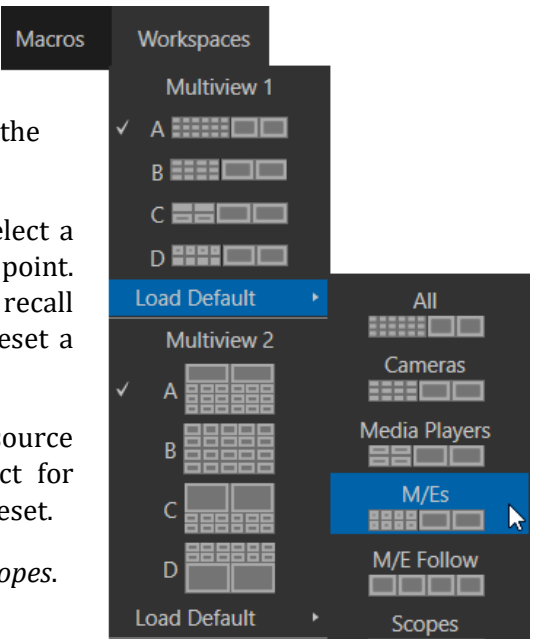
FIGURE 118

<div align="center">SECTION 10.4 SCOPES</div>
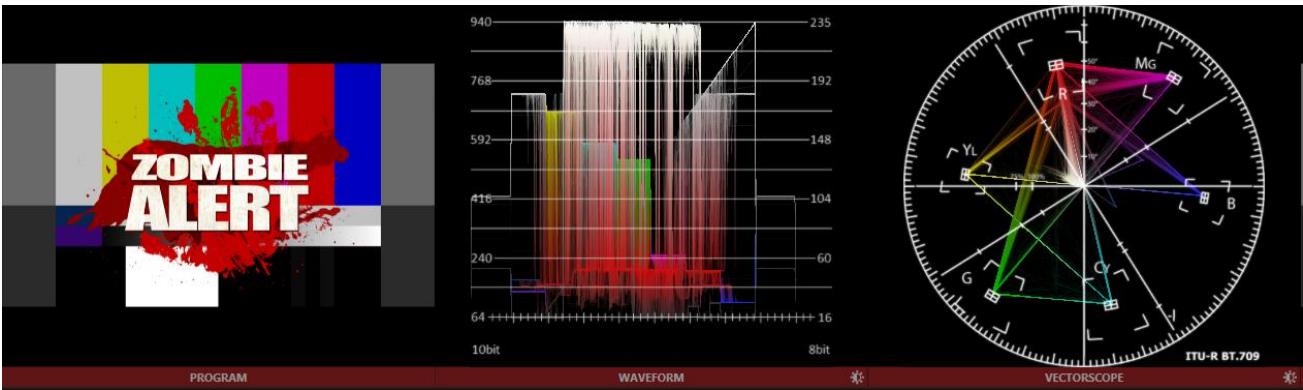
FIGURE 119

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 C, 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.
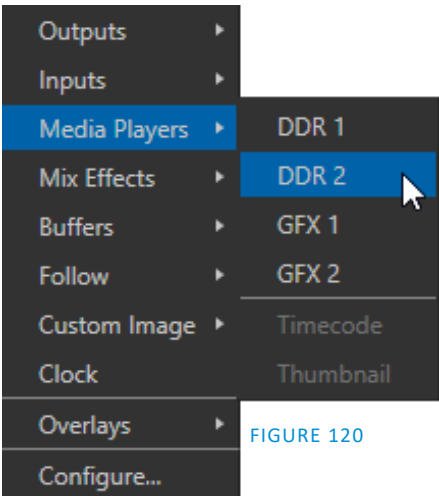
FIGURE 120

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 *Mix 1 - 4.*

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).

FIGURE 121

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, *Tracking Markers* and *Hot Spot Markers* (see Section 8.1.3)*.*

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.
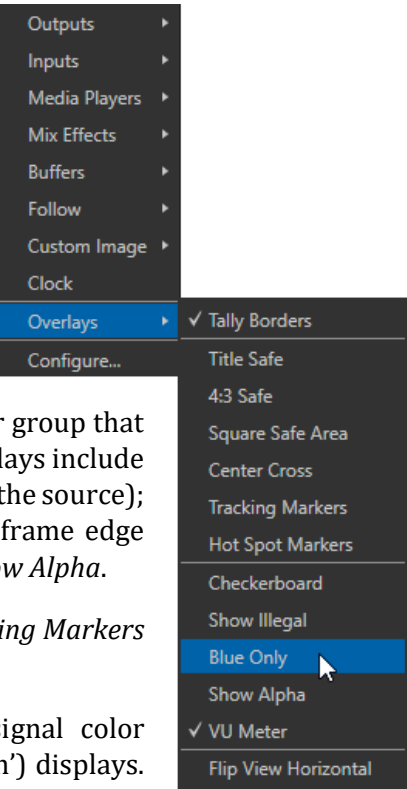
The final *Overlay* option flips the images horizontally, useful for a variety of studio requirements such as talent orientation in green screen applications (including *Hotspot* operations).

> *Note: Certain Overlay menu options are not suitable for all monitor sources, hence are not listed when inappropriate.*

One final item completes the monitor viewport options:

- *Configure* –opens the *Input Configuration* panel for the corresponding source.

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

10.5.1 VIEWPORT TOOLS

Viewports provide additional features when you move your mouse pointer over them.

FIGURE 122

FIGURE 123

As shown in Figure 122, 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 Use Monitors for Switching 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. 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 19.2).

The viewports for *Media Players* (Figure 123) 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.*

The *Program Output* monitor could hardly be more important, hence it's prominent default location at upper-right on the *Live Desktop.*
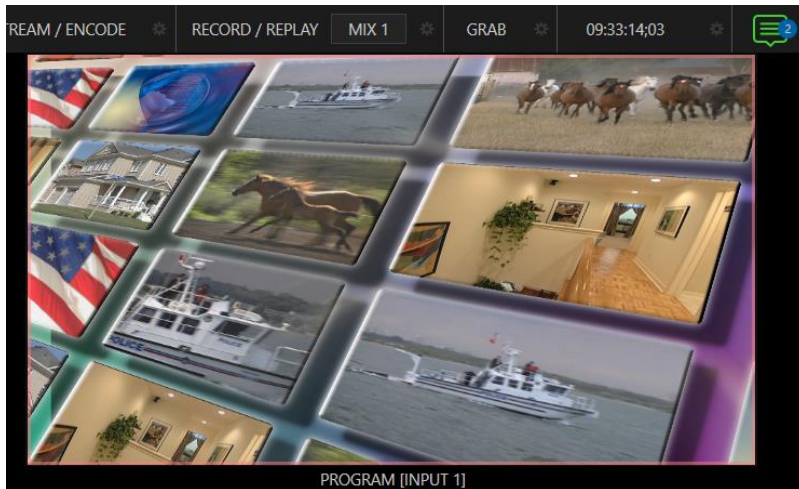
FIGURE 124

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. When you move your mouse pointer over the Program monitor, a Configure button (gear) appears at lower right. Clicking this button opens the Configuration panel (see Section 8.2).

SECTION 10.7 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.

FIGURE 125

- 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.

M/E PREVIEW AND PROGRAM

As mentioned earlier, monitor viewports can also be assigned to display the output of *M/Es*. Among other things, this means you can freely assign a monitor as a secondary 'program output monitor' in cases where you are using an *M/E* to supply an auxiliary program mix for independent display.

Viewports can be assigned to specific *M/Es*, or follow the delegate status (*Outputs >Follow>M/E Program*).
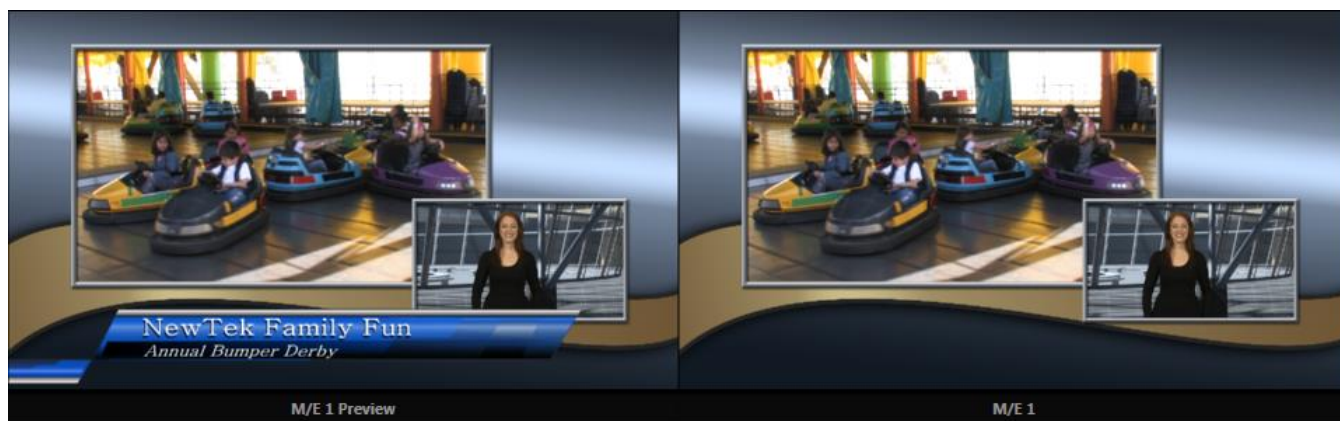
Complementing this feature, TriCaster provides *Look Ahead Preview* monitoring capability for *M/Es* as well (Figure 126). The *Viewport Options* menu group labeled *Follow* lists a special *M/E Preview* option for this purpose.

> *Hint: All viewports assigned as M/E Previews show output from the same M/E. Making an M/E delegate selection updates all viewports when Tabs Follow all Delegates is enabled.*

Just like the main *Look Ahead Preview*, the *M/E Preview* respects *Delegate* selections made in the *Transition* section of the assigned *M/E*, showing you the display that will result from the currently configured (*M/E*) *Take/Auto* operation.

Chapter 11 MEDIA PLAYERS & BUFFERS

Media Players permit you to integrate video, stills and title pages into your live presentation. Display media sequentially as a playlist, or on demand. 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

NewTek live production systems includes 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*.
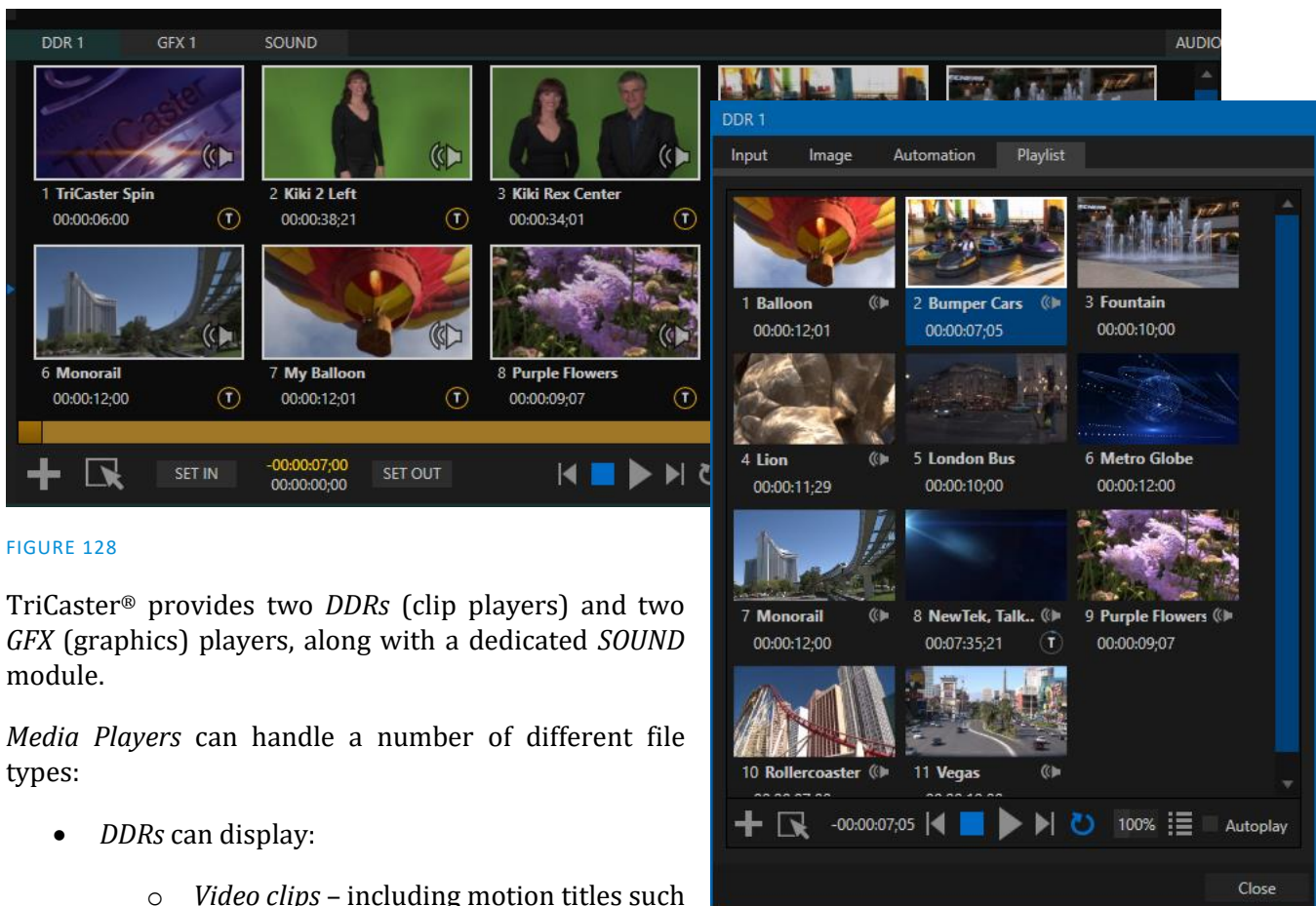
FIGURE 128

TriCaster® provides two *DDRs* (clip players) and two *GFX* (graphics) players, along with a dedicated *SOUND* module.

Media Players can handle a number of different file types:

- *DDRs* can display:

  o *Video clips* – including motion titles such as scrolls, and longer format 'movies'.

FIGURE 127

  o *Titles and still images* – editable title pages prepared using NewTek's integrated titling system, CG pages prepared as image files, or other still imagery – photos, graphics, etc.

o   Both the dedicated *Sound* player and the *DDRs* are able to play standard .wav or .mp3 format audio files.

Hint: DDR is short for "Digital Disk Recorder", a legacy term that – while deeply enshrined as a term referring to a playback system – is technically incorrect (since these DDRs don't directly support recording).

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.
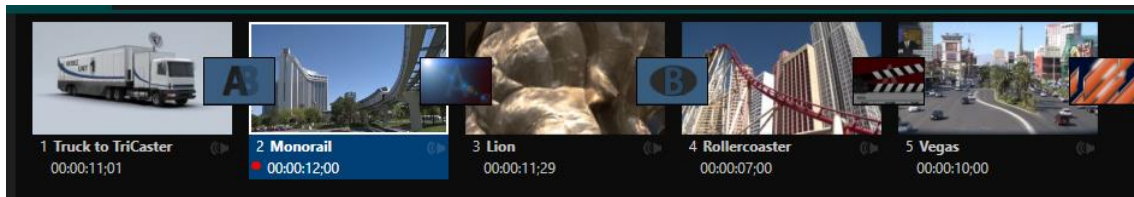
This arrangement offers easily visible thumbnail icons for each entry. A scrollbar at right accommodates long playlists when necessary. Icons in the playlist can be re-ordered quickly and easily using the familiar drag and drop workflow. The playlist can even be altered during playback (of course, if 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.

Hint: The duration shown is the play time after trimming, and thus may be less than the file length on disk. In such cases, the In and Out markers on the Scrub Bar (spanning the width of the playlist immediately below it) show the effect of trimming operations, while the full width of the Scrub Bar depicts the total length of the file on disk.

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.

* To enable multi-select mode for touch screen operations, click the *Multi-Select* mode arrow icon next to the *Add* + sign in the footer below the playlist (Figure 130).

Automatic Clip Trimming

Clips (but not stills, or titles, for reasons that will become apparent) added to 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).

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.

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

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 at left beneath the playlist pane to open a custom *Media Browser* (see Section 11.1.8). 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):

  - *Cut*
  - *Copy*
  - *Paste*
  - *Remove*
  - *Split at Current Frame*

  - *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.
  - *Duration*
  - *Speed*
  - *Use Current Frame as Icon*
  - *Angle*
  - *Automation*
  - *Edit Title*
  - *Properties*

  - *Transcode*

- *Add to Export Media* – see Section 18.3.
- *Send to > Buffer n* (Still image and title icons – see Section 11.3)

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

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

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

Most of the clip context menu items are self-explanatory, but let's talk about 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 AUTOMATION

We've discussed elsewhere in this Guide (Section 8.1.3) how you can assign macros to any *Switcher* source, including *Media Player*. Beyond this, though, the playlist context menu item *Automation* 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 executed 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.

Hint: You can use this capability, for example, to automatically show titles for certain types of clips and not others, give them different title page types, selectively adjust Proc Amps or apply LiveMatte keying automatically when needed for only certain 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 to a more suitable format.

To transcode the clip, click or tap the T gadget, or select the *Transcode* option in the clip's context menu. The process will proceed in the background, and the DDR's link to
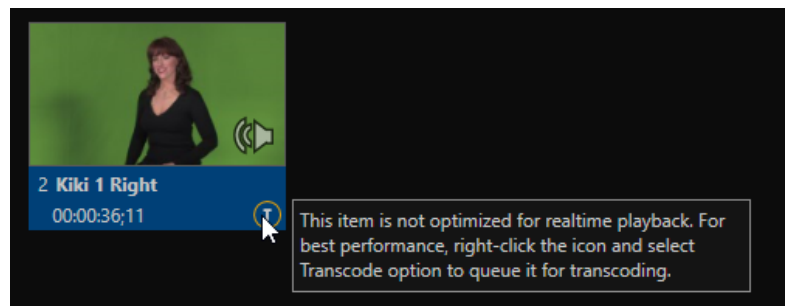
FIGURE 131

the original file will automatically be replaced when it is complete. Note that transcoding operations support multi-selection.

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 defaults 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.*
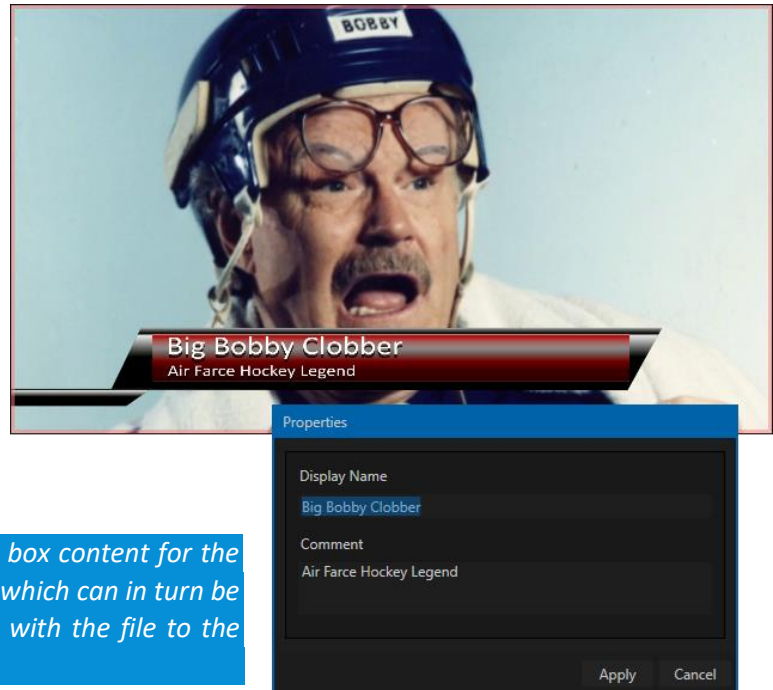
11.1.7 TRIMMING CLIPS AND THE SCRUB BAR

Just beneath the *playlist* pane is a full-width *Scrub-Bar* (Figure 133). 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.
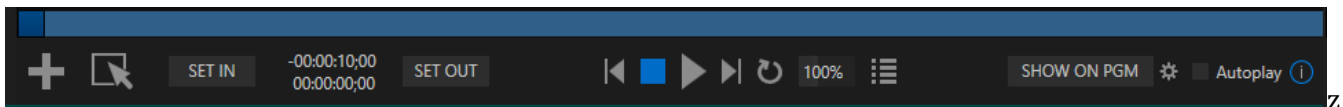
FIGURE 133

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 (Figure 133). 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.
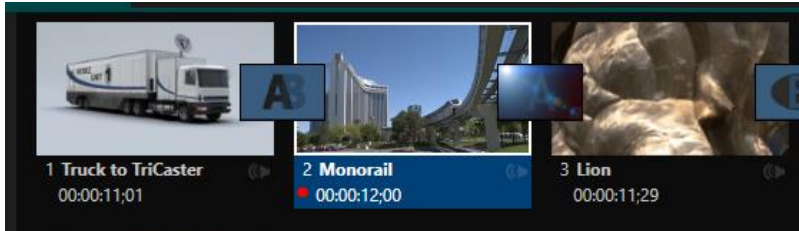
It's useful to note that QuickTime clips (only) that are still being captured continue to 'grow' even after addition to a DDR playlist (see Section 11.1.8). These growing clips, featuring the red 'recording' overlay (Figure 134) can be freely extended beyond the bounds of the 'in' and 'out' points they 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.

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.

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 begin playing the clip.

• (Of course, all of this could easily be performed by a macro, too.)

11.1.8 Media Browser
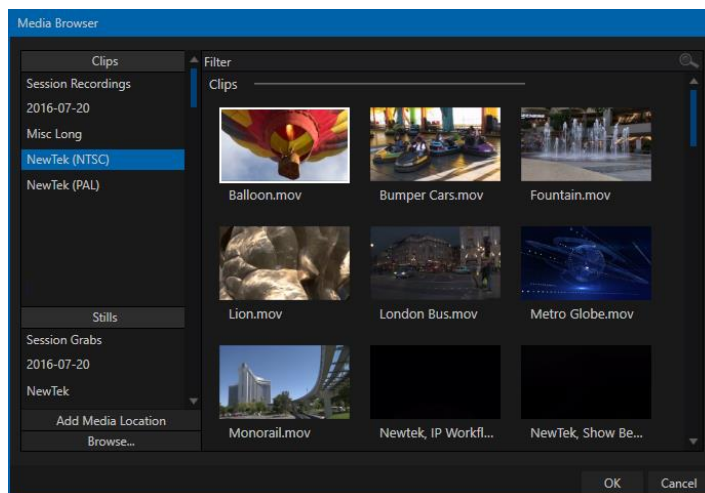
The custom *Media Browser* provides easy navigation and selection of content on your NewTek live production system or on the local network.

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 at 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.
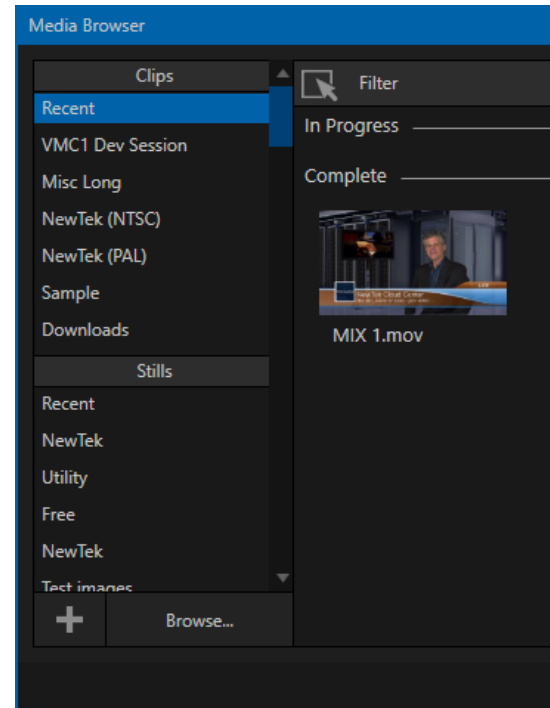
ADD MEDIA LOCATION & BROWSE

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).
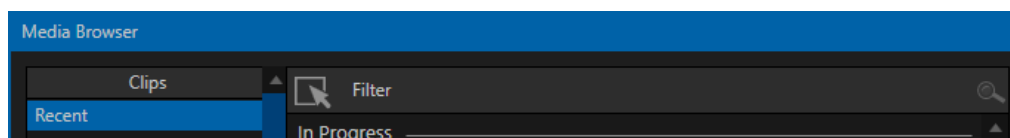
An additional filter appears above the *File Pane* (Figure 137). This filter quickly locates files matching criteria you enter, doing so even as you type. For example, if you enter "wav" into the filter field, the *File Pane* displays all content at the current location with that string as part of its filename. This would include any file with the extension ".wav" (WAVE audio file format), but also "wavingman.jpg" or "lightwave_render.avi".

> *Hint: The Multi-select arrow beside the Filter label work just like its sibling in the DDR footer.*

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.

11.1.9 Player Controls

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

FIGURE 138

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 provides 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
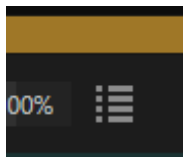
FIGURE 139

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 (Figure 139) 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

FIGURE 140

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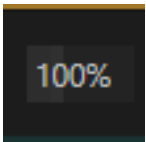
The *DDR* supports variable speed playback between 25% and 400% of the normal rate (100%). Speed can even be adjusted *during* playback.

> 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.

FIGURE 141

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 the 100% default.

LOOP

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

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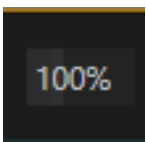
When enabled, the *Autoplay* switch has several important effects. First, it initiates playback automatically when the associated *Media Player* is placed on *Program Out* by a (Switcher) *Take* or *Transition* operation either directly (as a *Switcher* row selection) or *indirectly* – such as by being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

FIGURE 142

Second, if player output is displayed on *Program,* the reverse *Switcher transition* occurs automatically as the end of play approaches, whether at 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 14.2 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.

11.1.10 SHOW ON (…)

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

Labeled *SHOW ON PGM* by default, this feature can actually 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.
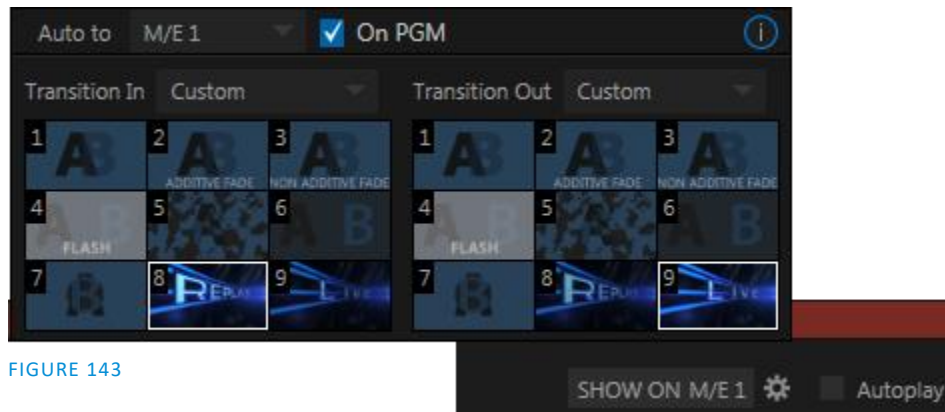
FIGURE 143

Click the configuration button (gear) beside the *SHOW ON* button to display the panel seen in Figure 143.

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.* Thus 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

Hint: Using complementary features in the IsoCorder Replay tab, SHOW ON functionality can be triggered by simply adding a clip (with custom length and speed defined in the Replay tab) from any source being captured to a DDR. Thus a single button click or numberpad key press can trigger all of this.

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.

11.1.11 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.

FIGURE 144

 MEM slots can be named, and 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 actually playing, rather than the one currently being *previewed* in the tab.
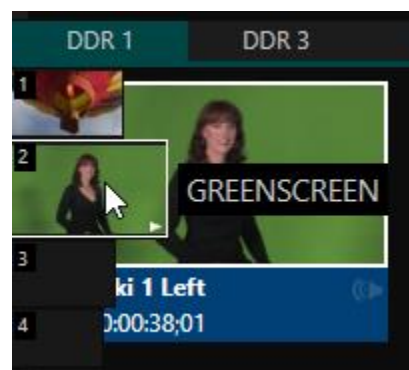
To change to the *previewed* MEM slot immediately – ending playback and display of the current item – you can do so by any of the following means:

- 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.

11.1.12 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
- DataLink Watch

Note: Several 'non-session dependent' locations in the main application folder are also shared. This allows applications such as NewTek's 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.

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.

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.

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 3Play™, LiveText™ and third party software, as well as any unrelated traffic on the network.

On mouse-over, title page icons display a text edit gadget in their lower-left corner (Figure 145).

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).
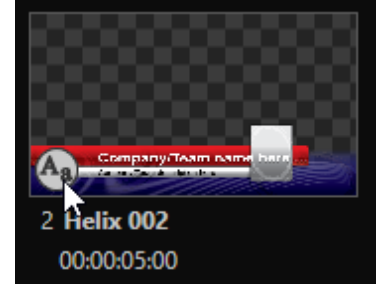
FIGURE 145

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 (Figure 146), indicating the text object is selected, and a text edit field opens.

Hint: When the box is yellow the text can be nudge 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).
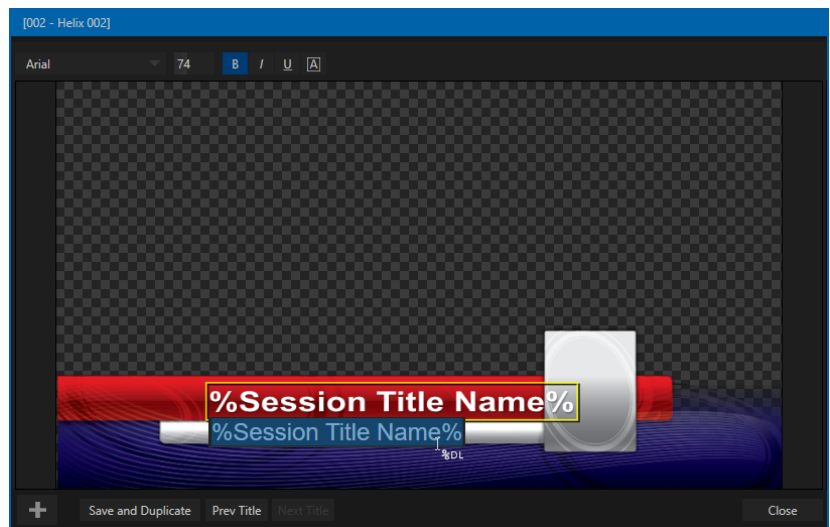
FIGURE 146

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
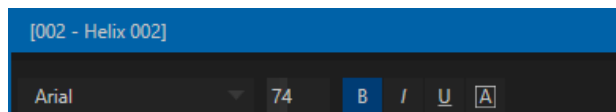
FIGURE 147

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.

FIGURE 148

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 + Shift + 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).
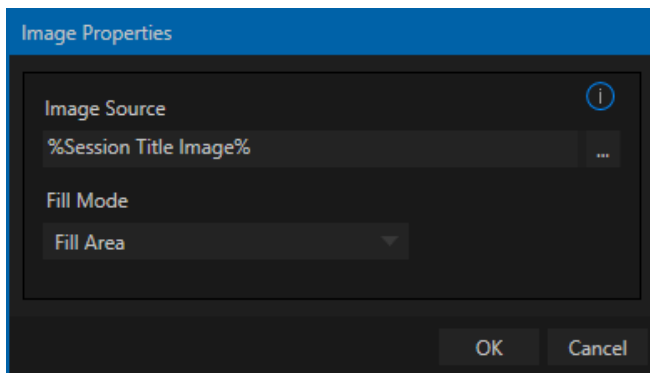
FIGURE 149

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 (Figure 149). 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*.
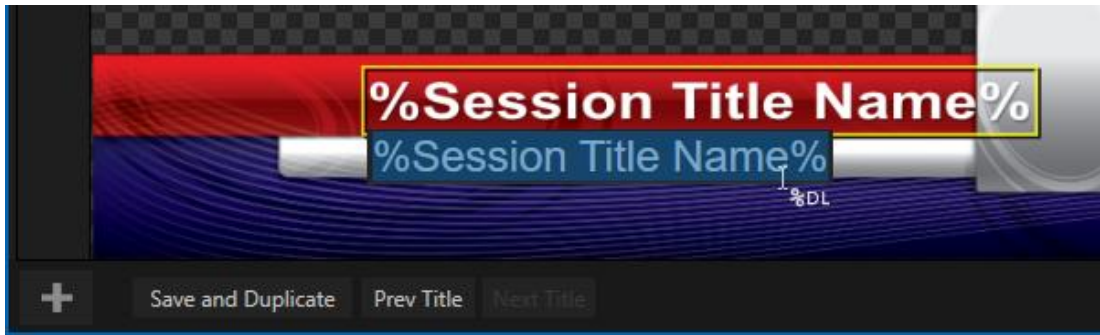
FIGURE 150

Since *DataLink* falls into the general realm of automation and also has access to external sources, complete coverage of its features and capabilities is found in the companion *Automation and Integration Guide* included with this product. We'll mention here, though, that both text and images on title pages accept *DataLink keys* as input.
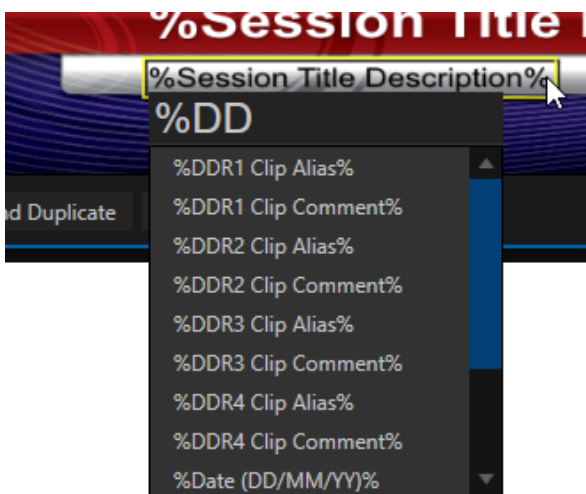
The Title Editor tells you which entry boxes accept *DataLink* keys by showing a custom mouse pointer, in the form %DL, as shown in Figure 150.

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 (Figure 151).

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.

FIGURE 151

There are endless uses for *DataLink*, and many ways to supply and update values assigned to *DataLink keys*.

For just one example, refer to the heading Configure DataLink Keys in Section 5.3.3. And 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.

SECTION 11.3 BUFFERS

The system's powerful *Buffer* implementation provides a large number of 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 (Figure 152) shows icons and controls for fifteen *Buffers*.
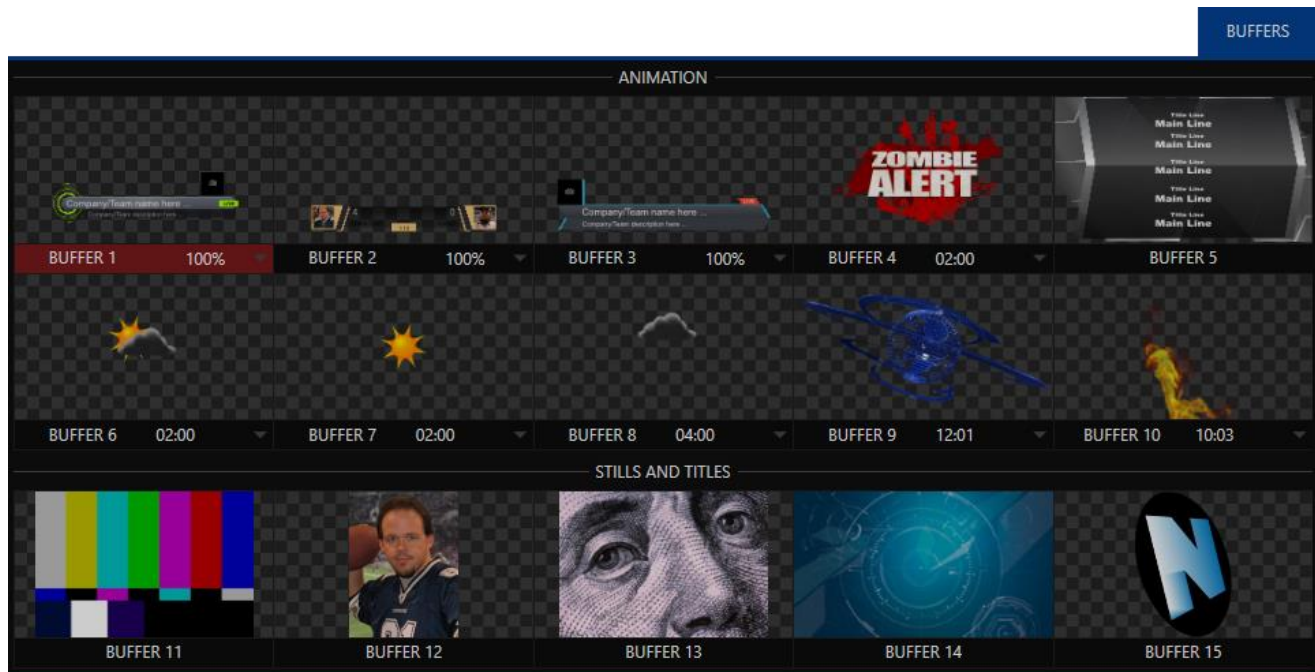
FIGURE 152

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.

   o *Looping* effects – These animations play repeating endlessly, making them ideal for station ID 'bugs' and the like.

   o *Auto-run* effects – These effects auto-run on display following a *Take* or *Auto*. Playback runs once and then holds the last frame.

- *Graphics*

   o *Images* – 24 bit or 32 bit (with embedded alpha channel) images.

   o *Title pages* – editable *title pages*, identical to those served up by the various *Media Players.*

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 and graphics, while the remaining five slots support still image files or title 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
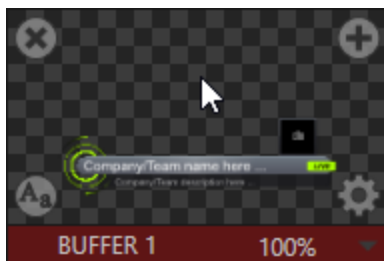
FIGURE 153

An *Add Media* [+] button appears at upper-right when you move the mouse over a *Buffer* icon. Click this to display the *Media Browser*, and then pick a suitable file to populate that *Buffer*.

Hint: 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:
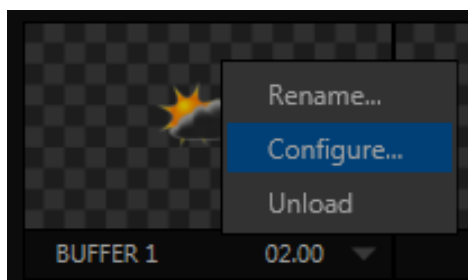
FIGURE 154

- *Rename* allows you to assign a custom name to the buffer. The name will also be visible in menus (such as DSK source menus).
- *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 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 determination is made in the *Animation Store Creator* utility when the effect is generated).

Loading either class of animation effect into a buffer results 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, a further control is added to the thumbnail icon when you move the cursor over it. The *Rehearse* button appears at the top-center (Figure 155). 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.

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

11.3.5 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 application (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. Actually, 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.

11.3.6 USING BUFFERS

Creative uses for buffers abound. You'll notice that the sample media content supplied with your system includes a number of 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*

  o *Program/Preview*) rows – all 15 buffers are directly accessible in the *Switcher*

  o *DSK* channels – choose a specific *buffer* using the *DSK's* drop-down source menu.

- *M/E banks*

  o Select a *Buffer* on an *M/E* row just as you would for the main *Switcher*.

  o *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, layering possibilities are nearly endless.

11.3.7 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.

11.3.8 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 (AA) 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.
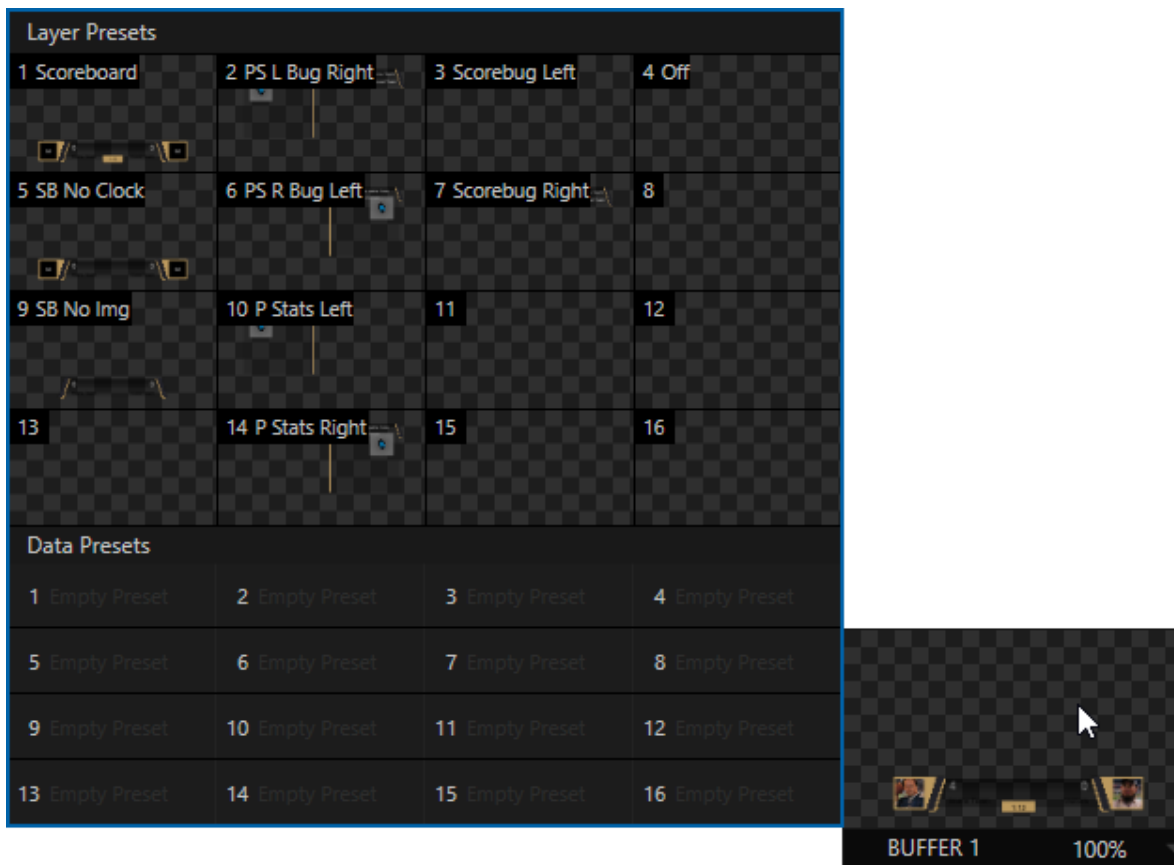
FIGURE 156

Hint: When the Buffer contains a layered title page created from a PSD file, a set of thumbnail icons depicting Layer Presets is also shown. Selecting a preset allows you to dynamically change from the current layer display state to another – see Figure 156.

Chapter 12 PTZ CONTROL

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

Any external *Switcher* input can be configured as a PTZ cam, controlled directly from the *Live Desktop* or using a NewTek™ control surface.

In addition to pan, tilt and zoom control, you can control *White Balance* settings, *Focus*, *Iris* (or 'brightness'), and *Animation Speed* ('travel speed') settings for your PTZ cameras. A convenient and very visual *PTZ preset* system is included, too, allowing you to 'lock in' your shots and access them quickly.

SECTION 12.1 INPUT CONFIGURATION, PTZ TAB
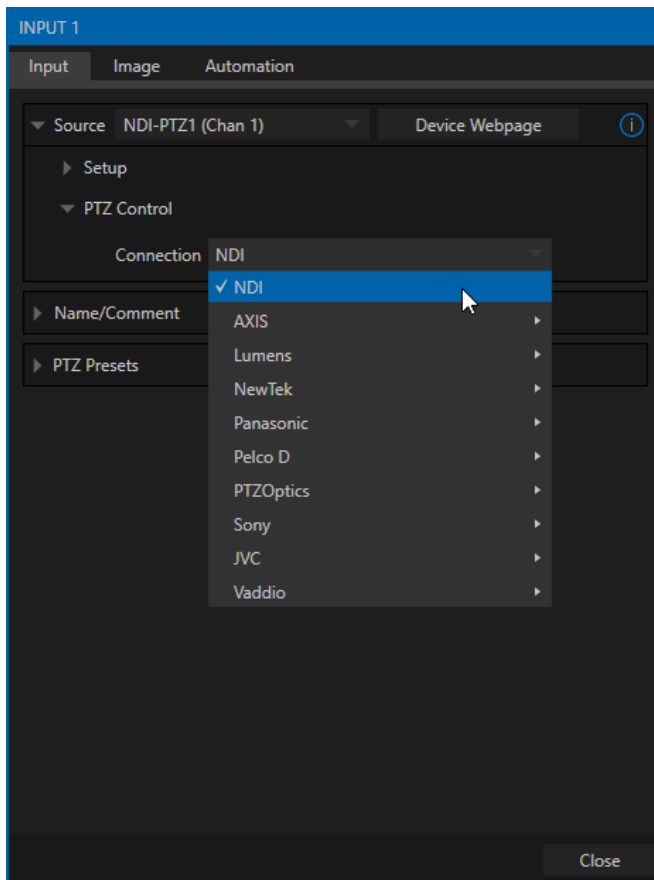
FIGURE 157
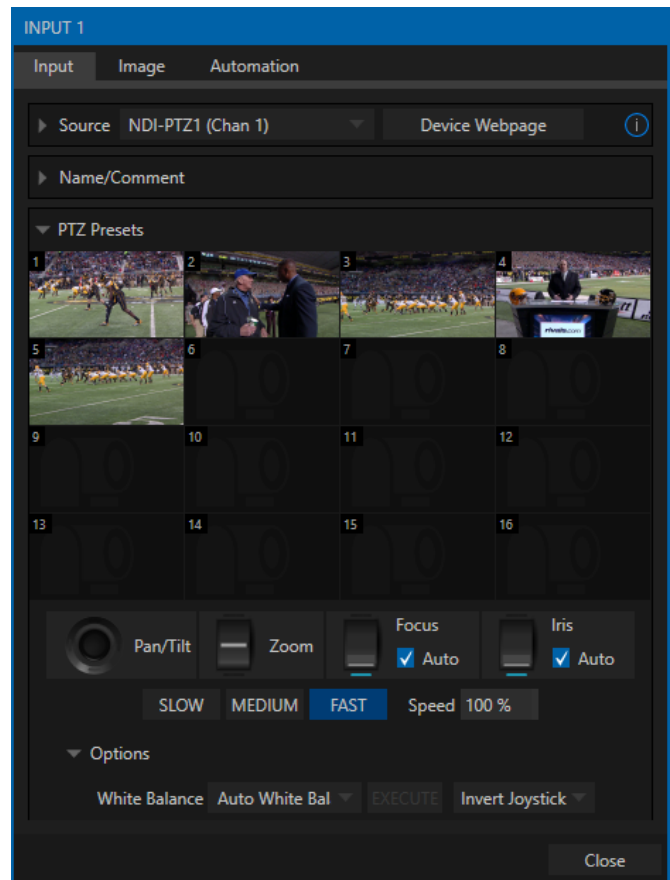
FIGURE 158

All of the controls and features just mentioned are located in the *Input Configuration* panel, specifically its first tab, which is labeled simply *Input* (Figure 157 and Figure 158).

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 of the settings you would otherwise need to configure.
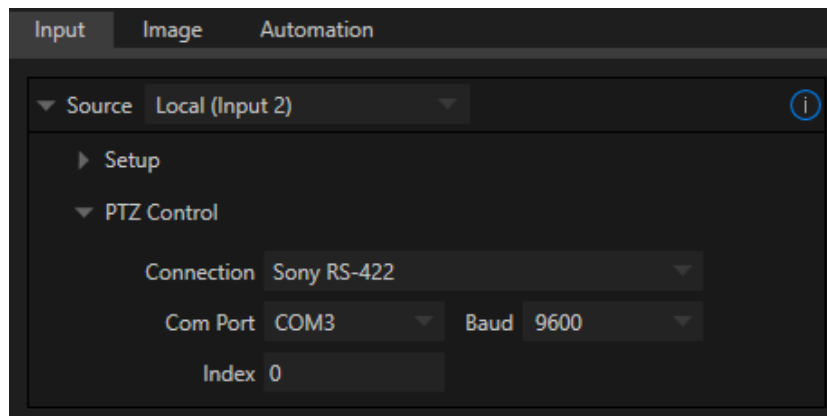
FIGURE 159

   o For non-*NDI* sources, use the *Connection* menu to choose the correct PTZ protocol for your device, and continue to 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 same panel, discussed next.

12.1.2 PTZ OPERATIONS

In this group, a set of manual *Pan/Tilt, Zoom, Focus* and *Iris* controls sits just beneath a large *PTZ Preset* 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.
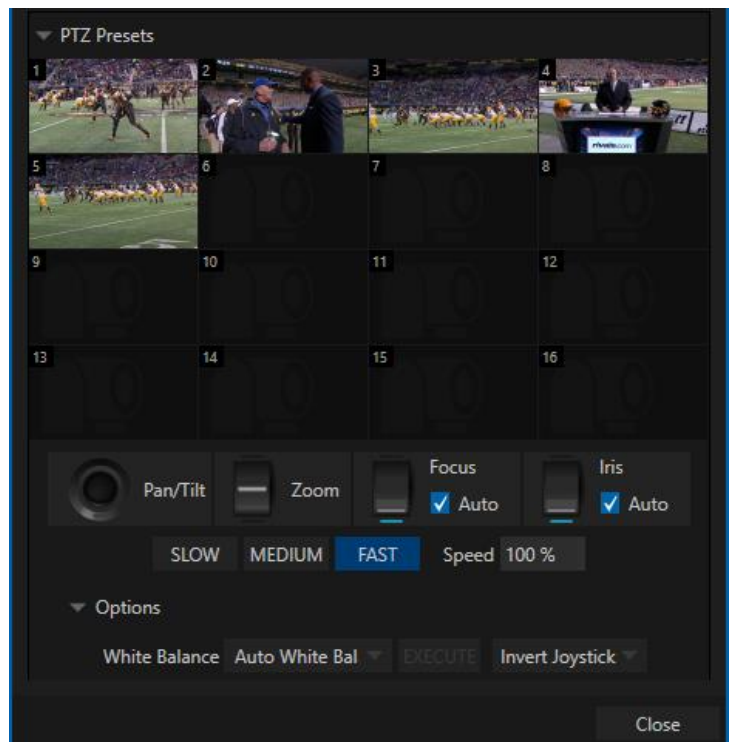
FIGURE 160
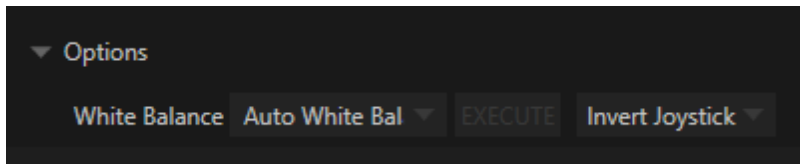
FIGURE 161

Expand the *Options* control below the PTZ speed group to access *White Balance* options (which may vary based on the camera model connected) and 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 surfaces.

12.1.3 PRESETS

The large *Preset Bin* (above the *Camera Bin*) shows sixteen thumbnail icons for the currently selected *PTZ camera*.   Click a preset to select it, and the camera automatically begins moving to the new position.

FIGURE 162

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.)

12.1.4 PTZ AND THE CONTROL SURFACE

Pan, tilt, zoom control, and preset selection for connected robotic cameras are also directly supported on some NewTek hardware control surfaces. See Chapter 21 for details.

Chapter 13 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*™.

FIGURE 163

LiveMatte™ controls are located 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 of the details; suffice to say it works very well, and is easy to configure.)
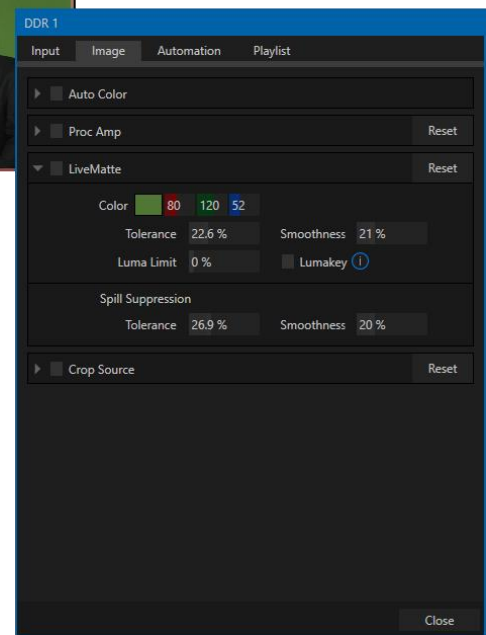
Hint: Crop controls in the Input Settings tab can serve as a 'garbage matte' tool for chromakey sources.

SECTION 13.1 UNDERSTANDING KEYING

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.

FIGURE 164

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.

<div align="center">SECTION 13.2 MATTE</div>

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.

13.2.1 COLOR

Initially, *LiveMatte* removes a specific color from the foreground image. This color is chosen using the *Color* button.

FIGURE 166

To choose this key color, click on the *Color* sample box and keep the mouse button depressed. Drag the *eyedropper* tool over one of the video monitors to choose the color you wish to *remove* and then release it. The neighboring 'color well' is updated to show the color selected.
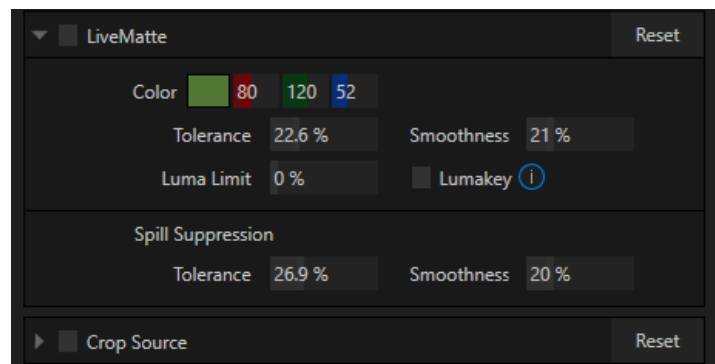
> *Hint: Enable the Lumakey switch to disregard hue, and base the effect solely on luminance.*

13.2.2 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, *LiveMatte* supplies a numeric slider labeled *Tolerance j*ust beneath the *Color* picker.

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.

13.2.3 SMOOTHNESS

Smoothness defines a further tolerance factor, and a very useful one. 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'.

13.2.4 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.

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.

SECTION 13.3 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.
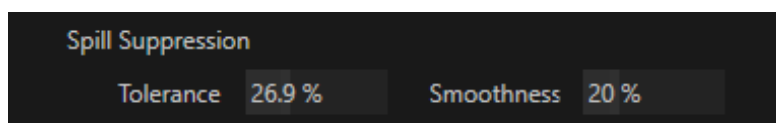
FIGURE 167

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 under *Spill Suppression* in similar fashion to the controls by the same name discussed earlier. Endeavor to subdue spill without *overdoing* it, which could result in an unsightly gray fringe around offending edges of your foreground.

SECTION 13.4 COMPOSITING

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.

SECTION 13.5 FINE TUNING

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 fairly 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.

SECTION 13.6 LIGHTING FOR LIVEMATTE

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 diffuse. 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.

Second, the distance from your talent to the screen behind can make a profound difference in key quality. When the subject stands too close to the key colored background, the key color reflects back 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).

CROP SOURCE
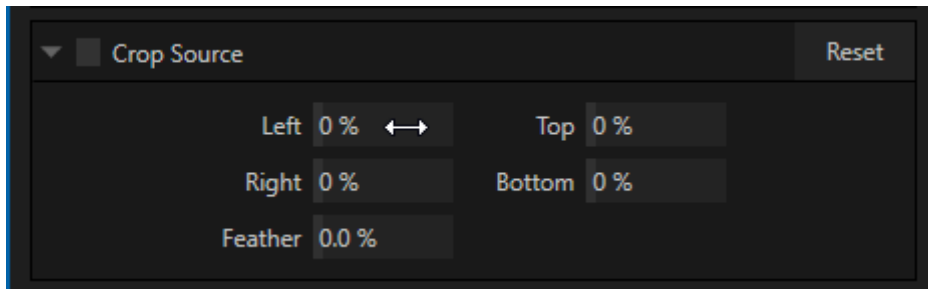
FIGURE 168

We discussed this feature back in Section 8.1.2, 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 14 MIX/EFFECT (M/E) TOOLS

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 NewTek's real-time virtual set technology, called LiveSet™, is applied.

We introduced *M/Es* (Mix/Effect banks) way back in Section 2.5.8, but it's time for us to look into these extremely powerful tools in greater depth.

SECTION 14.1 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*.
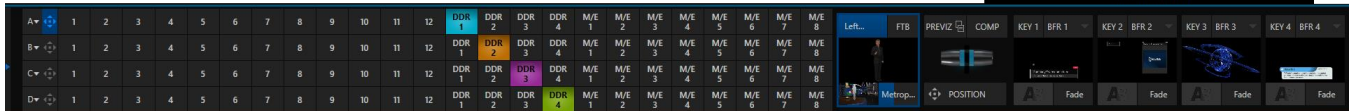
FIGURE 169

*M/E*s are presented individually in tabbed panes, each corresponding to a button in the main *Switcher.*

> Note: The number of M/Es available and the number of layers each supports varies by model.

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.

TriCaster 8000 and TriCaster 460 *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 .

SECTION 14.2 M/E MODES

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* actually 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 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*.
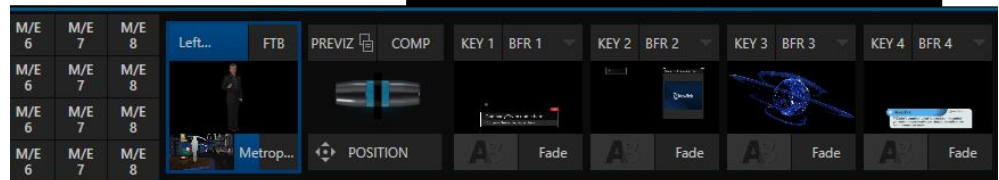
FIGURE 170

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* through (B or *D*) are arranged at left.
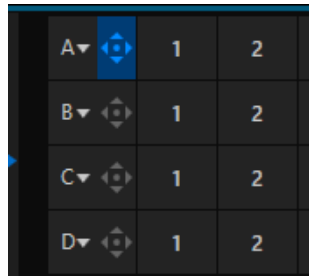
    FIGURE 171

    The number of layers shown varies according the effect selection you make, from two effect layers to four (number also varies by model.

*   At right are either two or four *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 point regarding an *M/E* in *Mix* mode and the main *Switcher* involves the *Autoplay* feature (see Section 11.1.9).

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 '*Auto* out' transitions.

14.2.1 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
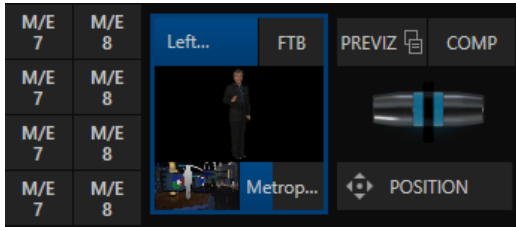
FIGURE 172

Even casual scrutiny reveals some (outwardly) subtle differences in the *M/E* control configuration when a *LiveSet* is loaded as the *Background* effect selection (Figure 172), as follows:

- The *Take/Auto* buttons located beneath the *T-bar* and *Transition icon* are replaced by a *Position* button.
- As required, as many as 4 input rows (*A, B, C*, and *D*) 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 realtime compositing and effects prowess more aggressively.

SECTION 14.3 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.

Hint: The maximum duration for an animated zoom is 30 seconds.

SECTION 14.4 INPUT POSITION CONTROLS

FIGURE 173

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 in Section 9.7.1.

SECTION 14.5 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 at left. With the exception of *Advanced Tracking* effects, 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 at partially transparent, the source assigned to input *B* is blended into the *M/E* background layer, and so on.

> *Hint: Don't overlook the fact that the input Position controls, including Borders, let you create very elaborate compositions even with these 'simple' compositing effects.*

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.

ADVANCED TRACKER

As we mentioned, effects can be 'simple' compositing effects, like most of the *Default* group, or more advanced. Before considering NewTek's virtual set system (a.k.a, LiveSet™), let's talk about some of the other effect types. Effects can vary widely in their types, from relatively simple utilities effects to image processing and advanced compositing effects.
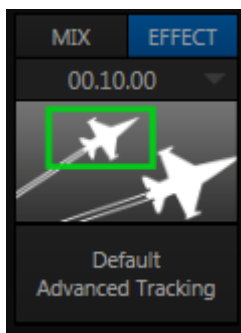
FIGURE 174

For example, we mentioned that one member of the Default group is unique.

The *Advanced Tracking* effect (TriCaster 8000 and 460 only) takes three video sources as input to produce a result that would otherwise require the use of an additional *M/E*.

Set up this effect as follows:

1. Click the label above the *Effect* icon, and use the *Media Browser* to select the *Advanced Tracking* effect from the *Default* group.

2. Add the clip named *Tracking Example.mov* (NewTek>Green Screen group) to the playlist for *DDR 1*.

3. Enable *Loop* mode for *DDR 1*.

4. Add the clip named "*Bumper Cars.mov*" (NewTek>Clips group) to *DDR 2*, set it to *Loop* as well.

5. Add an attractive full frame graphic to the *DDR 3* player.

6. Select *M/E 1* on the main Switcher's *Program* row, to make it easy to view the result of the following steps.

7. In the *M/E 1* tab, select *DDR 1* on the input *A* row.

8. Select *DDR 2* as input *B*.

9. Select *DDR 3* as input *C.*

10. Double-click the monitor for *DDR 1* to open its *Input Configuration* panel.

11. Continue to configure both *LiveMatte* and the *Tracker* for the video clip in *DDR 1*:

12. In the *LiveMatte* tab, click *Reset* to update the keyer settings to their defaults, and enable the *LiveMatte* switch at upper-left.

13. Use the *Scrub* bar under the playlist in *DDR 1* to advance through the clip until the colored card is visible in the frame.

14. Switch to the *Tracker* tab, click the *Color* picker (eyedropper) keep the mouse button held down, and drag the pointer over the color card and release to assign that color to the *Tracker* for *DDR 1*.

15. Boost the *Tolerance* setting to 34%.

16. Press *Play* for both *DDRs.*

Let's take a moment to review our progress, before completing setup steps:

On the *Program* monitor, you should see the talent clip overlaid on the image from *DDR 3* (*LiveMatte* is turning the green pixels in the *DDR 1* clip transparent). You'll also see imagery from *DDR 2* displayed wherever the (originally) orange card appears in the frame.

What's happening is that the *Advanced Tracking* effect is applying the values from the (DDR 1) *Tracker* for a secondary iteration of *LiveMatte.* Our *LiveMatte* settings cut away the green, revealing the *C* layer behind. Afterward, the orange color range is also keyed out, revealing the *B* source through the transparent region.

Up to this point, the effect takes advantage of the *Tracker* color values, applying them as a secondary keyer – but we haven't yet done anything with the actual *motion data* the *Tracker* is supplying. Let's do so now.

17. Click the *Position* button for input *B* to open the *Position Panel* for that layer.

18. Select *DDR 1* in the *Use source Tracker* menu.
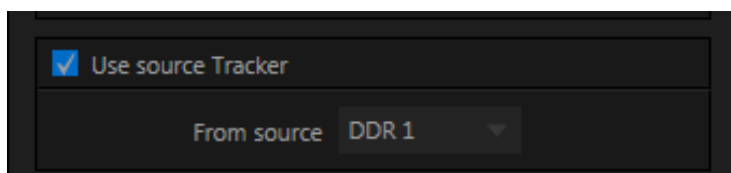
19. Enable *Follow Tracker* (Figure 175).

The result on your *Program* monitor should look much like Figure 176; full motion video appears wherever the orange card appears in the foreground clip. This is the standard setup for the *Advanced Tracking* effect, though it's possible to use it in different ways too.

Further Notes: Advanced Tracker 2 provides much improved compositing. (The original effect is provided for legacy purposes, but might also produce a better result in rare cases where a source has embedded transparency). Among other benefits, the newer effect performs spill suppression at the edges of the tracked region. Using the size (etc.) parameters of the tracker, the region being tracked can be made slightly larger to taste, to moderate this effect.

FIGURE 176

Now would be a good time to test the effect of the *Scale*, *Rotation,* and *Aspect* controls in the *Tracker* tab for *DDR 1* (remember you can double-click the *DDR 1* monitor to open this panel).

UTILITIES

FIGURE 177
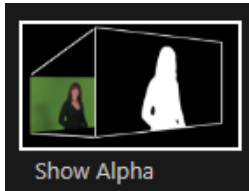
Effects can take other forms as well. We've looked into the *Default* effects group; now let's consider *Utility* effects.

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).

FIGURE 178

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.
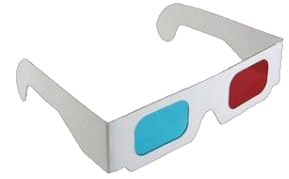
In turn, this combined stream resolves into 3D when viewed through special glasses with red and cyan (blue-green) filters for left and right eyes respectively.

VLC1 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 surface operations are required.

PHOTOSHOP BLEND

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 14.6 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.

FIGURE 179   FIGURE 180

LiveSet is one of TriCaster's most powerful tools, and can dramatically enhance a production.

With it you can achieve the look of a large, sophisticated studio setting (Figure 180) within a very small studio space (Figure 179), 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 14.2.2). 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 11.1.8).
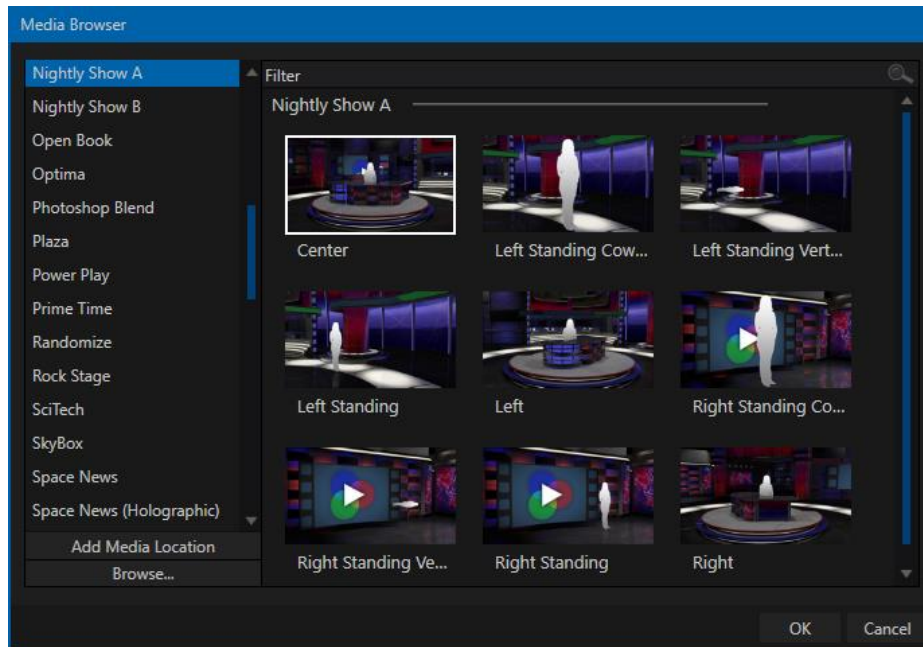
The *Location List* of the *Media Browser* lists any installed *LiveSet* groups under the heading "LiveSets". Select an entry beneath to show thumbnail icons in the Browser's *File Pane* (Figure 181 shows the content of the *NewTek* location under the *LiveSets* heading).

INPUT POSITION

FIGURE 182

We discussed *Positioning* controls for *M/E* video inputs previously (Section 14.4). 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 provided especially to make it easier for you to adjust cameras and position talent on your physical set to suit the design of typical virtual sets supplied with VLC1.*

14.6.1 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.

> *Hint: New holographic effects, like standard LiveSets, can be created using the optional Virtual Set Editor application. A demo version of this utility is installed on your system, and its instruction manual can be located in Startup>Help.*

SECTION 14.7 KEY CHANNELS
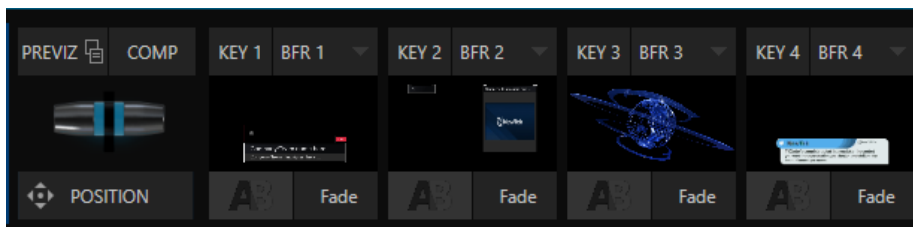
In *most* respects, the (two or four, by model) *KEY* channels in *M/E* panes match the *DSK* channels found in the *Switcher's* main *Transition* section. Unlike *DSKs*, though, they constitute a 'pre-main *Switcher*' sub-layer.

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.

14.7.1 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*.

14.7.2 AUGMENTED REALITY
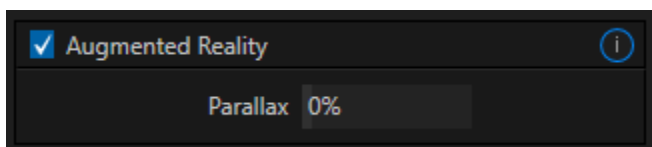
FIGURE 185

In one other unique and powerful departure from *DSK* features, the *Positioner* for *KEY* layers has an added feature labeled *Augmented Reality* (Figure 185).

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.

FIGURE 186

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 (Figure 186).

  (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 exactly 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 and 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.

Finally, note that the *Tracker* feature can also be used along with *Augmented Reality* and *Parallax* to produce uniquely dynamic motion graphic compositions.

SECTION 14.8 COMPS
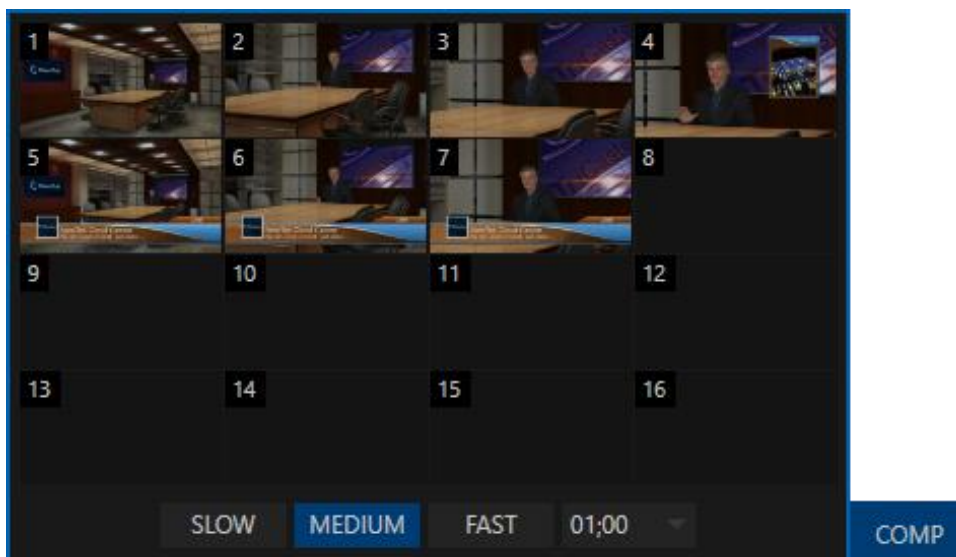
FIGURE 187

Different 'virtual camera' positions, along with other *M/E* attributes, can be stored in the *Comp Bin* associated with each *M/E* (TriCaster 8000 and 460 only).

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.

14.8.1 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 (Figure 188) or by right-clicking the icon and selecting *Update* in the context menu that appears (Figure 189).
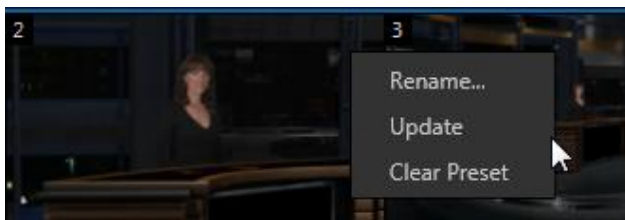
The context menu also allows you to *Rename* a *Comp*, or clear it entirely.

14.8.2 ANIMATION

Making a selection in a *Comp Bin* changes the current composition of layers displayed by the module to the new one. The change can be immediate, or animated over time. This is controlled by the duration set for individual layers in the numeric control below the thumbnail monitor for each layer.

> *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*.
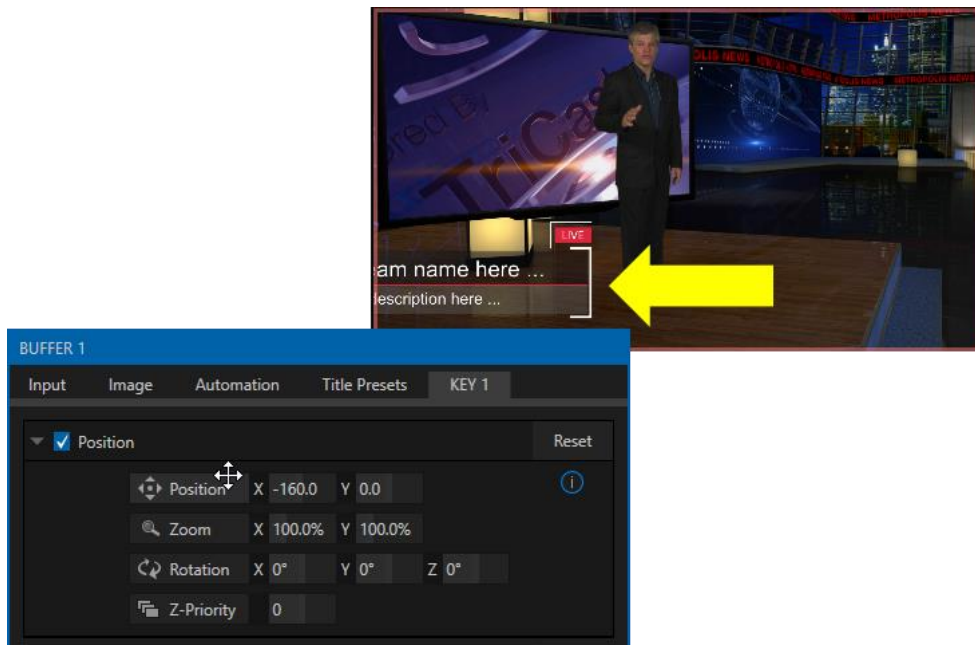
The result is that *KEY 1* will animate in and out according to the state stored in each *Comp*.

Better yet, *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*.

TIMING

The duration of the animation from the current state/position layers in a Comp to new states stored in a *Comp* is controlled by the *Speed* controls supplied in the footer of the *Comp Bin*.

Note: The effect duration for individual layers is <u>not</u> stored in Comps. Rather, any animation is governed by the current Speed setting.

Less than 100 years ago, movies were silent. We've come a very long way since "The Jazz Singer" (1927, Warner Bros.), and great audio now plays a huge role in video production. NewTek 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 back in Sections 3.5.1 and 3.8.1. 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 also audio outputs as follows, from left to right:

- *External* audio sources

    o   Controls for external audio *INPUTS*.

- *Internal* sources – *Media Players*, and *Effects* (sound embedded in *Animation Store* transitions).

- *Stream* – controls streaming output to the web.

- *Aux 1 to 3* – controls for *Aux* audio busses.

- *Phones* – volume control for the system's headphone output.

- *Master* – controls the primary audio bus.

- Level controls for each recorder are located in the *Record Configuration* panel.

NOTE: The system's backplane or faceplate, depending on the model, hosts analog output connections.

SECTION 15.1 AUDIO SPECIFICATIONS

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 15.2 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 (when present).

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 15.5.2 for more information on this feature.)

SECTION 15.3 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 (Figure 192) offering three options as follows:

FIGURE 192

- *dBVU* – most familiar to users of typical analog audio mixers

- *dBFS* – dB 'Full Scale' – the digital standard; see the heading Audio Headroom in Section 3.13

- *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)
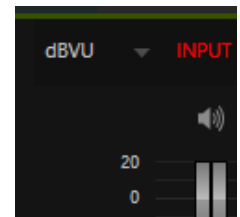
SECTION 15.4 EXTERNAL SOURCES

Columns in the first set of control groups are numbered as *Input 1-(8 or 12, by model).* Each of these can be assigned to any available audio source – whether analog (line level) sound supplied to rear panel connectors, SDI embedded audio from one of the four SDI 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 15.8). 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.
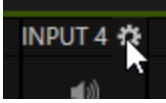
FIGURE 193

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.
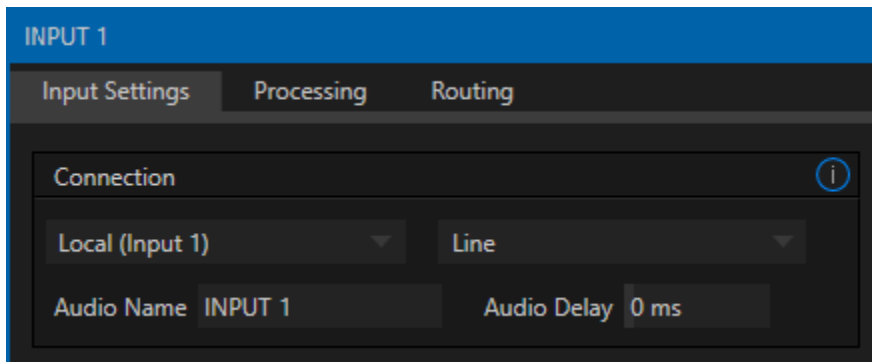
FIGURE 194

- *Local*

  o Physical inputs are listed as *Input 1-4*. These sources may support two connection types, as determined by a menu at right in the same group. They default to *Line* level analog audio from the same numbered audio jack. The alternative is *Embedded*, which is the correct setting for audio included with an SDI video connection.

  o Dante sources (network audio from systems supporting this protocol from Audinate™).

  o The (pink) *Mic* level analog input on the motherboard.

- *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.

SECTION 15.5 COMMON CONTROLS

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

15.5.1 MUTE

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

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

One important exception to *Mute* operation involves recording. The IsoCorder™ feature lets you capture any of the MIX 1-4 a/v outputs (i.e., the four primary 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*.

15.5.2 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.

AUDITIONING AN AUDIO SOURCE

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 15.6 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.

15.6.1 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.

15.6.2 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 15.7, but before we do so, let's drill further down into more advanced audio options and tools.

SECTION 15.7 OUTPUT AND PRIMARY BUS CONTROLS

As has been discussed, the *Mixer* supports four primary audio busses – *MASTER* and *AUX 1-3*. 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 of 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:

Actually, 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 actually a 'send' that adds sound to a 'Solo bus'.

Likewise, the IsoCorder™ module (on supporting models) permits discrete recording from the unmodified audio input associated with any single video source; this constitutes up to eight additional audio busses.

15.7.1 HEADROOM NOTES

FIGURE 195

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, as seen in Figure 195.*

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, by all means go as high as necessary – but it's equally practical to go no higher than necessary.

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

15.7.2 STREAM

Level controls for the stereo audio that accompanies *Streaming* outputs are provided in the *Output Configuration* panel (see Section 8.2).

SECTION 15.8 ADVANCED CONFIGURATION

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

The familiar 'gear' icon opens the 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 (Figure 196) offers many more important features and controls, however. Let's explore these now.

15.8.1 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.
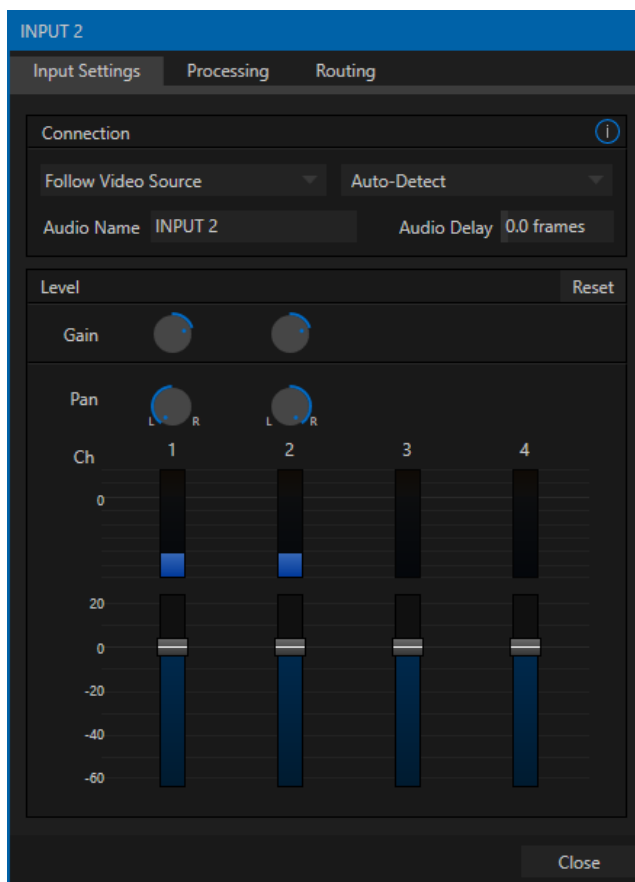
FIGURE 196

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 actually leading the digital output by a meaningful measure.*

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* knob labeled 1 splits the sound from *Input 1* equally onto *channels 1* and *2*.

- Sliding *Pan* for *channel 1* all the way to the right results in that source only being audible on *channel 2*, removing it completely from its original channel.

Pan also modulates the sound levels on the left and right channels so that the overall volume neither rises nor drops as a result of adjustments.

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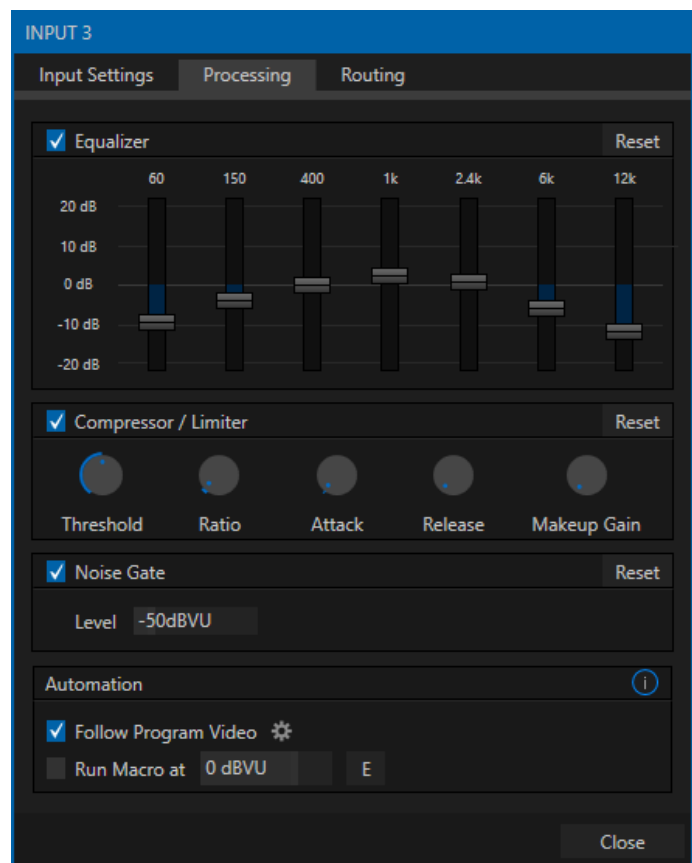
15.8.2 PROCESSING TAB

The second tab in *Audio Configuration* is named *Processing*, and likewise holds very valuable features.

FIGURE 197

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* is capable of preventing clipping (see Section 15.7.1) 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 manner in which it is applied are both dictated by the other settings.

RATIO

A *Ratio* of 4:1 means that if input level is 4 dB over the threshold, the output signal level after compression will be just 1 dB over the threshold. The gain (level) is reduced by 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 (with the exception of a brief period during a sudden increase in source loudness, as dictated by the *Attack* setting).

ATTACK

Attack (like Release) is labeled in milliseconds. The setting represents the amount of time it takes for the gain to change by a specified amount.

> 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'.

It would not be grossly incorrect to think of this setting as changing the slope of a graph depicting how aggressively the compressor pursues the target value (defined by applying the *Ratio* setting to the amount the signal surpasses the *Threshold*).

Shorter values are more aggressive, while longer values are more subtle (and tend to be less noticeable to the audience).

RELEASE

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

GAIN

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.*

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.

AUTOMATION

Several different per-input 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.

FIGURE 198

Audio for sources with *Follow Program video* enabled in the *Audio Configuration* panel is automatically removed from mixed outputs until one or more specified video sources are actually displayed on *Program Output*.
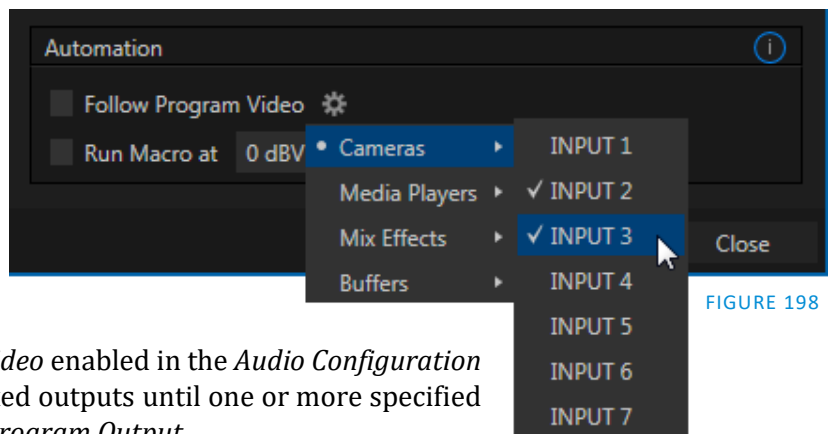
> *Hint: When the corresponding video source is not displayed on output, the audio source's VU meter level is displayed as a grayscale.*

RUN MACRO AT

The nearby *Run Macro at* (value in dB VU) is part of the *Audio Mixer's* powerful automation toolset. Click the *E* (Event) button to assign macros to run when the sound level for the input passes the threshold audio level (transients such as a brief cough are filtered out).

In this manner you could, for example, automatically perform a 'hands-free' camera switch to show someone who begins speaking, and then automatically switch back again when he stops.

15.8.3 ROUTING TAB

A main tab labeled *Routing* appears in the *Configuration* panel for all sources (Figure 199). 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 talk about what an audio bus is and how it is useful 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 from 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*

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.

FIGURE 199)

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.

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* 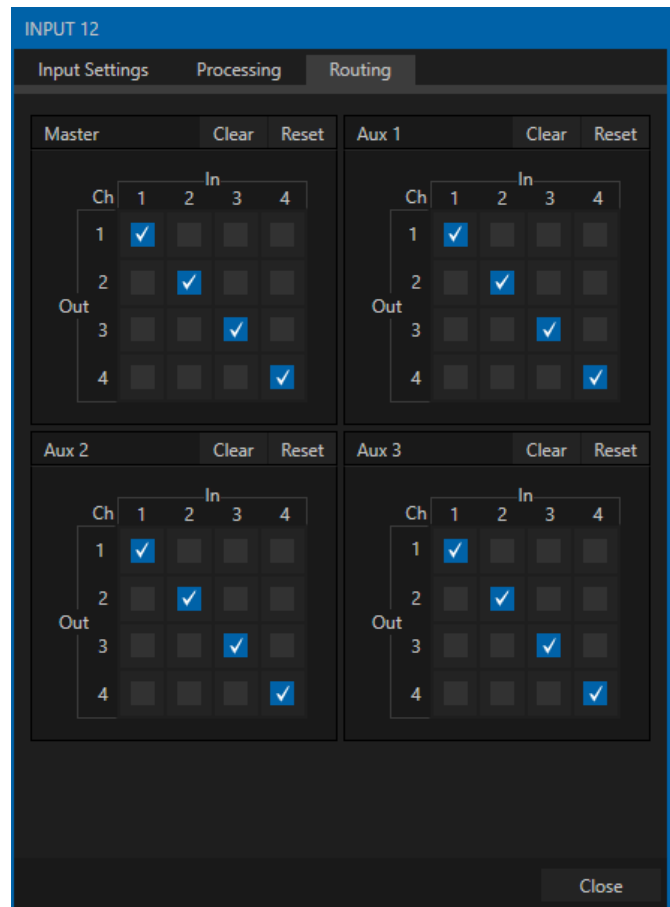player) to a secondary distribution system. Alternatively, you may want a 'clean' output from one or more sources for use apart from the main primary output mix.

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. Needless to say, this would be confusing and undesirable.

Suppose your interviewer is speaking into a microphone connected to channel 1 of *Input 1*. The audio from your interviewee is routed into *Channel 2*. You could easily supply both to your *Master* bus for your program output needs, but remove channel 1 from *Aux 1*, and remove channel 2 from *Aux 2* to provide mix minuses to send back to the interviewee.

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.

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. Or you may want a 'clean' output from one or more sources use apart from the main 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. Needless to say, this would be confusing and undesirable.

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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 4x4 matrix routing panels for each input, allowing for more sophisticated mixes than the example above. TriCaster supports 4 channel NDI output, so it's actually possible to route a

unique mono mix-minus on each channel for a single Aux bus. A single NDI output can thus provide all of the mix-minus needs for a TalkShow VS4000 system.

Let's consider a simpler example – configuring unique mix minus audio for return to a single VS4000.

The example assumes that you have assigned *Switcher* inputs 13-16 to receive the four 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 four 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 13*.

- Access the *Routing* tab, and click the *Clear* button above the *Aux 1* routing matrix.
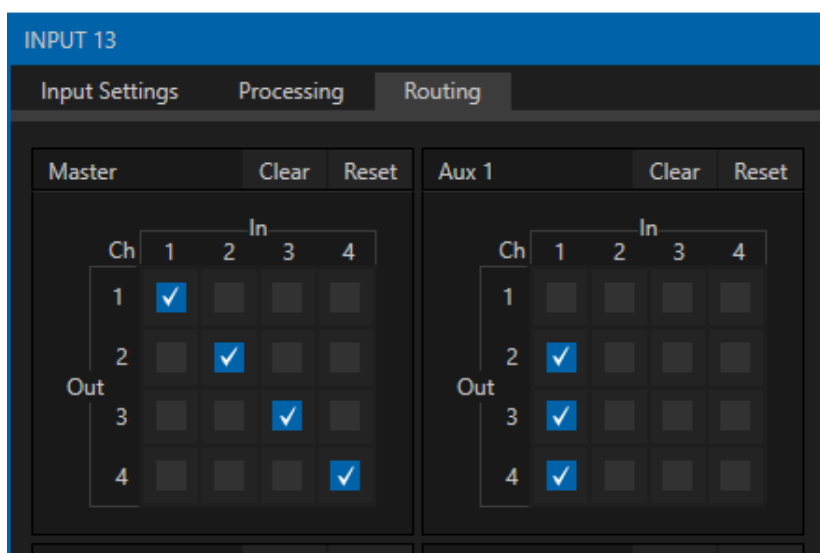
FIGURE 200

- Checkmark channels 2, 3 and 4 in the column below *In* 1 (see Figure 200). This routes sound from the first incoming Skype caller to all *Aux 1* output channels *except* channel 1.

- Open the audio configuration pane *Input 14* and, in the *Routing* tab, clear the *Aux 1* matrix.

- This time, checkmark channels 1, 3 and 4 in the column below *In 1*. This routes sound from the second incoming Skype caller to all *Aux 1* output channels *except* channel 2.

- Repeat the steps above for audio inputs 15 and 16, omitting the *Aux 1* checkmarks under *In 1* for channels 3 and 4, respectively.

That's it – you've got the perfect mix minus configuration for return to your four Skype callers. All you need to do now is finish up by configuring the TalkShow returns on the VS4000 system.
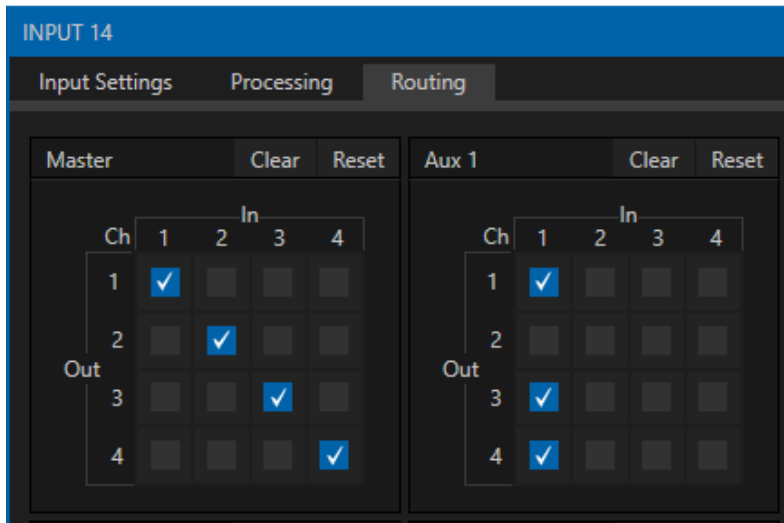
FIGURE 201

- Open the *Channel Configuration* pane for TalkShow *Channel 1* to its *Return to Caller* tab.

- Assign *MIX 2* as the return *Video Source*.

- In the *Audio* level control group below, click the speaker icon above all channels except *Ch. 1* (see Figure 202), thereby muting them.

Recall that you removed the sound from the first Skype caller from *Ch. 1* of *Aux 2,* which is embedded in *MIX 2*. So this is the mix minus designed for return to that caller. Muting all the others ensures the caller does not hear an echo of his own voice.

- Open *Configure Channel* for TalkShow's *Channel 2*, and configure its *Return to Caller* tab just like *Channel 1*; but this time, mute all audio channels except *Ch. 2* instead.

- Continue to set up *Channels 3* and *4* in similar fashion, but muting all audio channels other than *Ch. 3* and *4*, respectively.
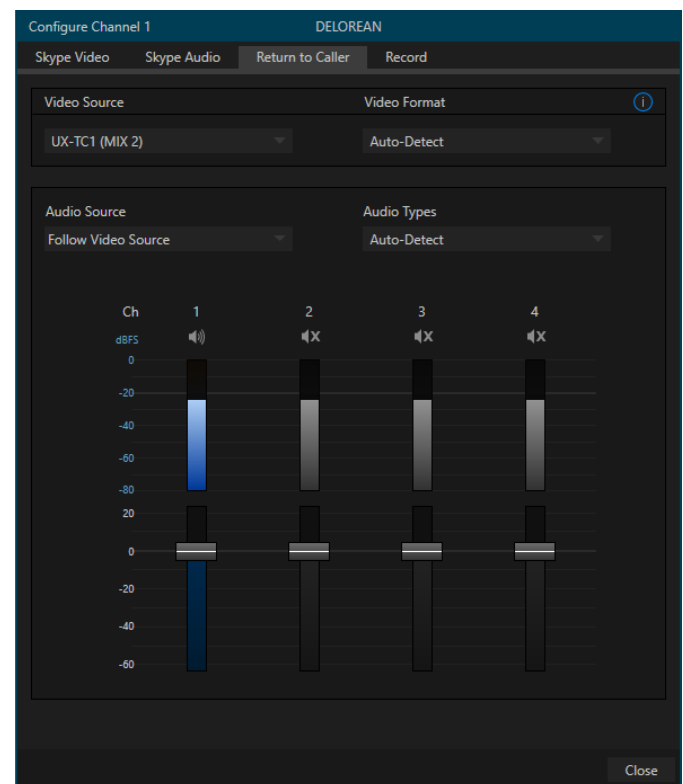
FIGURE 202

SECTION 15.9 MEMS

Roll the mouse to the left edge of the screen in the *Audio Mixer* to show its *MEM* bin. Audio *MEMs* work just like their counterparts in the *Media Players* (see Section 11.1.11).

MEMs are a convenient way to quickly store and recall audio steps and settings for different venues, productions, and users.

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, control surface operation, or *HotSpot*.

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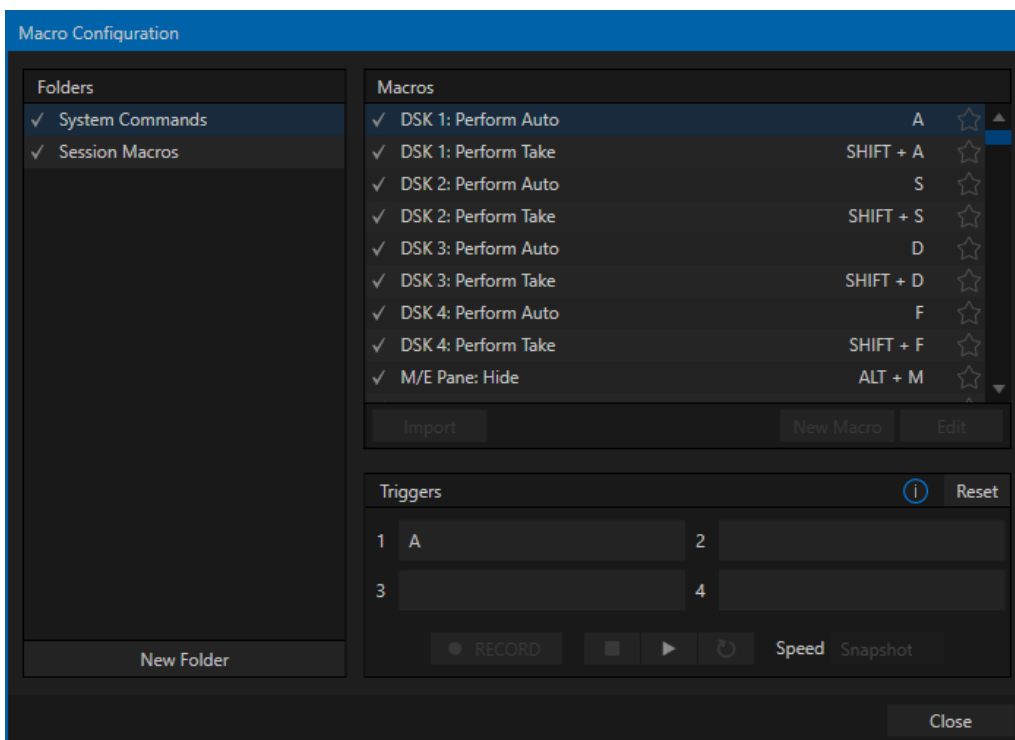
Click *Macros* to show a menu containing a *Configure Macros* item. This opens a large panel that allows to you create, organize, and even edit macros.

<div align="center">SECTION 16.1 CREATING MACROS</div>
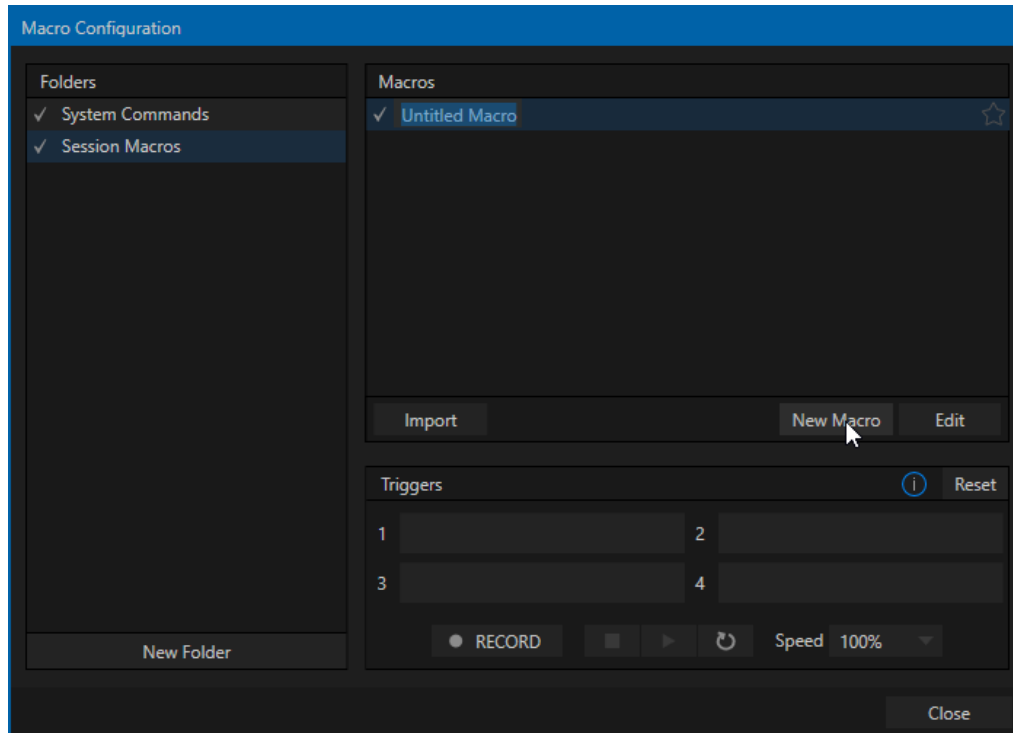
FIGURE 205

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 Surface* 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.

<div align="center">16.1.1 SPEED AND SNAPSHOT MODE</div>

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.
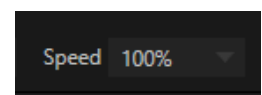
FIGURE 206

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.

> *Hint: You can record a macro that includes other macros. Depending on your order of operations, you may need to re-highlight the newly recorded macro in the list to show its Stop control (to end macro recording).*

16.1.2 TRIGGERS
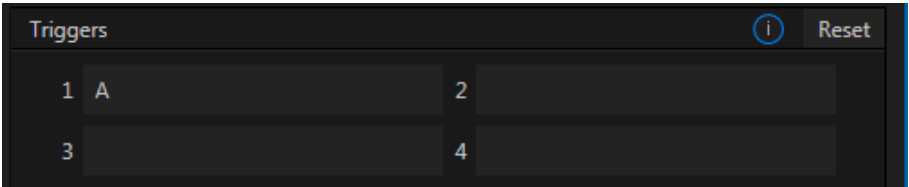
FIGURE 207

The *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. (See the accompanying Automation and Integration Guide for a more extensive discussion of triggering macros, including MIDI control and more.)

SECTION 16.2 MANAGING MACROS

The *Macro Configuration* panel has management features such as folders, rename, clone, and hotkey assignment, as well as *Import* and *Export* (use these to copy macros to other units, and for backup).

16.2.1 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).

> *Note: Please refer to the accompanying Automation and Integration Guide for full details, including a discussion of the integrated Macro Editor.*

SECTION 16.3 AUTOMATION

We have discussed automation features elsewhere in this Guide, notably in Sections 8.1.3, 11.1.1, and 0. Please refer to the accompanying *Automation and Integration Guide* for additional discussion of these powerful features.

Chapter 17 STREAM/ENCODE

Live webcasting has dramatically altered the broadcast landscape. Information can now be shared among audiences around the world with very small transmission costs. The live streaming market provides many creative and profitable opportunities. When it comes to taking advantage of this new medium, your NewTek live production system places you in the forefront of all the excitement.

SECTION 17.1 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.
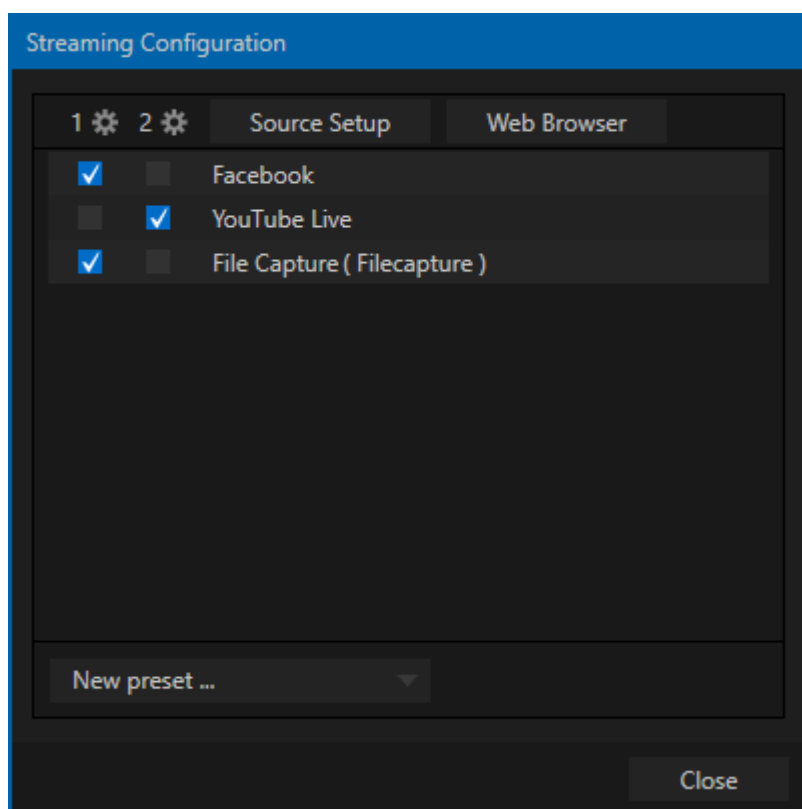
FIGURE 208

TC's *Streaming Configuration* panel supports the creation and configuration of all of the information and settings you are likely to need in this context.

SECTION 17.2 CONFIGURATION

To open the *Streaming Configuration* panel (Figure 208), click the *Configure* button (gear) at right of the *Dashboard*'s large *STREAM/ENCODE* button.

17.2.1 SOURCE SETUP
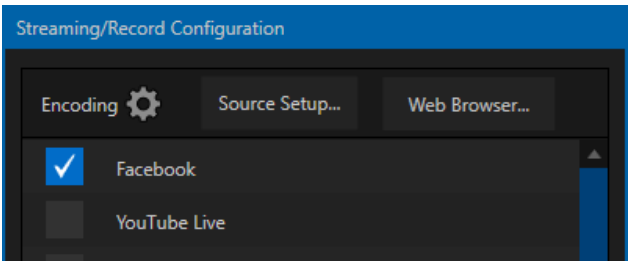
To assign video and audio sources to the streaming encoder, click the *SOURCE SETUP* button in the header of the *Streaming Configuration* panel (Figure 210). Doing so opens the *Output Configuration* dialog, where you can continue to choose audio and video sources, and adjust audio volume.
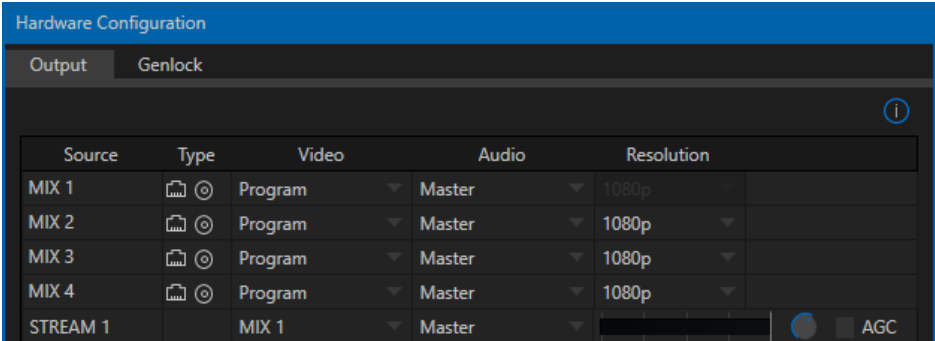
17.2.2 THE WEB BROWSER
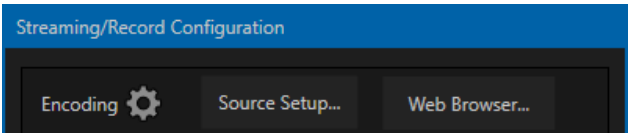
The *Web Browser* button in the header of the *Streaming Configuration* panel does what you would expect, opening a web browser. This feature is provided for your convenience when working with web streams or your content delivery network account. We do not recommend general purpose web surfing during live operations.

> Hint: If the web browser is hidden from view because a Live Desktop operation took precedence, you can re-use this button to bring the browser window to the front again.
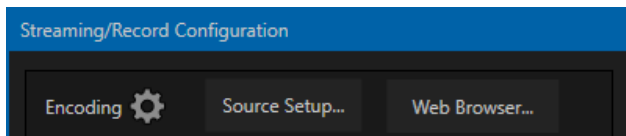
Settings for the encoder are configured in the *Configure Encoder* dialog (Figure 213). Open this dialog by clicking the configuration (gear) icon for the encoder at left in the header of the *Streaming Configuration* panel.
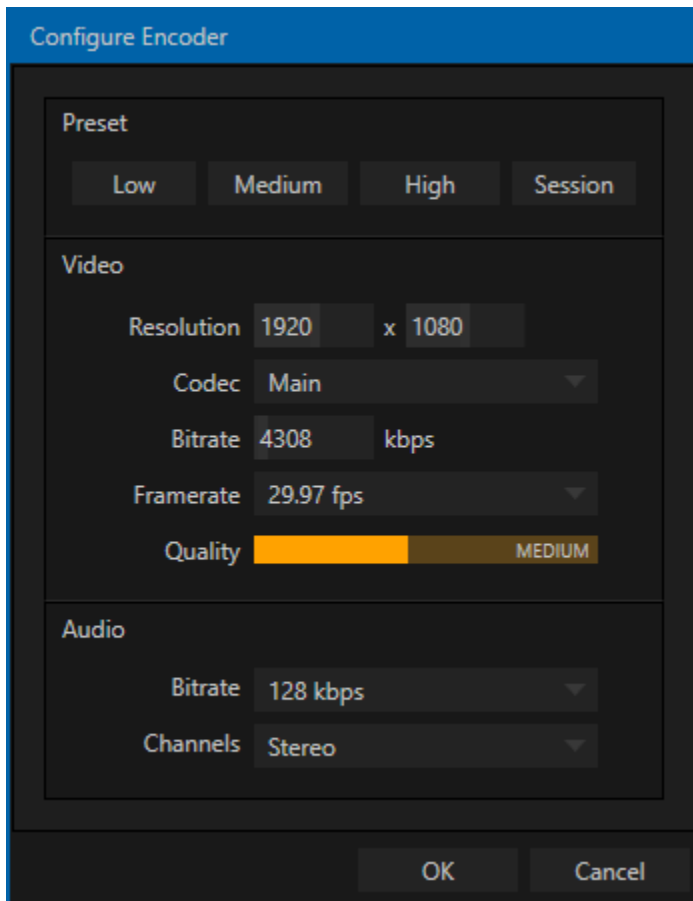
Select an encoder *Preset* (such as *Medium* or *High*), or manually configure custom settings using controls in the *Video* and *Audio* control groups below, and click *OK*.

SECTION 17.3 PRESETS

The information for a given CDN or other encoder target is also retained in a *preset* (e.g., Facebook, YouTube Live, etc.) New presets are added to the *Streaming Configuration* panel using the *New Preset menu* at left in the footer of the panel.

A set of checkboxes at left allow you to send the output from the *Streaming Encoder* to the presets at right.
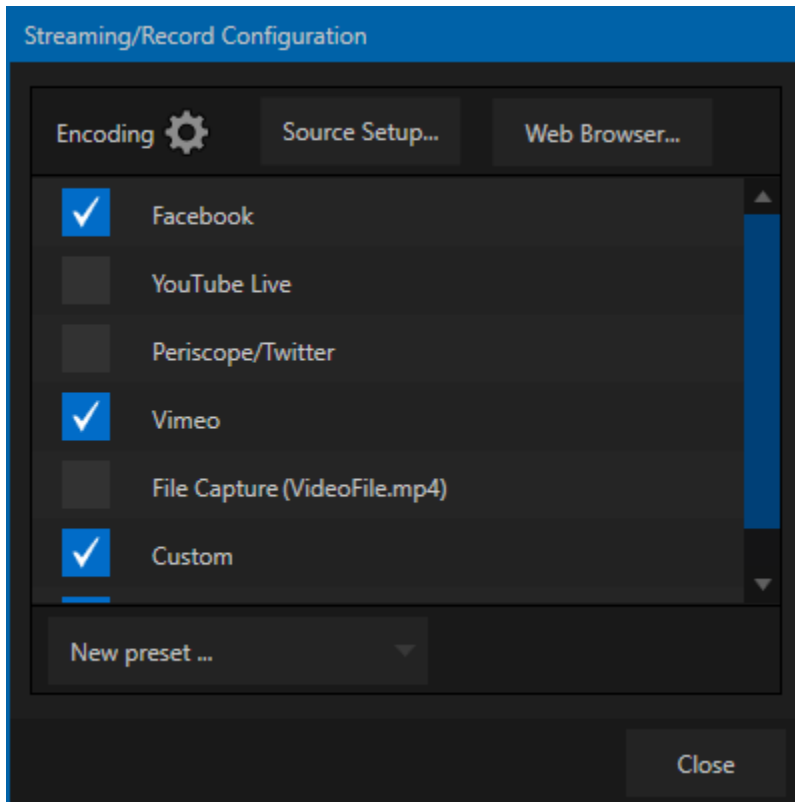
FIGURE 214

If you move the mouse pointer over a *Preset,* two new gadgets are shown at right (Figure 214). 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*.

17.3.1 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, supplying the necessary values for streaming via the service automatically.)

SECTION 17.4 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.)

SECTION 17.5 CAPTURING THE STREAM

To archive a live stream file as it is created by the encoder, simply configure and check-mark a *File Capture* preset.

SECTION 17.6 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.

17.6.1 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 realtime, give or take a little 'time in the pipe' as it were.)

Delivering a good quality stream requires that you consider both your network connection capabilities and that of your viewers. As well, to ensure reliable delivery, you will ideally have some idea of the size of your audience.

Naturally, streaming video is highly compressed to reduce bandwidth demands and make it available to a wider group. The decision as to which encoding format to use for your live stream is up to you or – in some cases – your client. Here are some things to consider:

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

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

BANDWIDTH CONSIDERATIONS

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 actually 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 17.8.1 for some useful resources.)

17.6.2 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 really only used for uploading a single stream, you can send a high quality stream, secure in the knowledge that it will not degrade as soon as a second viewer attempts to see it.

> *Hint: A helpful way to find a good streaming service provider is to ask other members for recommendations in NewTek's online discussion forums.*

SECTION 17.7 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: an external hard drive to transfer the files between systems, or simply transfer them across a local 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, 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 FACTORS

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. Finally, for high quality streaming, consider using a 720p session, even when your cameras may be SD and interlaced (there is no particular benefit to working in SD when your goal is a smaller streaming output.

As technologies go, video streaming is still in its adolescent phase, at best. There are a lot of different standards and diverse environments to consider. You have the necessary tools, but there are still some teething problems you may encounter. This section will point you in the right direction to overcome them.

17.8.1 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…

TESTING WITH PING

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, *iVGA™* and *LiveText™* connection issues, too (and it works just fine in a multi-platform environment!)

Ping sends a small set of data packets to the target host (IP number), then 'listens' for an echo response in return. Ping estimates the round-trip time in milliseconds, records any data losses, and displays a summary when finished.

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

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 at upper left on the Desktop, and select About *This Mac.*

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

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

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

Issuing a Ping

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

Windows®

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

2. Type "ping" (without quotes) followed by a space and the target IP number, as in the image below – then press Enter.
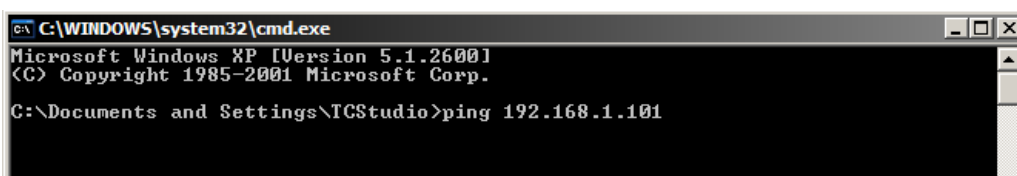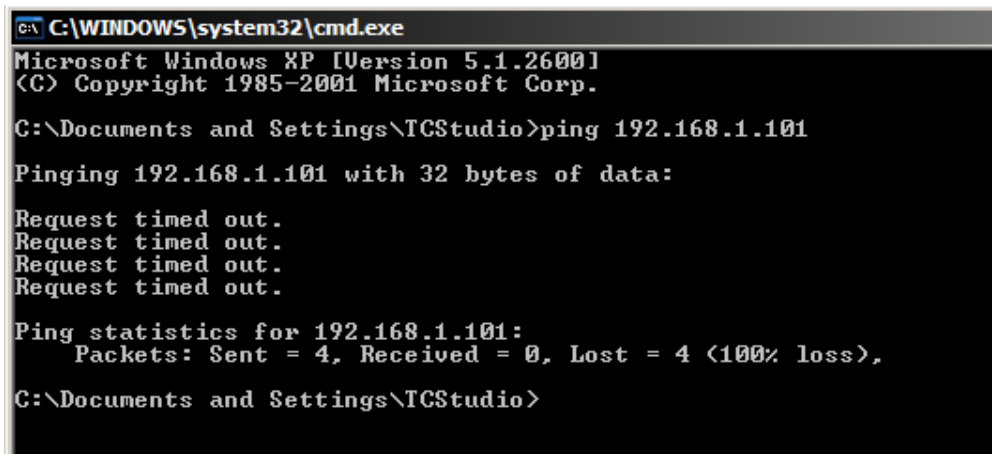
3. Ping will go to work, and in a moment or two begin reporting results. A ping failure (indicating a network problem) will look like Figure 216. A success ping will display a report like Figure 217.

FIGURE 216

FIGURE 217

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.

Are you sure your upload bandwidth is adequate to the bitrate you've set for your stream? Why not test and make sure. Again, a number of websites provide free speed testing. These will give you a basic idea of what your local bandwidth really is.   One site which provides a list of online speed test resources is: http://www.dslreports.com/speedtest?more=1

With regard to streaming issues, don't overlook the fact that your NewTek live production system is just one of the pieces of the puzzle. There are many others that are just as important. One useful thing to try is to check the streaming file. 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 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 18 EXPORT

The Export feature allows broadcasters to publish clips and stills from events like syndicated sports, entertainment or news programming to social media sites even while the live action and capture continues. 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 18.1 OVERVIEW

In today's broadcasting world, a single program feed is often inadequate, inappropriate, or both. More and more 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 supplemental content such as backstage feeds, locker room interviews, pre and post-game chatter, etc.), via such popular Internet sites as Facebook®, YouTube®, Twitter®, etc. 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 post production purposes.

Briefly, once you create 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 18.2 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 (Figure 218).

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.
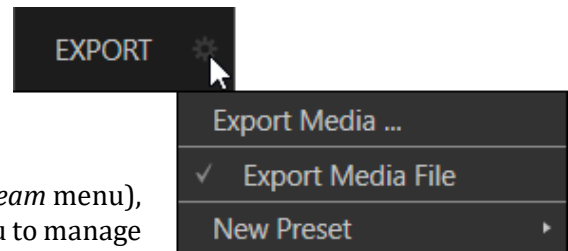
FIGURE 218

18.2.1 PRESET LIST

Below the *Export Media* menu item is a list of any presets you have configured as *Export* targets. (Before you actually 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.

18.2.2 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 just 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 *user name* 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).

18.2.3 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.

18.2.4 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.

18.2.5 WATERMARKING

To avoid unauthorized of use 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 taking into account the resolution and aspect of exported files.

SECTION 18.3 EXPORT MEDIA

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 (Figure 219), which allows you to manage the list of clips and still images you wish to export.
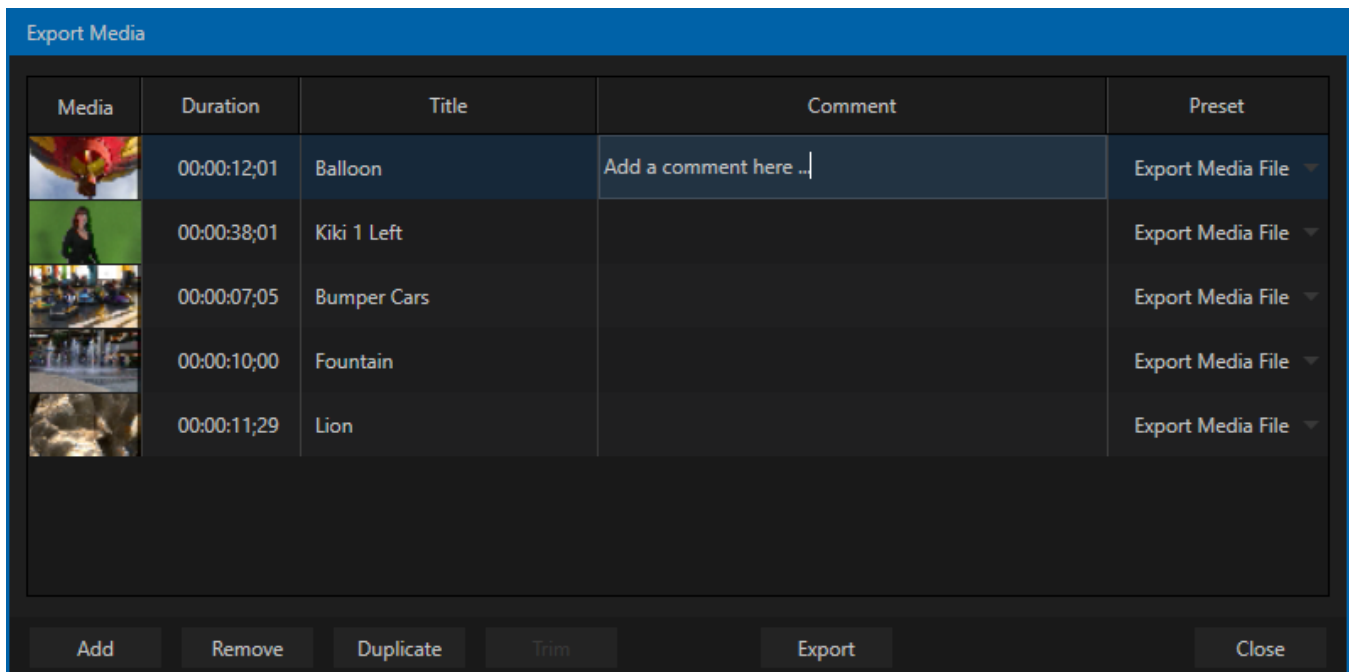
FIGURE 219

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.

18.3.1 METADATA
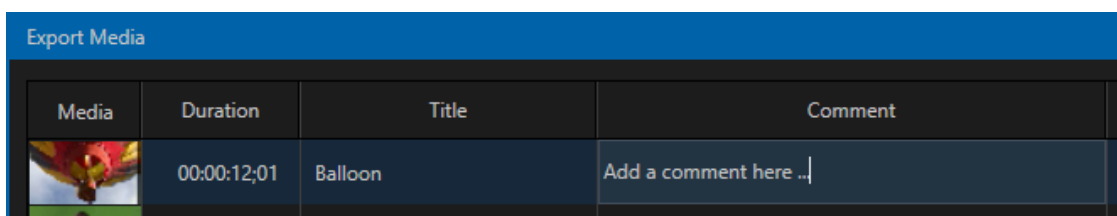
FIGURE 220

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.

18.3.2 PRESETS

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.

18.3.3 LIST MANAGEMENT
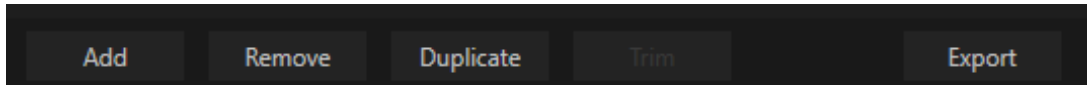
FIGURE 221

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.

FIGURE 222

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 (Figure 222) 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'.

Hint: Checkmark the Still Frame switch to select a frame and convert it to a JPEG image file on upload.

18.3.4 THE EXPORT BUTTON

FIGURE 223

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 …)

Note: The footer Export button is linked to the larger Dashboard Export button, which does the exact same thing.

18.3.5 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 headings File Operations in 11.1.1, and Action in Section 19.1.3).

- 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.
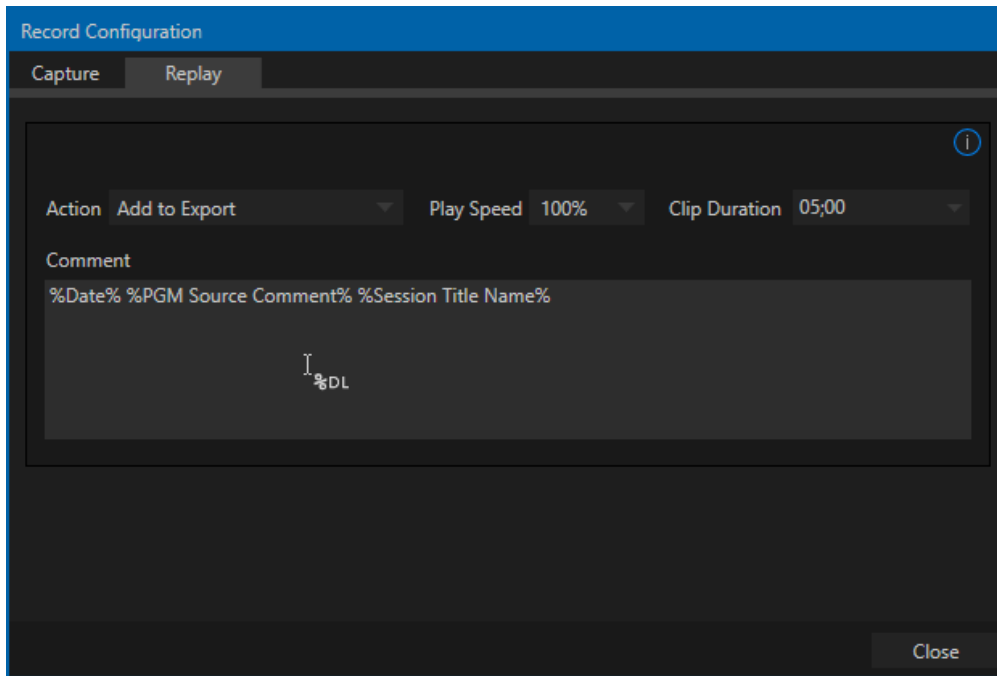
Better still, the *Name* and *Comment* fields in *Grab* and *Record* support *DataLink* (compare Section 11.2.3)*. This lets you automatically supply unique and meaningful information to social media sites along with your *Export* uploads. You can even mix *DataLink* keys with literal text, to produce 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 (Figure 224).

Chapter 19 RECORD AND GRAB

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 19.1 RECORD

NewTek™ 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).

FIGURE 225

FIGURE 226

NewTek's IsoCorder™ technology delivers powerful recording capabilities, allowing you to record up to eight (TCXD8000 only) or four 'local' video sources (chosen from the four primary outputs or SDI inputs) and an additional 4 'external' sources.

As the primary outputs are configurable, IsoCorder's local recorders allow you to capture *Program*, *Program (Clean)*, individual *Switcher* sources, *M/Es*, and more.
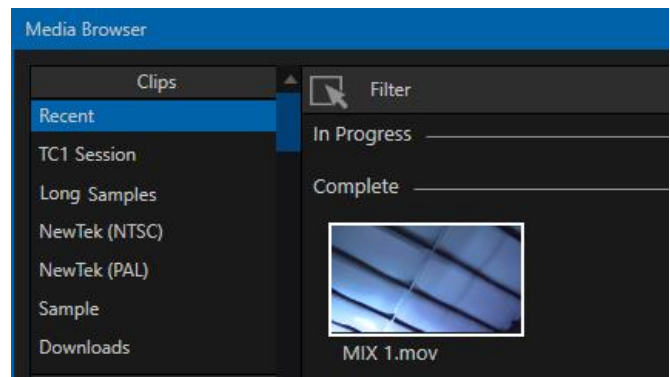
Recorders in the *External* control group can control capture on supporting remote devices, such as a NewTek NC1 I/O system. In addition, a/v streams from connected NDI|HX sources (such as a NewTek Connect Spark™ units or NDI-PTZ1™ camera) can be captured in convenient MP4 format files. And finally, IsoCorder also lets you capture a convenient, audio-only (MP3) file.

Recording is easily enabled by clicking the large *RECORD* button in the *Dashboard* (Figure 225). The 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. (MP4 clips from NDI|HX sources can be added to DDR playlists, but cannot be played back while capture is in progress).

19.1.1 RECORD CONFIGURATION

Of course, before you begin recording, you'll want to determine *what* to record, *where* to record it to, and so on. Settings and controls for recording are grouped in the *Record Configuration* panel. Click the popup *Configure* button (gear) in the Dashboard's *Record* control to open the *Record Configuration* panel.

The *Record Configuration* panel allows you to configure sources for individual recorders. Let's review the features and settings found in the *Record Configuration* panel, starting from the top.

19.1.2 CAPTURE TAB

Record Configuration is organized into two tabs, *Capture* and *Replay*. The first of these allows you to define the individual recordings you want to capture (Figure 227).

SOURCE

Drop-down menus in the *Source* column let you choose which video channel will be captured. IsoCorder provides numerous source options.

Selecting mixed outputs in the *Local* group gives you access to a variety of useful mixed video source combinations and formats, or single *Switcher* sources defined in *Output Configuration*.
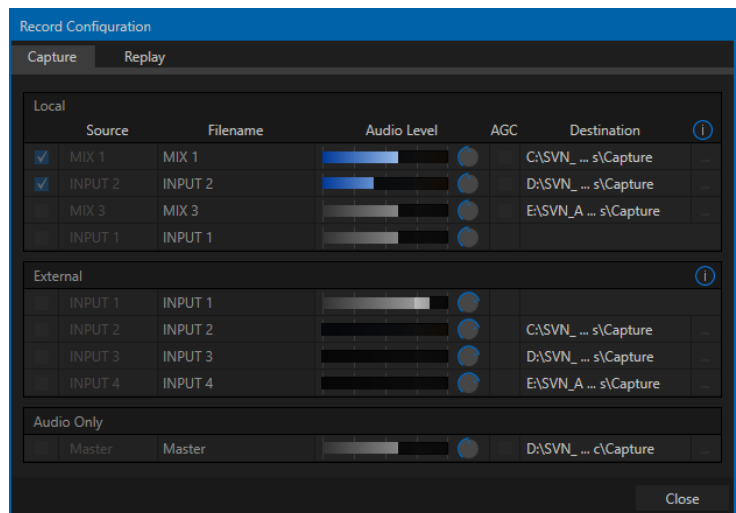
FIGURE 227

Any of the four SDI inputs can be selected as sources in the *External* control group. NDI|HX sources connected as *Switcher* sources can also be captured here. Too, NDI-connected sources supporting remote capture control (such as NewTek's NC1 I/0) can be controlled when configured here.

> Note: The same source cannot be selected for multiple recordings. For example: "IN 1" cannot be selected as the source for two recorders.

FILENAME

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, NewTek'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 NewTek product, as doing so will result in higher resource usage during live production.

The *Audio* Level control lets you set the volume independently for each source you capture.

DESTINATION

For *Local* recorders, the *Save To* drop-down menu allows you to select from available storage volumes as targets for the recording. For *External* recorders, the *Save To* column updates when recording is initiated to show the (non-editable) file path on the remote record unit.

> *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 are capable of handling the load.*

QUICKTIME

IsoCorder records a high quality Quicktime file. The *Transcode* function in *Export* makes it possible to supply files in a wide number of different formats, when necessary.

> *Hint: Download free NewTek codec packs for Windows® and Apple® computer platforms from the Downloads page on NewTek's Support website.*

19.1.3 REPLAY TAB

Features related to instant replay have been gathered into the *Replay* tab.
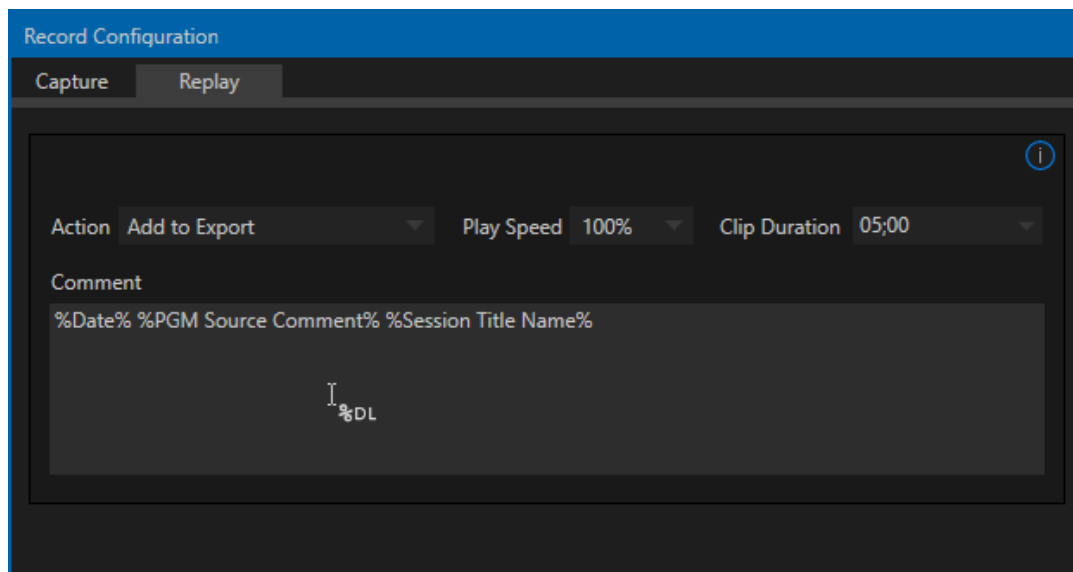

FIGURE 228

Let's examine these controls one by one, beginning with the *Add to* menu options.

ACTION

Choose an *Add to* option from the *Action* menu to automatically send newly-created clips to the target(s) you choose. You can choose a *DDR*, or collate the clips into different *MEM slots*.

Choosing *Add to DDR (1or 2) and Show* takes advantage of the powerful *Show On* feature in *Media Players* to trigger an instant replay. This means that, with one mighty click, you can:

- Send a clip of pre-determined length from any angle you are recording to a *DDR*
- Auto the *DDR* onto the Switcher's *Program* row (or a target *M/E*) using a custom transition
- *Autoplay* the clip at the pre-determined playback speed
- Then transition the *DDR* back to *Preview*, restoring the *Switcher* (or *M/E*) Background transition.

All of this without interrupting recording, which continues without a hiccup. Enabling the *Add to Export* option adds the clips to the *Export Media* bin at the same time.

CLIP DURATION AND PLAY SPEED
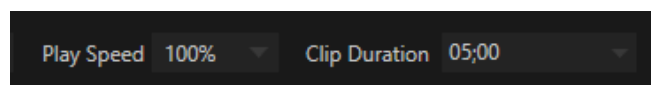
Let's spend a moment on these two controls before getting into the more interesting bits.

- *Clip Duration*, as you'd expect, determines the length of clips added to the *DDRs* or *Publish Bin*. (Note that this control accepts values typed directly, up to 30 seconds.)
- *Play Speed* affects clips added to *DDRs* only, pre-setting their individual playback speed to the value you select here.

THE REPLAY PAD

The *Replay Pad* is a *Dashboard* feature, and appears in the form of buttons placed to the right *within* the main *RECORD button* area.

The *Replay* feature makes it easy to send clips from any recorder defined in the *Capture* tab to a *DDR* or to the *Publish* module. *Replay buttons* appear in the Dashboard's Record group for up to four *Local* and four more *External* recorders. This is the *Replay Pad* area. The labels show which sources are assigned to the recorders.

Clicking any *Replay Pad* button adds the clip from that recorder to the targets defined in the *Action* menu. Alternatively, you can perform the same operation by pressing a number pad key on your keyboard. The *Play Speed* and *Clip Duration* you define are applied when clips are added to a *DDR*.
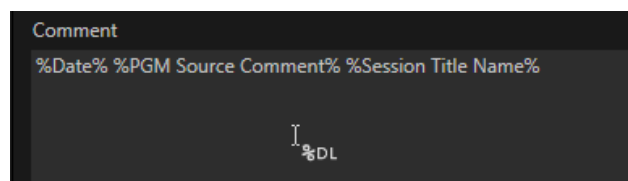
> Hint: As mentioned elsewhere, clips added in this fashion will also retain the information from the Comment box (Replay tab).

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.

OUTPUT

Click the *Configure* button (gear) next to *Grab* in the *Dashboard* at the top of the *Live Desktop* to open the *Grab Still Configuration* panel. The options presented are mostly similar to those of *Record Configuration*, though a bit simpler. Choose which outputs will be grabbed by the Dashboard *Grab* button.

Note: De-Interlacing is automatically applied to avoid a 'comb' effect caused by inter-frame motion in fielded sessions.

Enable the *Add grabs to* switch to automatically append newly captured images to selected playlists, or to send them to a specific *Buffer*, ready for immediate playback during the live production. Likewise, enable *Export* in this menu to immediately append the grabbed image to the *Export Media bin*.

Close the *Grab Still Configuration* panel by clicking *Close*, or clicking outside the panel. Then click the Dashboard *Grab* button to capture the selected a/v source(s) to your hard drive. Image files are stored in a folder named for the session inside the main *Still* folder for the current session (sub-folders are created for the supplementary files captured when *Grab all inputs* is in use).
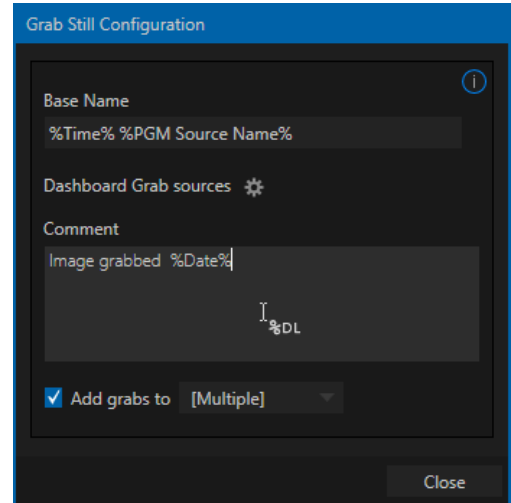
FIGURE 232

INPUT

To grab an image from *any* Switcher input, simply move the mouse over any source viewport other than a *Media Player*, and click the snapshot (camera) icon that is shown in the label below the monitor.

Hint: Grab stores images from sources with embedded alpha complete with their transparency information.

Chapter 20 AUTHORING TITLE PAGES

NewTek's (extra cost) standalone LiveText™ application delivers live titles and CG pages to Switcher inputs across the network from an external system, and can also author title pages that are editable right in the system's Media Players. An integrated version of LiveText with similar offline page authoring capabilities is included with your system to let you create title pages with 'live-editable' text and image elements for use in the Media Players.

LiveText™ is a full-blown, powerful, professional program, and is also available at extra cost as a standalone application. The LiveText manual can be accessed from the *Help* icon in the system's *Launch Screen*, or the Resource webpage served by to your local network and available in the web browser of connected devices. In this Chapter, then, we will review matters specific to this offline version of LiveText.

SECTION 20.1 SESSIONS, PROJECTS AND DISPLAY

LiveText *projects* are launched from the *Session Page* in the *Launch Screen*. After creating a new session or opening an existing one, click the *Graphics* menu link. This reveals options and links at right, discussed previously in the *Launch Screen* chapter just mentioned.

LiveText uses the current session settings for new projects (created within the LiveText *File* menu or from the *Session Page*) and bitmap file exports.

This offline version of LiveText does not send output from the canvas to the system's video outputs. For this reason, the *Live Display* pane and associated tools that appear at upper-right (above the *Pages Panel*) in LiveText standalone do *not* appear in the offline LiveText interface.

20.1.1 FILES/FILEBIN

LiveText's *File menu* dialogs (*Open*, *Add*, *Save* and *Save As*) have pre-configured *QuickTabs* pointing to the following default paths *for the current session*.

> Note: the Quicktab links refer to 'session-dependent' or dynamic paths. That is, for a given session, the path the Quicktab refers to is established at launch time. For this reason, the offline version of LiveText does not support user-added Quicktabs.

LiveText's *File* menu has two special items – *Send Current Page to Live*, and *Send All Pages to Live*. (These take the place of other export options appearing in the standalone version of LiveText.) As you would expect, these functions creates files for use in the Live Desktop, automatically storing them in the correct place(s) for easy access.

Titles prepared in LiveText can be either still or motion pages. When you send a *still* page to *Live*, it becomes a *Title Page* file, with the characteristic filename extension ".cgxml". Title Page files can be edited in the Live Desktop's *Media Players*. *Send Current Page to Live* will automatically store exported title page files in the D:\Media\Titles*sessionname**projectname* folder.

Motion pages (scrolls and crawls) that you send to *Live* are stored as bitmap animation files (with an .avi file extension), suitable for playback in Live Desktop's *DDR*. These are stored in similar fashion to title pages, such as D:\Media\Clips*sessionname*\Motion\folder. The content of motion pages cannot be edited in the *Live Desktop*.

When you select *Send All Pages to Live,* each page in the project is exported in turn to the appropriate format and location. This means they are readily accessible in the Live Desktop's *Media Browser* afterward, for easy addition to a *Media Player* playlist. Title Page icons will appear grouped under their project names in the Media Browser's *File Pane* when you select the session name in the *Location List* at left.

20.1.2 NAMING STAND-IN IMAGES

Among other things, the *Title Editor* in *Media Players* (DDR, Still and Titles) allows you to substitute a different image for stand-in (or "placeholder") images in Title Pages (.cgxml) exported from LiveText (working with stand-in images is discussed in Section 11.2).

When creating title pages for this purpose in LiveText, you may find it saves you time to add the string "_placeholder" somewhere in the filename of images you prepare for this purpose. For example, you might name an image "headshot_placeholder.png", or "_PLACEHOLDER_crest.jpg".

Images named in this manner will automatically appear as stand-in images (unlocked) in the Title Pages you export using the *Send to Live* options in LiveText's *File* menu.

Chapter 21 CONTROL SURFACES: PRIMARY

This chapter introduces the control surfaces offered by NewTek(tm) for your TriCaster®, helping you to see how they complement your system and add ability to your production setup. We will also discuss connecting to the control surfaces from your live production system.

SECTION 21.1 TC1LP

This powerful 'two-stripe', 24 switcher column unit delivers precise control over your program, allowing you to quickly and confidently produce your show.

21.1.1 CONNECTION AND CONFIGURATION

Simply connect the TC1LP control surface unit to the same *network your TriCaster is on. TC1LP also requires a standard, 3-prong AC power connection.

The TC1LP control surface unit connects to your TriCaster using a network connection. In addition to establishing this connection, you need to pair your control surface with a specific TriCaster unit as described next.

> *The control surface and your TriCaster should be connected to the same subnet.*

21.1.2 PAIRING

TriCaster automatically detects compatible control surfaces on the same network. Often there will only be one such surface, which makes setup easy. At other times, though, you may be in an environment with more than one surface, more than one TriCaster, or both of these conditions.
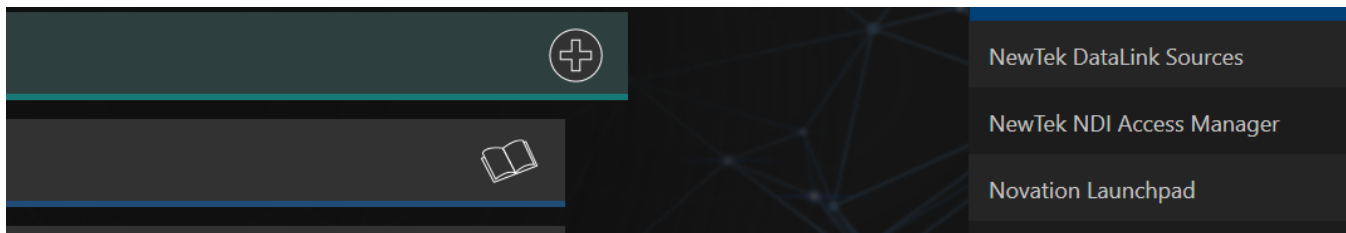
FIGURE 234

To allow you to manage these control connections, a *Surface Configuration* utility has been included in the list of TriCaster's *Add-Ons*.

1. Click the *Add-Ons* button on the main menu on the *Home page* in the *Launch* pane to show the list of installed add-on applications.
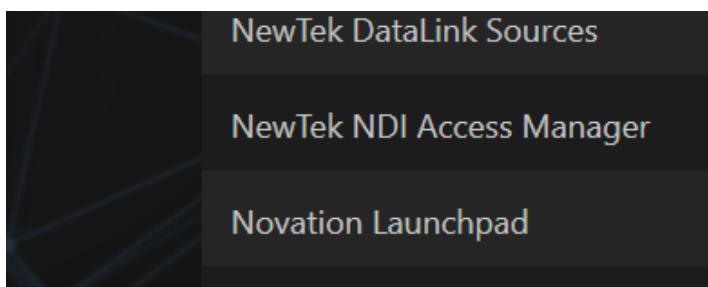
FIGURE 235

2. In the list shown at right, select the *Surface Configuration* link to launch the utility.

3. The utility will automatically detect and list qualified control surfaces it detects on the network, assigning each an ID number.

Note that this ID number is not permanent, and may change as surfaces are added to or removed from the network. The simplest way to make sure you are selecting a specific surface is to temporarily disconnect all other surfaces.

4. Check-mark the desired entry in the list, and set its *Channel* option to 1.

5. Add a unique name or comment in its *Memo* field. (Afterward, the *Memo* text will make it easy to tell one surface from the other.)

TriCaster will now accepting control instructions from the check-marked entry.

> *Note: TC1LP communicates with TriCaster exclusively on channel 1. Any other channel setting will fail.*

Generally, you can think of the various control groups provided as being organized into horizontal 'stripes'.

CONTROL GROUPS

Controls in each horizontal stripe can be grouped into the following groups (Figure 237):

- **1 – Selection:** choose *Switcher* and *M/E* video sources for use in your program
- **2 – Capture (Record, Steam, Grab)**
- **3 – PTZ Options and Titles**
- **4, 5 – Layers & Effects:** Switcher and M/E transitions and layer visibility
- **6 – Position controls:** joystick delegates and operations
- **7 – Media Players**

FIGURE 237

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

21.1.4 SELECTION GROUP

FIGURE 238

The *first stripe* (nearest the operator) provides three rows of twenty four buttons allowing you to choose sources for the various layers comprising TriCaster's primary *Switcher* output.

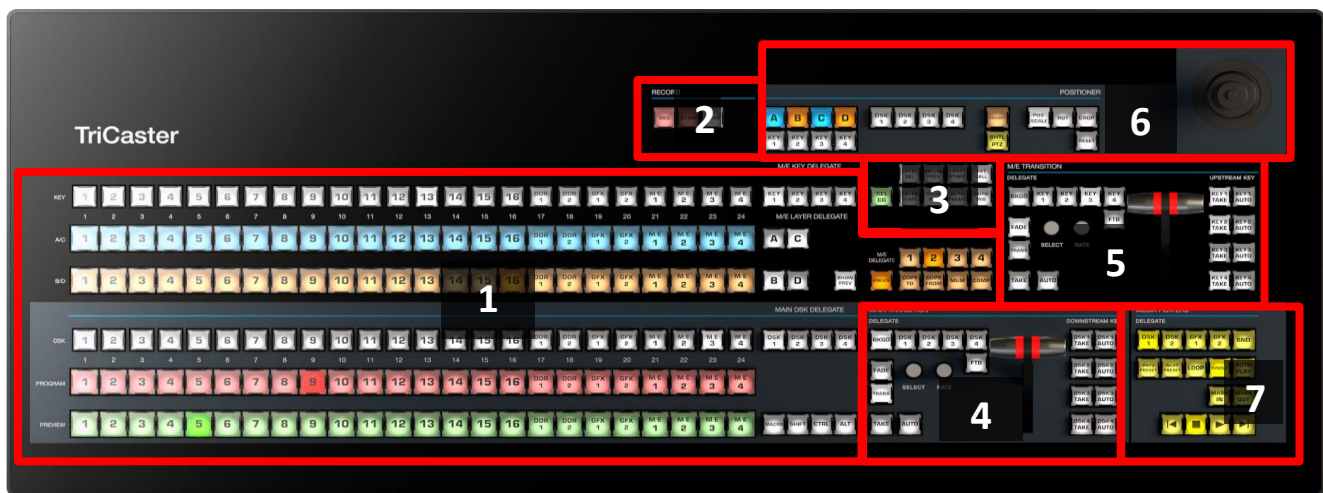The red and green rows govern *Program* and *Preview* row selections in the *Switcher*, respectively. Using buttons in the *MAIN DSK DELEGATE* group at right (Figure 238), the row of 24 white buttons at left above can be assigned to control selections for any of the 4 *DSK*s.

Note: Press and hold the ALT button to access Switcher sources in Bank 2.

QUALIFIERS – SHIFT, CTRL, ALT

Another group of four buttons just below includes the *Macro* button (discussed momentarily), along with modifier keys (SHIFT, CTRL and ALT). The latter three buttons are used in combination with other operations to produce alternate results.

MACRO

The last button we will discuss in this group offers spectacular convenience. TriCaster's powerful macro system is fully addressable from TC1LP. A macro can be assigned to any button on the surface in much the same manner as it can be assigned to a keyboard button. The steps are as follows:

1. On TriCaster's *Live Desktop*, open the *Macro Configuration Editor*.
2. Select the macro you wish to assign in the onscreen lister.
3. Click the mouse in the *Listen* field at bottom left.
4. Hold down the *MACRO* button and press a suitable button on the control surface.

That's it – you can close the *Macro Configuration* panel and test the result. To play back the macro at any time, press the *MACRO* button along with the assigned key.

M/E KEY AND LAYER DELEGATES

The second stripe is similar, but has an *M/E KEY DELEGATE* group in place of *DSK* buttons (Figure 239).

Below this, *M/E LAYER DELEGATE* buttons control the two twenty four button rows at left.

The upper row can be delegated to control either *Layer A* or *C* in cases when an *M/E* effect has *four layers (layer count varies by model).

FIGURE 239

Likewise, the lower row can support selections in either *Layer B* or *D*.

Hint: Delegate buttons generally support multi-selection. Note, as well, that If you reduce the number of layers required by an M/E (by loading a different effect) the control surface will automatically revise the LAYER SELECT delegate state as required.

SHOW PREVIEW

This buttons toggles the *Tabs Follow All Delegates* option in TriCaster, which in turn causes TriCaster's *M/E Preview* viewports to update when a new *M/E DELEGATE* selection is made.

M/E DELEGATE

Five of the remaining buttons in this group are labeled *M/E DELEGATE*. Pressing these buttons assigns all of the other controls in *Stripe 2* to the designated bus (or busses), including the special *PREVIZ* bus.

Hint: Add SHIFT to buttons 1-4 to access M/Es numbered 5-8 on TriCaster 8000.

FIGURE 240

At right beside *PREVIZ*, buttons labeled *COPY TO* and COPY *FROM* support the "Send to Previz" and "Copy from Previz" functions (presented in the *Live Desktop* via the *PREVIZ* and associated 'clipboard' buttons located just above *T-Bars*).

MEM

When the *MEM* button is held down, pressing a button between 1 and 9 in the selection rows at left causes corresponding operation in the *MEM* bin for the delegated M/E as follows:

- Pressing a button in the DSK/KEY row recalls the corresponding *MEM*.
- Pressing a button in the PGM/A row stores or updates the corresponding *MEM*.
- Pressing a button in the PREV/B row clears the corresponding *MEM*.

COMP

The *COMP* button operates similarly (to *MEM*, just discussed). When the *COMP* button is held down, the first 16 columns in the *Switcher* or *M/E* rows at left correspond to the 16 *COMPs* available for the delegated bus.

- Pressing a button in the *DSK/KEY* row recalls the corresponding *COMP*.
- Pressing a button in the *PGM/A* row stores or updates the corresponding *COMP*.
- Pressing a button in the *PREV/B* row clears the corresponding *COMP*.

FIGURE 241

Three buttons labeled *REC*, *STRM*, and *GRAB* are located in this group.

- *REC* – Pressing this button enables TriCaster's *Record* feature. As a safety measure, pressing the *REC* button when recording is underway does <u>not</u> stop recording.   Instead, the *SHIFT* button flashes to reminds you that you must hold it down at the same time as pushing *REC* to end recording.

- *STRM* (Stream) – Push to enable or disable TriCaster's live streaming feature.

- *GRAB* – Push to store snapshots from sources assigned in TriCaster's *Grab Configuration* panel.

  Note: The 'Add to' (DDR) feature in the Record/Replay > Replay tab can be triggered by holding down CTRL while pressing the numbered button on the PGM row that corresponds to the specific recorder desired.

21.1.6 PTZ OPTIONS AND TITLES

FIGURE 242

PTZ CONTROL BUTTONS

- **PTZ SEL** – Hold this button down and press a button in the KEY row at left to designate which PTZ camera to control.
- **FOLLOW PREV** – Toggle: When this button is lit, PTZ selection automatically tracks PTZ camera selections made on the Switcher's *Preview* row.
- **PST STORE** – Hold this button down and press button 1-15 in the KEY row at left to store the current PTZ position for the currently selected camera to the designated PTZ preset.
- **PST CALL** – Hold this button down and press button 1-15 in the KEY row at left to recall the designated PTZ preset for the currently selected PTZ camera.
- **AUTO FOCUS** – Toggle the autofocus setting for the currently selected PTZ camera.
- **AUTO IRIS**– Toggle the auto iris setting for the currently selected PTZ camera.

- **SEL CG** – Hold this button down and press button 1-15 in the KEY row at left to select a Buffer slot containing the title page you wish to control.
- **LAYER STATE** – Apply a title page layer preset.
- **PAGE PST** – Hold this button down and press button 1-16 in the KEY row at left to select and activate a title page data preset having the same number.

21.1.7 LAYERS & EFFECTS

The layer and effect controls for the main *Switcher* and *M/E* column (all stripes) govern transitions and layer visibility for the various video busses.
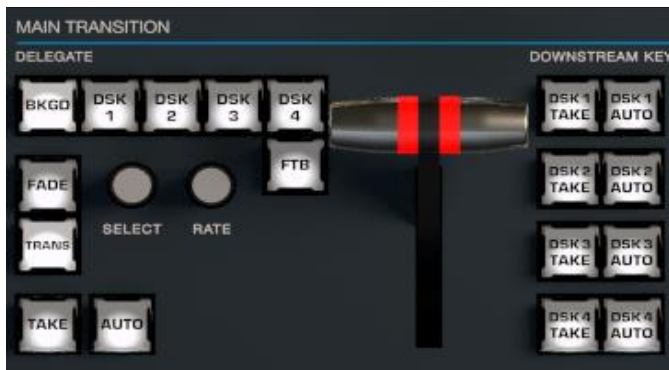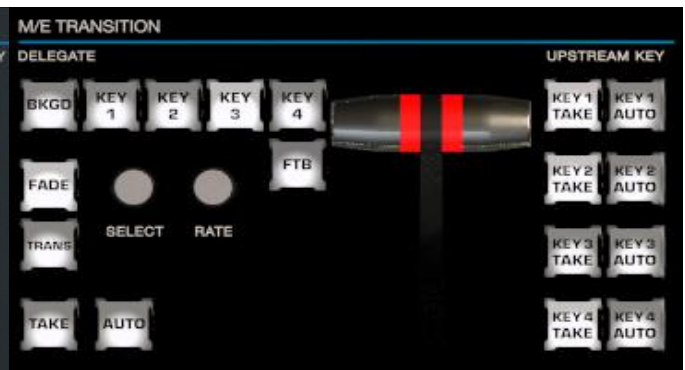
FIGURE 243   FIGURE 244

The controls and functions of these two control groups are virtually identical, so we will consider them together.

BKGD AND DSK/KEY 1-4
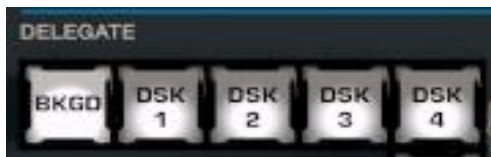
FIGURE 245

These delegate buttons determine what video layers the other controls in the group (*TAKE*, *AUTO*, *T-Bar*, etc.) will affect. Multi-selection is supported, so, for example, if you select both *BKGD* (Background) and *KEY 1*, then press *AUTO* for a stripe delegated to the *Main Switcher*, a transition is applied to both the *Background* layer and *DSK 1*.

FADE & TRANS

These two buttons provide a quick way to control the *Transition Bin* selection for the delegated switcher layer(s).

- Pushing *FADE* offers a quick and convenient way to select the standard *Crossfade* transition.
- Push the *TRANS* button to activate the last-used transition icons for a video layer (or layers).

FIGURE 246   *Hint: For new sessions, TRANS jumps to the first transition in the bin.*

The *FADE* and *TRANS* (Transition) buttons are mutually exclusive; selecting either one cancels the other, and only the currently active button remains lit.

SELECT & RATE

Twist the *SELECT* knob to cycle through the various transition effects that you have added to the software preset bin for the currently delegated video layer. Pressing the knob toggles the *Reverse* option for the current effect.

Rotate the nearby *RATE* knob to modify the transition timing for the delegated layer(s). Or press the knob to cycle through the standard *Slow*, *Medium* and *Fast* presets.

FTB

To perform a *Fade to Black* operation, press *SHIFT* + the *FTB* button (the SHIFT button is required as a safety measure, since FTB is a somewhat dangerous operation). Revert to normal output by pressing *FTB* alone.

> Hint: The duration of the transition to and from black is derived from the BKGD transition duration setting.

TAKE & AUTO
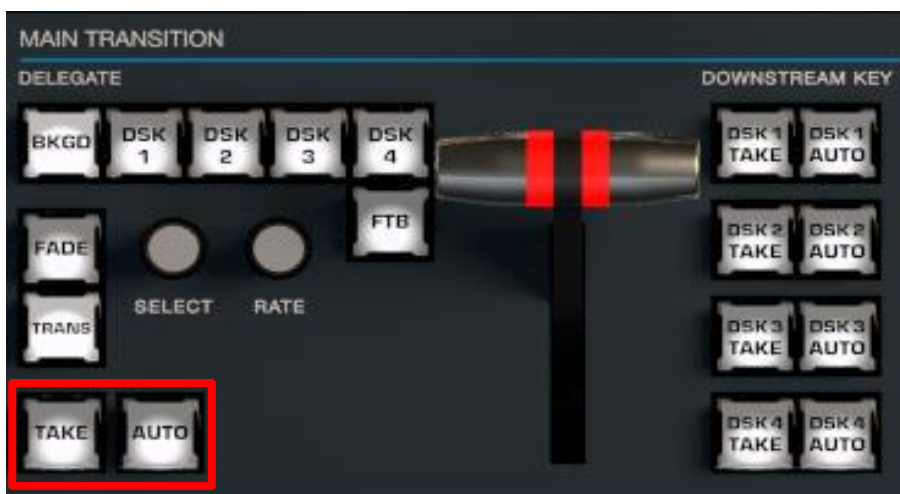
The *TAKE* and *AUTO* buttons perform a cut or transition respectively, affecting only the currently delegated video layers.

T-BAR

The T-Bar is perhaps the most recognizable component of a professional video control surface, and arguably one of the most important. TriCaster provides standard functionality by this means, along with exceptional system feedback. Obviously, you can pull the *T-Bar* to manually modify the progress of a transition between delegated video layers. The T-Bar can also be used to zoom M/Es configured with LiveSet virtual sets.

ILLUMINATION

The *T-Bar* employs colorful illumination to provide feedback and status updates based on your control surface selections and operations. The lighting schemes applied to *T-Bars* controlling both *M/Es* and *MAIN*

video layers reinforce traditional button illumination in a way that soon becomes instinctive, and which provides unparalleled confidence in use. The following tables provide a color code for your convenience.

M/E TRANSITIONS

1. For an *M/E* with a transition assigned as the *Background* effect, control surface T-Bar illumination conforms to the color scheme of the *M/E tabs* on the *Live Desktop*.

M/E 1	M/E 2	M/E 3	M/E 4	PREVIZ
Turquoise	Teal	Lt. Pink	Terra Cotta	White

2. If *BKGD* is delegated alone, the *T-Bar* color is as shown in the table above, identifying which *M/E* is delegated to the stripe. (When multiple *M/Es* are delegated, the first selected delegate determines the color.)

3. This color is at its brightest when the *PGM/A* source (effectively the *Program* row for a transition type effect) is fully displayed. As the *T-Bar* is moved (or *AUTO* is pressed) to begin a transition, the color gradually dims until the effect is complete. At that point, it pops back to full brightness, just as the onscreen *T-Bar* returns to the top of its stroke.

4. In a mixed delegate situation (*BKGD* along with one or more *KEY* layers) the *T-Bar* is lit it medium blue, and conforms to the *BKGD* behavior described above.

5. If one or more *KEY* layers are delegated without *BKGD*, the *T-Bar* color is purple. When the *KEY* layer (or, for multi-*KEY* selections, the first *KEY* layer) is fully displayed, *T-Bar* lighting is at its brightest. Removing the layer dims the illumination.

6. The *T-Bar* is always lit in orange for *M/E's* with a LiveSet effect assigned as the *Background* effect.

MAIN TRANSITIONS

1. Just as you would expect, the *T-Bar* uses industry-standard red/green color coding for *Program* and *Preview* rows.

2. *DSK*-only operations result in the *T-Bar* being lit in purple, similar to *M/Es*.

3. Mixed mode (*BKGD* plus *DSK* delegates) result in blue illumination, after the fashion of *T-Bar* behavior previously described for *M/Es*.

21.1.8 POSITIONER

The TC1 control surface joystick provides a very versatile input mechanism. *Joystick* operations can affect many things, including KEY or DSK layers, *M/Es*, *PTZ* (Pan, Tilt & Zoom) cameras, or even *Media Players*.

- The specific target of *Joystick* operations at any moment is primarily determined by a set of *Joystick delegate* buttons, outlined in red in Figure 249.
- The operation performed on the delegated target is determined by a set of *Control Mode* buttons at right, outlined in green in Figure 249.

DELEGATES

Let's consider the *delegates* first. Nine of the buttons in this group rely on the current *M/E Delegate* selection (see the heading M/E DELEGATE in Section 21.1.4 to designate which M/E is addressed. These are:

- **A-D** – When the delegated *M/E* is configured to use a LiveSet effect, selecting a button in this group assigns the joystick to control the corresponding primary video layer of that *M/E*.
- **KEY 1-4 –** Selecting a button in this group assigns the joystick to control the corresponding *KEY* layer of the delegated *M/E*.
- **LIVESET –** Selecting this button assigns the joystick to control the LiveSet zoom and pan settings of the currently delegated *M/E*.

DSKs, of course, are unique to TriCaster's main *Switcher*. This buttons in this group are not dependent on any other delegate.

- **DSK 1-4 –** Selecting a button in this group assigns the joystick to control the corresponding *DSK* layer of the *main Switcher*.

The final *Joystick Delegate* serves two purposes.

- **PTZ** – Press this button to assign the joystick to control the PTZ camera that is currently delegated (see Section 21.1.6).

  Hint: With PTZ delegated, press SHIFT and rotate the joystick to adjust focus.

- **SHTL –** Press this button with *SHIFT* to assign the joystick to control the *Media Player* camera that is currently delegated. To shuttle a *Media Player*, move the joystick horizontally (as viewed from above).

CONTROL MODE

Let's turn now to buttons that govern the Joystick operating mode.

Note: Some control modes are invalid for certain joystick delegates. For example, the Rotate and Crop functions aren't supported by PTZ cameras or LiveSets. Invalid control mode selections are ignored.

FIGURE 250

POS/SCALE

- Move the *joystick* horizontally, vertically or diagonally (as viewed from above) to move the delegated video source(s) on the X and Y axes.
- Twist the *joystick* clockwise to scale delegated source(s) up, or counter-clockwise to scale down.

Hint: When multi-delegate selections are active for the Positioner, adjustments are relative to the current state for individual delegates.

ROT (ROTATE)

- Move the joystick horizontally (as viewed from above) to rotate delegated sources on the Y axis.
- Move the joystick vertically to rotate delegated sources on the X axis.
- Twist the joystick clockwise/counter-clockwise to rotate delegated sources on the Z axis.

CROP

- Twist the *joystick* clockwise (as viewed from above) to crop delegated sources inward on all four edges, maintaining the original aspect ratio.
- Twist the *joystick* counter-clockwise to reduce cropping of delegated sources on all 4 edges.
- Move the *joystick* horizontally to crop only the left edge of delegated sources.
- Move the *joystick* horizontally with the *joystick button* pressed to crop only the right edge of delegated sources.
- Move the *joystick* vertically to crop only the top edge of delegated sources.
- Move the *joystick* vertically with the *joystick button* pressed to crop only the bottom edge of delegated sources.

RESET

Despite its location, *RESET* is really an action button (not a *Joystick* mode). Press it to restore all (appropriate) position settings for currently delegated source to their defaults. (This is also why *RESET* does not stay selected when pressed, nor does it change the current *Joystick mode*.)

Hint: When SHUTTLE is delegated, delegated Media Players are reset to the starting point of the current item (or playlist). And when delegated to an M/E with LIVE SET enabled in the LAYERS group, the LiveSet is reset to its default positioning.

21.1.9 MEDIA PLAYERS

Let's explore the details of the *MEDIA PLAYER* control group (depending on your control surface model, there may be one or two such control groups).

DELEGATES

The *Delegate* buttons determine which players are governed by operations in this group. Multi-selection is supported.

PREV PRESET/NEXT PRESET

These two buttons let you to cycle backwards or forwards respectively through existing presets for the delegated *Media Player.*

LOOP, SINGLE, AND AUTOPLAY

Click these buttons to toggle the *Loop, Single* and *Autoplay* modes for the delegated players.

MARK IN/OUT

Click these buttons to set the *in point* or *out point* for the current playlist item in delegated players to the current frame.

> Hint: Press SHIFT with the button to reset the specified end point to its full limit.

TRANSPORT CONTROL

- |◀ (Previous Item) – Press this button to go to the previous playlist entry in delegated *Media Players*. (The selection cycles to the last playlist entry when necessary.)

- ■ (Stop) – Push once to end playback for delegated *Media Players*; push a second time to return to the start position (this operation respects the *Single* setting for individual *Media Players*

- ▶ (Play) – Push to initiate playback for delegated *Media Players*.

- ▶| (Next Item) – Push this button to go to the next playlist entry in delegated *Media Players*. (The selection cycles to the first playlist entry when necessary.)

SECTION 21.2 TRICASTER 8000 CS

For use with this software version, the TriCaster 8000 CS button map conforms precisely to that of the TC1LP control surface described in the previous section.

21.2.1 CONNECTIONS & POWER

Or course, since the 800 CS connects to TriCaster by a USB cable, the details in the previous related to network connection and assignment are not relevant. Simply connect the TriCaster control surface unit to your TriCaster using the USB cable supplied. There is no need to install drivers, or configure the software. Recognition of the control surface is automatic.

OTHER POWER CONSIDERATIONS

TriCaster 8000 CS requires an AC power connection, in addition to its USB control connection. We recommend that if you *must* operate the control surface at greater distances from the TriCaster than recommended above, you first connect it to a powered USB hub by a short USB cable, in turn connecting the USB hub to one of TriCaster's USB ports.

> *Important Note: So-called USB extenders are not recommended, having proven less reliable than long USB cables with powered hub, as discussed above. Each added connector in the circuit introduces 'reflections' that degrade the signal. A control surface may seem reliable for some time, but then fail unexpectedly. (If this should happen, disconnecting and reconnecting the control surface may temporarily restore functionality).*

SECTION 21.3 TRICASTER TC1SP & 450 CS

The compact 450 CS unit was re-mapped to provide support for new features, and now ships with different labeling as TC1SP (SP for 'small panel'), as shown in Figure 252.
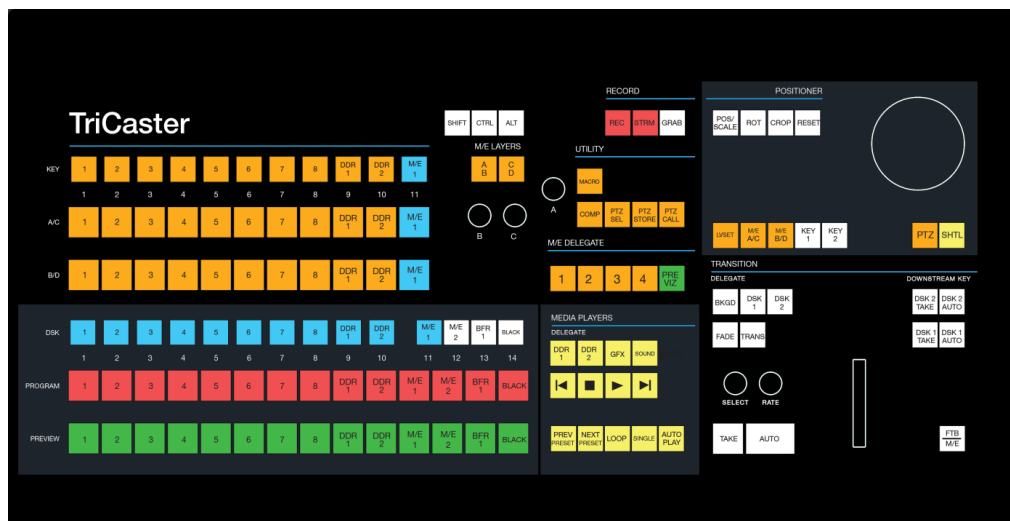

FIGURE 252

> *Hint: Button mapping for an 860 CS largely conforms to 450 CS practices, with differences accorded by its higher Switcher row button count.*

21.3.1 CONNECTION AND CONFIGURATION

Simply connect the control surface to your TriCaster using the USB cable supplied. There is no need to install drivers, or configure the software. Recognition of the control surface is automatic.

POWER CONSIDERATIONS

This control surface is powered by its USB connection. Connecting the unit using a longer cable than the one originally supplied can diminish available power to the point where problems could ensue, including connection recognition failure or operational problems.

For this reason, we strongly recommend that if you *must* operate the control surface distances that require a longer USB cable, you connect the surface to a powered USB hub by a short cable, then connect the USB hub to one of TriCaster's USB ports.

> *Important Note: So-called USB extenders are not recommended, having proven less reliable than long USB cables (with powered hub, as discussed above). This is because each added connector in the circuit introduces 'reflections' that can degrade the signal. In this configuration, the control surface may seem reliable for some time, but then fail unexpectedly. (If this should happen, disconnecting and reconnecting the control surface may temporarily restore functionality).*
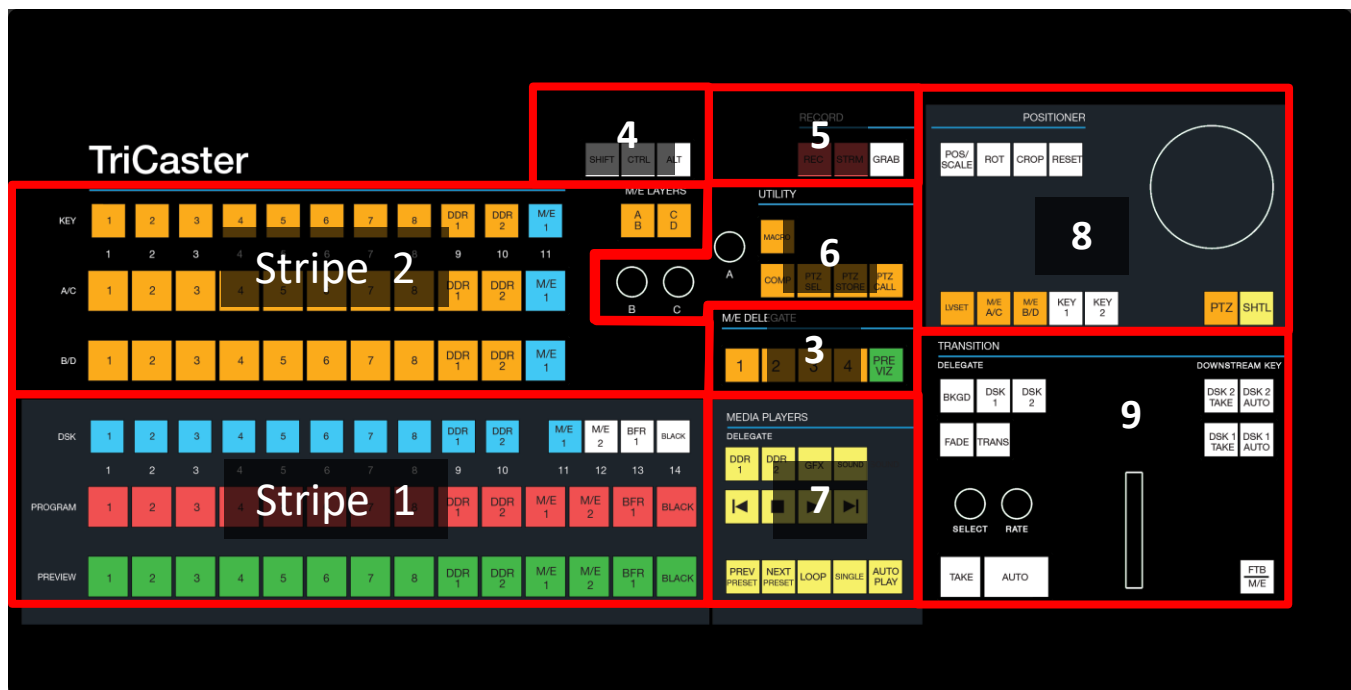
21.3.2 CONTROL LAYOUT

FIGURE 253

The various control groups are organized into groups as shown in Figure 253.

Stripe 1 & 2: choose main *Switcher* and *M/E* video sources for use in your program

3 – M/E Delegates

4 – Modifiers: *SHIFT*, *CTRL* and *ALT* provide access to alternative control features

5 – Capture: *Record, Steam, Grab*

6 – Utility: *Macro*, *COMP* and *PTZ* operations

7 – Media Players

8 – Positioner: joystick delegates and operations

9 – Layers & Effects: Switcher and M/E transitions and layer visibility

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

21.3.3 STRIPE 1 & 2

FIGURE 254

The *first stripe* (nearest the operator) provides three rows of buttons allowing you to choose sources for the various layers comprising TriCaster's primary *Switcher* output.

The red and green rows govern *Program* and *Preview* row selections in the *Switcher*, respectively. Buttons in the *DSK row* control selections for *DSK 1*. Hold down *SHIFT* to control *DSK 2*.

Note: Press and hold the ALT button to access Switcher sources in CS Bank 2.

M/E AND LAYER DELEGATES

FIGURE 255

The second stripe is similar, but includes *M/E LAYERS* and *M/E DELEGATE* control groups (Figure 255).

Use the *M/E DELEGATE* buttons to designate which *M/E*(s) the rows at left are assigned to.

Hint: Delegate buttons generally support multi-selection. Note, as well, that If you reduce the number of layers required by an M/E (by loading a different effect) the control surface will automatically revise the LAYER SELECT delegate state as required.

As for the primary Switcher's *DSK* row, the second *KEY* layer source can be set by holding down *SHIFT* when making a selection.

The *M/E LAYERS* button allow you to assign the selection rows marked *A/C* and *B/D* as desired in cases when an *M/E* effect has four layers.

- When the A|B button is lit, the two rows at left are assigned to rows *A* and *B* in the *M/E*.
- Otherwise (when C|D is lit) the rows at left correspond to rows *C* and *D*.
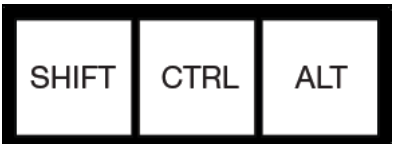
21.3.4 QUALIFIERS

This group of buttons includes the common modifier keys *SHIFT*, *CTRL* and *ALT*. These buttons are used in combination with other operations to produce alternate results.

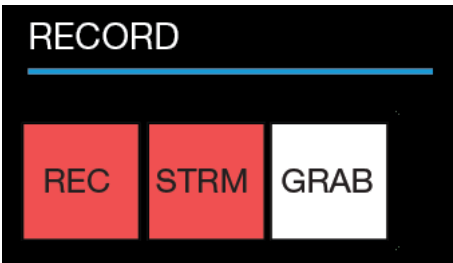> *Note: Press and hold the ALT button to access Switcher sources in Bank 2.*

21.3.5 CAPTURE

Three buttons labeled *REC*, *STRM*, and *GRAB* are located in this group.

- *REC* – Pressing this button enables TriCaster's *Record* feature. As a safety measure, pressing the *REC* button when recording is underway does <u>not</u> stop recording.   Instead, the *SHIFT* button flashes to reminds you that you must hold it down at the same time as pushing *REC* to end recording.

- *STRM* (Stream) – Push to enable or disable TriCaster's live streaming feature.

- *GRAB* – Push to store snapshots from sources assigned in TriCaster's *Grab Configuration* panel.
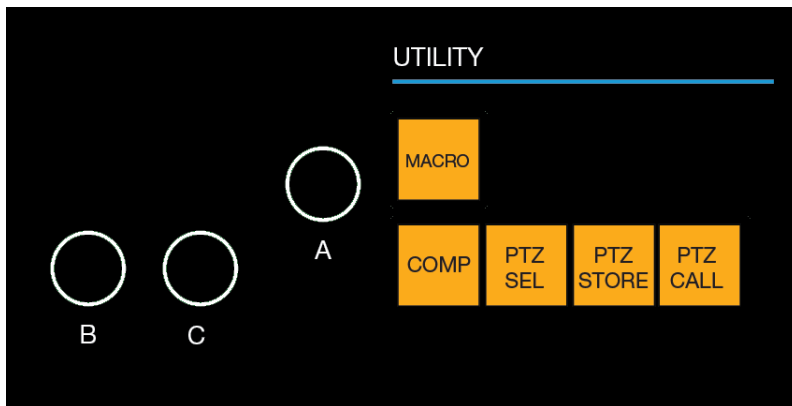
FIGURE 258

MACRO

The last button we will discuss in this group offers spectacular convenience. TriCaster's powerful macro system is fully addressable from the control surface. A macro can be assigned to any button on the surface in much the same manner as it can be assigned to a keyboard button. The steps are as follows:

1. On TriCaster's *Live Desktop*, open the *Macro Configuration Editor*.
2. Select the macro you wish to assign in the onscreen lister.
3. Click the mouse in the *Listen* field at bottom left.
4. Hold down the *MACRO* button and press a suitable button on the control surface.

That's it – you can close the *Macro Configuration* panel and test the result. To play back the macro at any time, press the *MACRO* button along with the assigned key.

COMP

When the *COMP* button is held down, the buttons in the *Switcher* or *M/E* rows at left correspond to the same numbered *COMPs* for the delegated bus.

- Pressing a button in the *DSK/KEY* row recalls the corresponding *COMP*.
- Pressing a button in the *PGM/A* row stores or updates the corresponding *COMP*.
- Pressing a button in the *PREV/B* row clears the corresponding *COMP*.

Hint: See the sub-heading Utility Knobs (A, B, & C) for additional Comp control features.

PTZ OPERATIONS

- **PTZ SEL**

  o Hold this button down and press button in the *KEY* row at left to designate which PTZ camera to control.

  o Press PTZ SEL together with PRE VIZ, below, to enable *Follow Preview* mode. This will cause the joystick to track PTZ camera selections made on the Preview row. (Repeat this process to toggle Follow Preview mode off).

- **PST STORE** – Hold this button down and press button *1-11* in the *KEY* row at left to store the current *PTZ* position for the currently selected camera to the designated *PTZ* preset.

- **PST CALL** – Hold this button down and press button *1-11* in the *KEY* row at left to recall the designated *PTZ* preset for the currently selected *PTZ* camera.

UTILITY KNOBS (A, B, & C)

- **Knob A –** With the *COMP* button pressed down, twist *knob A* to:
  - Pop up the *Comp bin* for the current *M/E* (if multi-delegated, the bin for the first delegate only)
  - Advance through the selections in the bin as you continue to twist the knob
  - Apply the highlighted Comp by pushing the knob.

- **Knob B** - Cycle through the color link assignments for the *A* or *C* row (depending on the *M/E Layers* buttons state) for the currently delegated *M/E.*

Knob C - Cycle through the color link assignments for the *B* or *D* row (depending on the *M/E Layers* buttons state above) for the currently delegated *M/E*.

21.3.7 MEDIA PLAYERS

Let's explore the details of the *MEDIA PLAYER* control group (depending on your control surface model, there may be one or two such control groups).
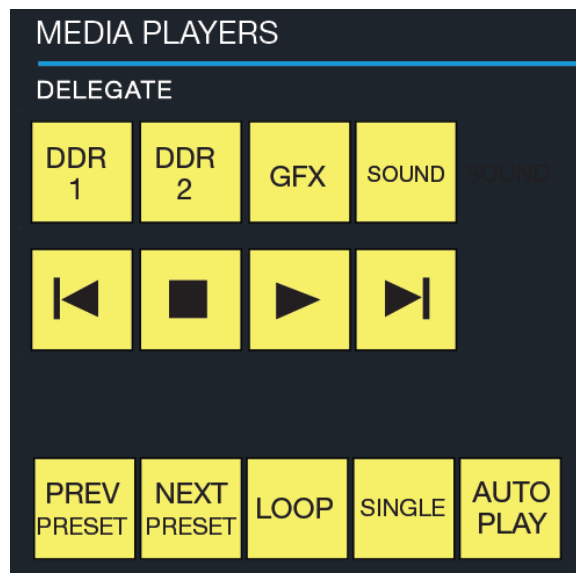

FIGURE 259

DELEGATES

The *Delegate* buttons determine which players are governed by operations in this group. Multi-selection is supported.

These two buttons let you to cycle backwards or forwards respectively through existing presets for the delegated *Media Player.*

LOOP, SINGLE, AND AUTOPLAY

Click these buttons to toggle the *Loop, Single* and *Autoplay* modes for the delegated players.

TRANSPORT CONTROL

- |◀ (Previous Item) – Press this button to go to the previous playlist entry in delegated *Media Players.* (The selection cycles to the last playlist entry when necessary.)

- ■ (Stop) – Push once to end playback for delegated *Media Players*; push a second time to return to the start position (this operation respects the *Single* setting for individual *Media Players*

- ▶ (Play) – Push to initiate playback for delegated *Media Players.*

- ▶| (Next Item) – Push this button to go to the next playlist entry in delegated *Media Players.* (The selection cycles to the first playlist entry when necessary.)
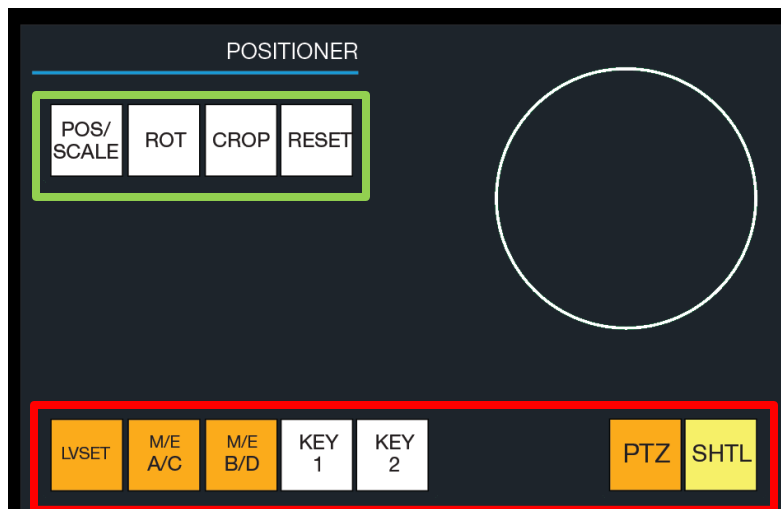
21.3.8 POSITIONER

FIGURE 260

The *Joystick* provides a very versatile input mechanism. Its operations can affect many things, including KEY or DSK layers, *M/Es*, *PTZ* (Pan, Tilt & Zoom) cameras, and even *Media Players.*

The target of *Joystick* operations at any moment is primarily determined by a set of *Joystick delegate* buttons, outlined in red in Figure 260. The operation performed on the delegated target is determined by a set of *Control Mode* buttons at right, outlined in green in Figure 260.

Let's consider the *delegates* first:

- **LIVESET –** Selecting this button assigns the joystick to control the LiveSet zoom and pan settings of the currently delegated *M/E*.

- **M/E A/C** – This selection assigns the joystick to control the layer represented by the upper row of the M/E selected in the *M/E DELEGATE* group – whether A or C, depending on the current *M/E Layer* selection (See Section 21.3.3).

- **M/E B/D** – This selection assigns the joystick to control the layer represented by the lower row of the M/E selected in the *M/E DELEGATE* group – whether B or D, depending on the current *M/E Layer* selection (See Section 21.3.3).

- **KEY 1, 2 –** Selecting a button in this group assigns the joystick to control the corresponding *DSK* or *KEY* layer for either the main *Switcher* or the delegated *M/E*.

  Note: To delegate the joystick to control the KEY layers, press and hold SHIFT while pressing KEY 1 or 2.

- **PTZ** – Press this button to assign the joystick to control the currently delegated PTZ camera (see Section 21.3.6).

  Hint: With PTZ delegated, press SHIFT and rotate the joystick to adjust focus. Press SHIFT and press the joystick button to enable Auto Focus; add CTRL with SHIFT to disable it.

- **SHTL –** Press this button to assign the joystick to control the *Media Player* camera that is currently delegated (see Section 21.3.7). To shuttle a *Media Player*, move the joystick horizontally (as viewed from above).

CONTROL MODE

Let's turn now to buttons that govern the Joystick operating mode.

Note: Some control modes are invalid for certain joystick delegates. For example, the Rotate and Crop functions aren't supported by PTZ cameras or LiveSets. Invalid control mode selections are ignored.
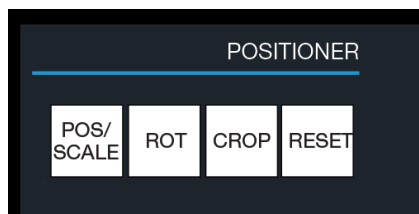

FIGURE 261

POS/SCALE

- Move the *joystick* horizontally, vertically or diagonally (as viewed from above) to move the delegated video source(s) on the X and Y axes.
- Twist the *joystick* clockwise to scale delegated source(s) up, or counter-clockwise to scale down.

ROT (Rotate)

- Move the joystick horizontally (as viewed from above) to rotate delegated sources on the Y axis.
- Move the joystick vertically to rotate delegated sources on the X axis.
- Twist the joystick clockwise/counter-clockwise to rotate delegated sources on the Z axis.

CROP

- Twist the *joystick* clockwise (as viewed from above) to crop delegated sources inward on all four edges, maintaining the original aspect ratio.
- Twist the *joystick* counter-clockwise to reduce cropping of delegated sources on all 4 edges.
- Move the *joystick* horizontally to crop only the left edge of delegated sources.
- Move the *joystick* horizontally with the *joystick button* pressed to crop only the right edge of delegated sources.
- Move the *joystick* vertically to crop only the top edge of delegated sources.
- Move the *joystick* vertically with the *joystick button* down to crop the bottom of delegated sources.

RESET

Despite its location, *RESET* is really an action button (not a *Joystick* mode). Press it to restore all position settings for currently delegated source(s) to their defaults. (This is also why *RESET* does not stay selected when pressed, nor does it change the current *Joystick mode*.
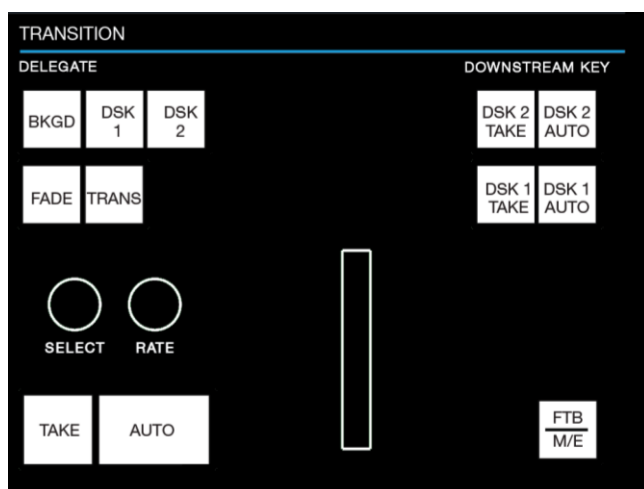
21.3.9 LAYERS & EFFECTS:

FIGURE 262

The controls in this group (Figure 262) are similar to those in the user interface, performing the same functions in much the same manner.

TRANSITION DELEGATE

DELEGATE buttons determine what *video layers* the main *Take*, *Auto*, and *T-Bar* affect, and the scope of the *Select* and *Rate* knobs. Active *delegate* buttons remain lit. Multiple selections can be performed by pressing one or more buttons at the same time.

> Hint: Use SHIFT with DSK 1 and DSK 2 to access DSK 3 and 4.

M/E | FTB

By default, this entire control group affects video layer in the primary *Switcher*. Re-purpose the controls to operate on the current *M/E delegate* by pressing the M/E button at bottom right in this section.

While the *M/E* button is lit, the *BKGD* and *DSK* delegate buttons, along with other controls in the *TRANSITION* group that correspond to existing M/E and M/E KEY layers and effects, are diverted to the currently delegated M/Es. (Add *SHIFT* with *DSK* buttons to access *M/E KEY* layers 3 and 4.)

Note that when you hold down *SHIFT* while pressing this button, an *FTB* (Fade to Black) operation is performed instead. (*FTB* has no dedicated transition controls; its fade in/out duration is derived from the *BKGD* transition setting.)

> Hint: When FTB is displayed on Program Out, it obscures all other Switcher activity.

TRANSITION BIN CONTROL

The control surface does not have *Transition Bins* for the different video layers as such, but can nevertheless control the transition selection and attributes for delegated video layers.

SELECT

When a single layer, such as *BKGD*, is selected in the *TRANSITION DELEGATE* group on the control surface, rotating the *SELECT* knob cycles the current transitions in the Transition Bin for that layer. When multiple video layers have been delegated, turning *SELECT* affects the transitions for all layers as follows:

- When all delegated layers are currently on the same transition bin 'slot', the selection in the corresponding transition bins simply cycles left or right synchronously.

- Otherwise (when the *Transition Bin* slots for multi-delegated layers are *not* matched), rotating the knob moves the selection layer by layer as the knob turns until the selected slots *are* aligned. From that point, continuing to twist *SELECT* moves the transition selection in lock step.

The *SELECT* knob also acts as a push button:

- Push *SELECT* to toggle the *Reverse* setting for the *BKGD* transition.
- Push *SHIFT + SELECT* to toggle the *Ping Pong* switch for the *BKGD* transition.

RATE

The *RATE* knob operates in similar fashion to *SELECT*. Rotate the knob to modify the transition *Rate* for delegated layers. Or press the knob to cycle through the standard *Slow*, *Medium* and *Fast* presets. Multi-delegate selections are handled the same as for *Select* (for both twist and push operations).

> *Hint: You can assign the A and B rows of M/Es as well as the main PGM and PREV rows to color groups by turning the respective Select and Rate knobs with the CTRL button held down.*

FADE & TRANS

FADE TRANS

FIGURE 263

These two buttons provide a quick way to control the *Transition Bin* selection for the delegated switcher layer(s). The FADE and TRANS (Transition) buttons are mutually exclusive; selecting either one cancels the other, and only the currently active button remains lit.

Pushing *FADE* offers a quick and convenient way to select the Crossfade transition. Push the TRANS button to activate the last-used transition icons for a video layer (or layers. For new sessions, TRANS jumps to the first transition in the bin.

PERFORMING TRANSITIONS

Just as in the user interface, the TriCaster control surface provides both local and main transition controls.

MAIN T-BAR, TAKE AND AUTO

These controls correspond exactly to their *Live Desktop* counterparts, and affect all currently delegated video layers (*BKGD*, *DSK 1*, *DSK 2*, or *FTB*) at the same time.

Note that two small LEDS are situated near the left side of the T-*Bar* – one at each extreme of its stroke. When a transition is in progress (or is halted partway), one LED is illuminated. This LED marks which direction to push the T- to complete the current transition.

LOCAL TAKE/AUTO

Local *Take* and *Auto* buttons are provided for *DSK 1* and *DSK 2*, but not *FTB*. These perform a cut or transition respectively, affecting only the corresponding switcher layer.

> *Hint: When a DSK layer is fully displayed on Program out, its local Take button (on the Live Desktop as well as the control surface) remains lit.*

Chapter 22 CONTROL SURFACES: TIMEWARP™

This chapter describes the functionality supplied by the TimeWarp™ control surfaces offered by NewTek(tm), helping you to see how they deliver convenient replay and Media Player control to your production setup.

This chapter discusses the use of NewTek TimeWarp™ control surfaces (in two variants). Both models (TriCaster® 860TW and its predecessor, TW-42) add convenient slow motion instant replay to the already potent capability of your TriCaster system.

TriCaster 860TW has the same profile as TriCaster 460 CS and TriCaster 860 CS. Of course it delivers the same precise control over TriCaster's instant replay recording and live playback when used alone. The TW-42 model, though designed for use with earlier TriCasters, continues to provide great functionality.

For the most part, both TimeWarp™ models have similar controls, with similar labels, and perform in much the same manner. For that reason, in the discussion which follows we will focus on the newer TriCaster 860TW, simply giving you a friendly heads-up whenever we discuss an item where TW-42 varies from its newer sibling.

TW-42 NOTES Wherever items of special interest to TW-42 users appear in this chapter, they will be flagged in the same manner as this paragraph.

SECTION 22.1 22.5.1 CONFIGURING TRICASTER

1. Connect a suitable video source to a camera input on your TriCaster live production system.
2. Select that source on the Switcher's *Program* row.
3. Open TriCaster's *Record Configuration* panel and set the Primary Source (typically to the Program option).
4. Select a suitable encoding format for the captured files.
5. Use the *Add to* menu in the *Primary Recording* controls to assign the recorded clips to either DDR 1 or 2.

SECTION 22.2 OVERVIEW

TriCaster 860 TW is quite straightforward to use, especially true if you are already familiar with common TriCaster controls and features. In this section, we'll discuss each part of the control surface, explaining how the various controls operate and what effect they have, revealing a few little tricks that you may find helpful along the way.

TimeWarp provides convenient control over two Media Player's as well as the recording of sources configured for capture.

For convenience, related controls and buttons are grouped together on the control surface. We will discuss the features and operations supported by each group in the pages that follow. The layout includes the control groups listed below (as shown in Figure 264):

- DDR Delegates
- Edit group (modify playlist content)
- Play Speed (T-bar and presets)
- Mark (replay clip creation buttons)
- ALT and Qualifiers (which modify the operation of other controls)
- Record toggle
- DDR options
- Preset (DDR Playlist)
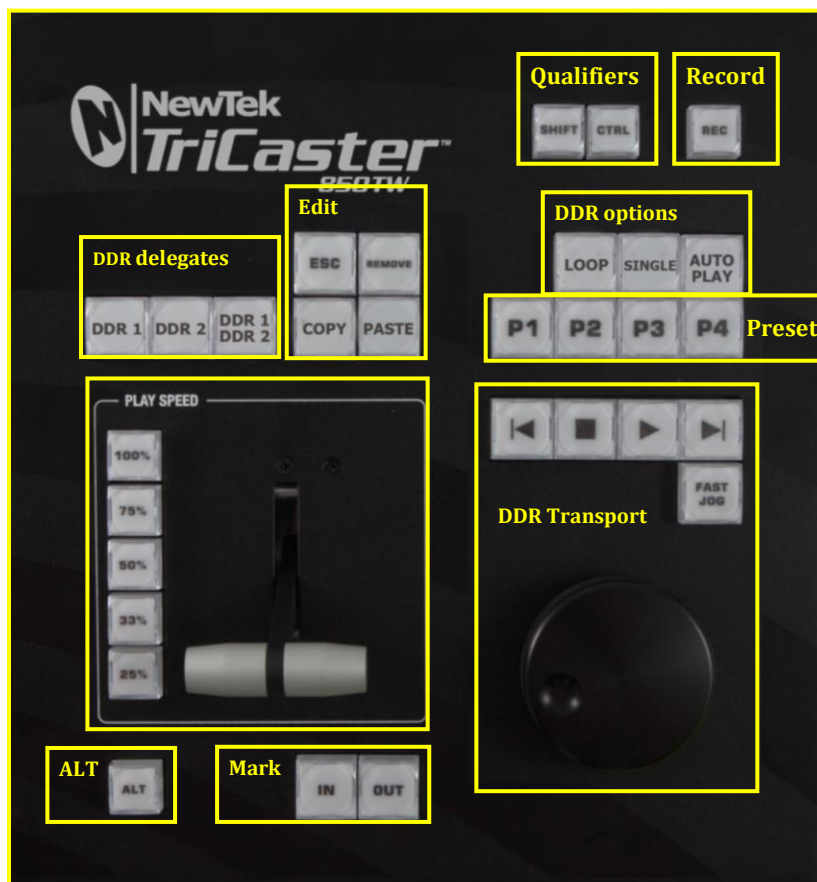- DDR Transport (clip playback and position controls)

FIGURE 264

Let's take a closer look at the members of each control group and their purpose.

FIGURE 265

Much of the functionality of your TriCaster 850 TW relates to clip playback, navigation, and the like. These are essentially *Media Player* functions, controlling one or another of TriCaster's *DDRs*.

The first two buttons in this group (*DDR 1* and *DDR 2*) basically delegate the other controls to the service of the *DDR* named (TriCaster 300 is, of course unique in having just one *DDR*).

> *Note: These buttons only relate to TriCaster 850 TW operations, and do not interact with the Switcher (or TriCaster 855 CS) delegate buttons.*

The third button in this group button is *not* a delegate button (nor is it a radio button). The *DDR 1/DDR 2* button is a toggle switch. When enabled, it tells the control surface to apply *DDR Transport* control group operations to both DDRs (see Section 22.11).

TW-42 NOTES There is no corresponding *DDR 1/DDR 2* button on TW-42. Multi-delegating DDRs is not supported with this control surface.

The DDR 1 and DDR 2 buttons are 'radio button' controls. This means that they operate just like the 'Favorite' buttons provided on a car radio to let you jump to a preset station.

Pressing a button produces an immediate change of state, and your selections are mutually exclusive.

SECTION 22.4 EDIT GROUP

FIGURE 266

In general, these buttons operate on selected playlist content in the currently delegated *DDR* (see Section 22.3).

- *Remove* – Push to remove currently selected entries from the delegated *DDR*'s playlist (selected items are not deleted from the hard drive, however).

  TW-42 NOTES The *Remove* button is labeled *RMV* on TW-42.

- *Copy* – Push to copy currently selected playlist items into the Paste buffer.
- *Paste* – Push to insert Paste buffer content into the playlist of the delegated DDR
- *Esc* – close any popup dialog or text entry item.

> *Hint: These four buttons are also 'action buttons' – that is, pushing one of them has an immediate effect (but unlike a radio button, the operation is complete on release, and does not remain in force).*

TW-42 NOTES There are no *Copy, Paste or Esc* buttons on TW-42.

FIGURE 267

As you would expect, the speed preset buttons in this group (marked *25%, 33%, 50%, 75%* and *100%)* govern the playback rate of the active *DDR*.

Speed preset buttons are mutually exclusive, and establish a playback *mode.* They do not initiate playback; rather, the playback speed you choose is applied when subsequently press *Play.*

(If a *DDR* is already playing, pushing a speed preset button alters the current playback speed immediately.)

Hint: If you use an onscreen speed control to change to a new playback speed, the control surface button selection state follows when possible (in cases where no button corresponds exactly to the newly established speed, no preset button will be illuminated).

The speed *T-Bar* works in similar fashion to the preset buttons, but provides a smoothly variable approach to setting playback speed.

TW-42 NOTES There is no *Speed T-bar* on TW-42.
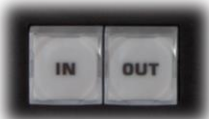
SECTION 22.6 MARKING GROUP

FIGURE 268

The *IN* and *OUT* buttons in this group allow you to indicate the *In points* and O*ut points* for events you wish to record for later replay.

22.6.1 (MARK) IN

Pressing *IN* actually performs several related functions. First, remember that TriCaster must be in *Record* mode for any instant replay marking purpose.

For this reason, if you should happen to push the *IN* button before enabling recording, it is enabled automatically (illuminating the interface Record button just as if you had pressed it on the screen).

With *Record* active, an *In Point* is set for the current clip that will eventually be stored (when you press *OUT*) in the currently delegated *DDR* (see Section 22.3).

FIGURE 269

Hint: Actually, the IN button can also be thought of as a 'reset In Point' function. Pressing it updates the In Point, discarding any incomplete clip (i.e., one for which an Out Point had not been set. The partially recorded data up to that time is simply dropped (and is not added to the DDR playlist).

A *different* operation results when you hold down *ALT* (see Section 22.7) at the same time as you push *IN*. This operation updates the *In Point* of the active clip in the currently delegated *DDR* to the frame currently displayed.

TW-42 NOTES This feature is supported on TW-42 as well.

Hint: This represents a non-destructive edit of the playlist clip, equivalent to dragging the trim handle at the left-hand end of the DDR scrub bar.

22.6.2 (MARK) OUT

Pushing the *OUT* button likewise performs a short series of several actions:

- An Out point is assigned to the primary clip

- If the *Add to* switch is enabled in the *Record Configuration* panel, the clips is added to any targets configured in the associated destination menu (new clips are added to the end of the playlist)

Note: This is a non-destructive operation. Rather than actually chopping the file, recording continues without interruption, and an instance of the file is added to target playlists.

ALT + OUT

 A *different* operation results when you hold down *ALT* (see Section 22.7) at the same time as you push *OUT*. This operation updates the *Out Point* of the active clip in the currently delegated *DDR* to the frame currently displayed.

Hint: This is a non-destructive edit of the playlist clip, equivalent to dragging the trim handle at right-hand end of the DDR scrub bar.

22.6.3 ONE BUTTON MARKING

Another handy method of creating clips for instant replay is referred to as 'one button marking'. With *Record* enabled, watch for notable events, and simply press *OUT* whenever one occurs (no need to press *IN* beforehand in this case). This creates a new clip with an *Out Point* at the current frame, automatically setting the *In Point* to achieve the *Duration* set in the *Record Configuration > Replay tab*.

SECTION 22.7 ALT AND QUALIFIERS

FIGURE 270

For ergonomic reasons, *ALT* is in a special location by itself just below the *Play Speed* control group. It, along with *SHIFT* and *CTRL* (Control) are what are termed 'qualifiers buttons', in that (like their keyboard equivalents) they qualify, or modify the outcome of operating some other control.

We've discussed one use of *ALT* in Section 22.6; see also Section 22.8. At the time of writing *SHIFT* and *CTRL* are reserved for as yet unspecified future purposes.

SECTION 22.8 RECORD

It's probably no surprise at all that pressing the *REC* (Record) button enables TriCaster's own *Record* feature. It's worth mentioning though, that *REC* is not a simple toggle button (as it is on the user interface). Simply pressing *REC* again does *not* turn *Record* off.

Recording is such an important function, we are sure you agree you don't want anyone to be able to accidentally disable it.

For this reason, you must use *ALT + REC* (hold down *ALT* while pushing *REC*) to turn recording off. This makes disabling recording a very deliberate operation, and not one that is at all likely to have been unintentional (as perhaps by some hapless passerby coming in contact with the control surface while looking over your shoulder).

TW-42 NOTES There is no *REC* button on TW-42. Even so, pushing the *Replay* In button will automatically enable *Record*.

Also, you can add a five second clip from the Primary record source to all current Add to targets by pressing *SHIFT + REC*.

SECTION 22.9 DDR OPTIONS

FIGURE 272

The *LOOP*, *SINGLE* and *AUTOPLAY* buttons toggle their namesake features for the currently delegated *DDR*.

TW-42 NOTES There is no *Loop* or *Autoplay* button on TW-42. While there is no *Single* button either, TW-42's *Sel* (Select) and *List* buttons turn *Single* mode on and off for the current *DDR*.

SECTION 22.10 PRESET (DDR PLAYLIST)

"P" is for "preset" … or "playlist", if you prefer. However you choose to view it, the buttons labeled *P1 – P4* allow you to quickly access any of the first four *playlist presets* for the currently selected *DDR*.

FIGURE 273

SECTION 22.11 TRANSPORT (CLIP CONTROLS)

FIGURE 274

This group of controls provides a variety of convenient clip transport and navigation tools. The dominant feature is a large, smoothly operating *Jog Wheel*.

This oversize knob permits you to traverse the current clip in the delegated *DDR* in frame-accurate increments.

The *Jog Wheel* can be a real boon when coupled with the *ALT + IN/OUT* method of trimming already captured clips (Section 22.6), or can allow you to review an event by scrubbing through it manually even while it is displayed live.

The *Jog Wheel* is supplemented by the nearby *Fast Jog* button. Press this control to toggle a high-speed jog mode, which skims through the clip at eight times the normal rate.

TW-42 NOTES The *Jog* wheel on TW-42 works similarly, but is augmented by an outer *Shuttle* ring that can be used to move quickly through a clip or playlist.

The other buttons in this control group are labeled with familiar VCR-style icons, and work as follows:

- *Previous (Clip)* – Push to highlight the prior clip in the playlist of the delegated DDR.
- *Stop*
    - o Push to end playback at the current frame.
    - o When already stopped, push again to go to the first frame of the current clip (or playlist, when *Single* mode is off for the *DDR*).
    - o Push *Alt + Stop* during playback to jump to the end of the current clip.
- *Play* – Push to play the current clip in delegated DDR, beginning at the current frame.
- *Next (Clip)* – highlights the next clip in the playlist of the delegated DDR.

TW-42 NOTES

- Press *ALT + Next* to jump the play head 1 sec. forward from its current position in the clip.
- Press *Alt + Prev* to jump the play head 1 sec. back from its current position in the clip.

SECTION 22.12 TIPS AND TRICKS

- *Multi-angle capture* – TriCaster's IsoCorder™ technology supports multi-source capture. Although TimeWarp initially adds and controls the *first* recording channel to the designated DDR, the clip context menu in the DDR playlist allows you to selectively display concurrent angles..

- *Audio Control* – Remember that you can reduce (or *Mute*) the audio for replays individually using the local playlist pane audio controls in a *DDR*, or with the *DDR* level controls provided in TriCaster's *Audio* tab(s).

- *DSKs* and *LiveSets* - TriCaster provides a great deal of creative versatility in connection with instant replays. For example, a *DDR* with replay clips that is assigned to the *Overlay* channel of an *M/E* can be quickly displayed or hidden (with its own transition effect). And, of course, something similar can be achieved with *DSK* layers. Or, you could use a double-box LiveSet to show a replay alongside on-camera commentators.

- *Clip Organization* – It can be helpful, at times, to use the *MEM slot* options in the *DDR* to collate clips for different purposes.

APPENDIX A: 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 to 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 a better technology to extend your productions to remote participants, whether around the corner or in far-flung corners of the world. NewTek products actually provide several approaches to working with Skype.

Let's discuss two approaches that utilize Microsoft's professional level Skype TX™ platform first.

A.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. NewTek was honored to be selected as the sole North American manufacturer of authorized Skype TX hardware, the NewTek TalkShow™ product line.

A.2 TALKSHOW®

FIGURE 275

Each Skype TX-based TalkShow™ VS4000 unit provides the features needed to connect four high quality a/v streams between Skype callers and standard studio systems. NewTek live production systems make connection particularly convenient, by leveraging NewTek's NDI® (Network Device Interface) IP protocol. Thanks to NDI, a single gigabit network connection easily handles all a/v traffic between the two units.

The basic network connection between the NewTek production system and TalkShow is quite simple. Individual a/v outputs for each remote Skype caller from TalkShow can be assigned to the *Switcher* and Audio *Mixer* like any other NDI a/v input source.

Similarly, the video output from your program can be assigned as the return-to-caller source on the TalkShow system. You will likely want to prepare a unique mix minus audio feed for the audio return to each individual caller. See the sub-heading Sub-Mixes and 'Mix Minus' in Section 15.8.3 of this manual for more detail on configuring these.

A.2.1 SKYPE TX CONTROLLER

A vital part of the Skype TX™ platform is the call-center application referred to as Skype TX Controller (available free from https://media.skype.com/skype-tx). You might think of Skype TX Controller as the 'switchboard' for your calls. The operator can initiate outgoing calls, answer incoming calls, and more.

FIGURE 276

The Skype TX Controller console provides numerous professional conveniences, including contact and call management tools, auto-answer, detailed call quality metrics, and fall-back images to be displayed automatically should network conditions for a remote caller fall below designated minimums.

A.3 SKYPE FOR CONTENT CREATORS

Microsoft has announced an important update called Skype for Content Creators, designed to provide new possibilities for Skype users including broadcasters, streamers, and vloggers. Importantly, when Content

Creator mode is enabled, this release will include not only recording but also output using NewTek's NDI protocol.

This support for NDI in this version, described as "in preview" at the time of writing, provides yet another way to bring Skype calls into NDI–enabled software and systems, including TriCaster.

Input setup for Skype a/v output will be similar to connecting any other NDI source. At the time of writing, this Skype edition does not directly support NDI input. You can, however, use the NDI Virtual Input application included with the free NDI Tools pack from NewTek 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 15.8.3 of this manual.

APPENDIX B: 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.

B.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 really tough jobs with confidence.

B.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.

B.2.1 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!"

B.2.2 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, it would 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.

B.2.3 LATENCY AND YOUR NEWTEK SYSTEM

NewTek 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 NewTek 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 (see Sections Section 3.6, Section 3.14 and 8.2.4). 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 actually assess the latency of your pipeline fairly easily. Run timecode directly to 1) a monitor and at the same time 2) through the switcher to a second (identical) monitor. Take a photograph that encompasses both monitors, and compare the timecode shown.

B.2.4 OTHER SOURCES OF LATENCY

More often than not, significant latency is added by other devices in the IMAG chain that come *after* the switcher. Projectors are a common contributor, but 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 resolution sent from the switcher to the native resolution of the projector. (On some projectors this allows the unit to avoid using its own internal scaling, which is often a significant factor in unwanted latency.)

- 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 C: 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 really 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.

C.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 give consideration to *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.

C.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.

C.2.1 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.)

C.2.2 ADJUSTING COLOR

We're going to move into color calibration next, but first we can actually 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 (Figure 277) can be likened to the familiar 'color wheel' (Figure 278) 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.
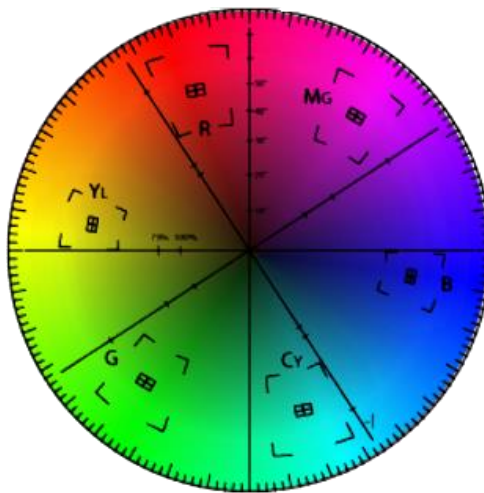
FIGURE 277   FIGURE 278

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, actually 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.

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. Two examples are shown here. Figure 279 is an example of the color bars used in NTSC countries, while Figure 280 is a PAL example, common throughout European nations.

FIGURE 279 (NTSC)
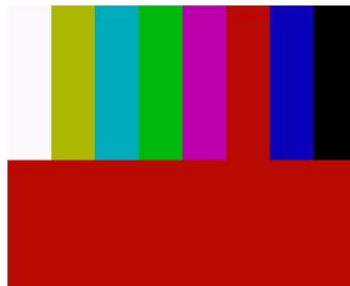
FIGURE 280 (PAL)

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 cross-hair 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 (see Figure 281).
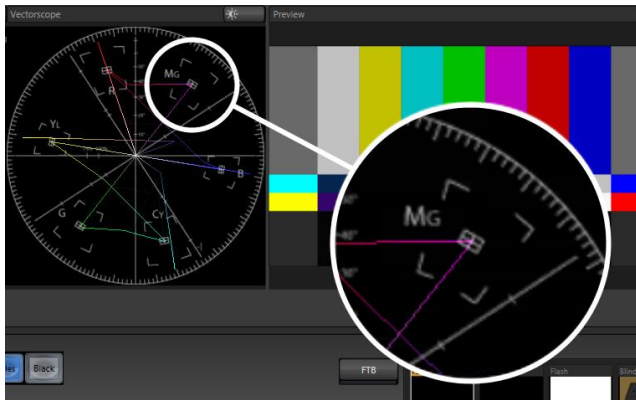
FIGURE 281

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.

C.3 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.

C.3.1 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" will yield an endless list, along with some commercial utilities for those who feel the need. Here are links to several such sites:

> http://epaperpress.com/monitorcal/
> http://www.lagom.nl/lcd-test/
> http://www.jasc.com/support/kb/articles/monitor.asp
> http://www.photofriday.com/calibrate.php
> http://www.onecomputerguy.com/windows7/windows7_calibrate_color.htm

C.3.2 PROGRAM OUTPUT MONITOR

Again, a search of the Internet for "video monitor calibration" will yield a large number of 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.

C.3.3 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 (Figure 282).
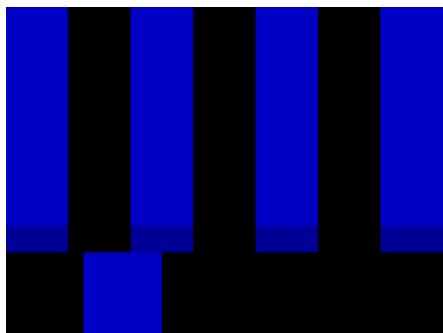
FIGURE 282

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 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.

C.4 FURTHER READING

You may find it helpful to review the white paper, available from NewTek's website, entitled "NewTek TriCaster Scopes – How and Why", by Allan Tépper. This document provides many helpful insights into waveform and vectorscope use, as well as the development and application of video standards.

APPENDIX D: KEYSTROKE SHORTCUTS

D.1 SWITCHER…

Program Row, Inputs 1 to 24 (by model)	F1 – F12 plus [Shift + F1-12]
Preview Row, Inputs 1 to 24 (by model)	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

D.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

D.3 RECORD, GRAB, AND STREAM

Record on/off	r/ Shift + r
Grab (still image)	p
Stream Start	Ctrl + /
Stream Stop	Ctrl + Alt + /

D.4 TABS

Show (DDR, PTZ, Mixer, etc.; varies by model) 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

D.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

D.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

D.7.1 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

D.7.2 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

D.7.3 MISC.

Cut	Ctrl + x
Copy	Ctrl + c
Paste	Ctrl + v
Delete	Delete Key
Show version	Alt + b

APPENDIX F: RELIABILITY TESTING

We know our products play vital roles in the productions of our customers. Durability and consistent, robust performance are much more than just adjectives for your business and ours.

For this reason, all NewTek products undergo rigorous reliability testing to ensure they meet our exacting test standards. The following standards are applicable:

Test Parameter	Evaluation Standard
Temperature	Mil-Std-810F Part 2, Sections 501 & 502
Ambient Operating	0°C and +40°C
Ambient Non-Operating	-10°C and +55°C
Humidity	Mil-STD 810, IEC 60068-2-38
Ambient Operating	20% to 90%
Ambient Non-Operating	20% to 95%
Vibration	ASTM D3580-95; Mil-STD 810
Sinusoidal	Exceeds ASTM D3580-95 Paragraph 10.4: *3 Hz to 500 Hz*
Random	Mil-Std 810F Part 2.2.2, 60 minutes each axis, Section 514.5 C-VII
Electrostatic Discharge	IEC 61000-4-2
Air Discharge	8K Volts
Contact	4K Volts

APPENDIX G: CUSTOMER SUPPORT

It is frequently said that "All good things must come to an end" ... but your NewTek live production system is designed to work as well on any day as it did on the day you bought it. NewTek's 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 NEED A LITTLE HELP?

Product support is available for as long as you own your NewTek system. Find complete details on our main Support page at http://new.tk/cs.

- **Training:**
  - ○ **Videos**: Our library of online training videos and learning resources will help you take advantage of the countless creative possibilities your unit offers – see http://new.tk/learn.
  - ○ **Curriculum:** Find further reading material at http://new.tk/training
- **Software Updates**: visit https://www.newtek.com/downloads/
- **Knowledge Base**: Our extensive online knowledge base will help you troubleshoot issues and clear up any misunderstandings – see http://new.tk/kba.
- **Chat**: When you need it, direct chat support is available in our Support webpages (under the heading Live Customer Support – see http://new.tk/chat.
- **Warranty**: Learn about warranty provisions and check the status of your NewTek systems at http://new.tk/warranty.
- **NewTek User Forums**: Join the conversation, get answers, learn techniques and share ideas with users like yourself at http://forums.newtek.com

G.1.1 THE PROTEK™ ADVANTAGE

The option ProTek™ plan goes far beyond basic service, offering you NewTek-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 Elite customer gets the white-glove treatment by their local Elite Service Provider.
- ProTek Care 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 NewTek 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 Care customers can usually get a replacement shipped right to your doorstep the very next day. Find full details of the ProTek program at http://new.tk/ProTek.

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CREDITS

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This product uses the following libraries, licensed under the LGPL license (see link below). For the source, and the ability to change and recompile these components, please visit the links provided:

- FreeImage library http://freeimage.sourceforge.net/
- LAME library http://lame.sourceforge.net/
- FFMPEG library   http://ffmpeg.org/

  For a copy of the LGPL licence, please look in the folder c:\Program Files\NewTek\LGPL\

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