



TriCaster[®] TC1[™]

Live Video Production
User Guide

NDI[™]

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PART I (GETTING STARTED)

Introducing NewTek TC1™ – 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 use your NewTek TriCaster® TC1 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 all of the relevant details.

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 to TriCaster TC1™ – connecting devices (cameras, monitors, etc.) and registration, ending with Basic Training – a brisk jog through helpful resources available to help you become familiar with common operations and principal features.

➤ *PART II - REFERENCE*

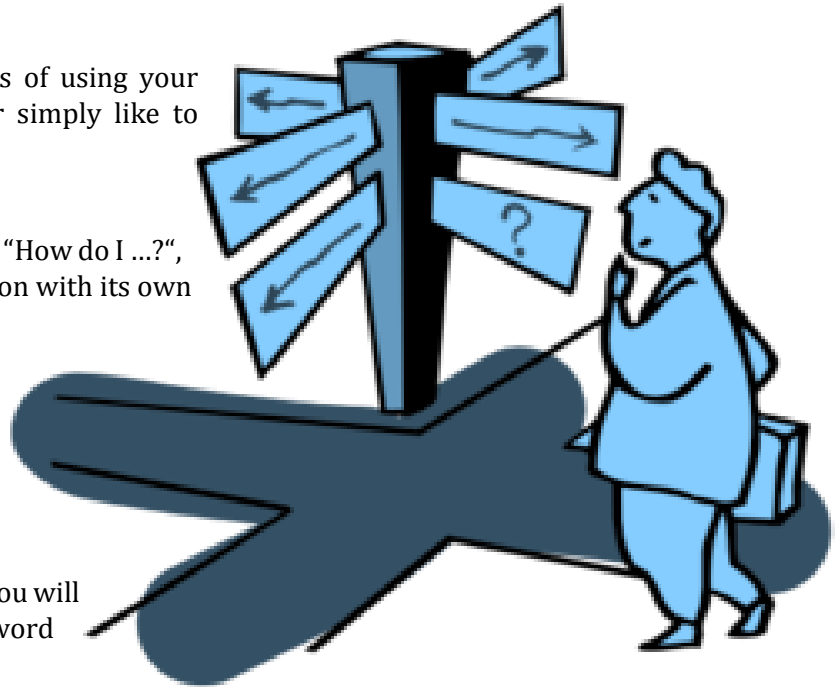
This section covers the fine details of using your system (for those who need it, or simply like to know everything there is to know).

➤ *PART III - APPENDICES*

Leads off with a handy section titled "How do I ...?", a helpful question and answer section with its own brief index.

When you have a specific need, you may well find a quick answer here, along with cross references to more detailed information when appropriate.

Appendix D lists all shortcut keys. You will also find a comprehensive keyword index in Part III.



Chapter 2 INTRODUCTION



Thank you for purchasing this NewTek™ product. As a company, NewTek is extremely proud of its record of innovation and commitments to excellence in design, manufacture, and superb product support. TriCaster® TC1™ is our most advanced live production system, and you will find it exceptionally powerful and versatile. This chapter provides a quick tour of its components and features.

SECTION 2.1 OVERVIEW

NewTek's innovative live production systems have repeatedly redefined broadcast workflows, providing new possibilities and economy. 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.

TriCaster® TC1 is a complete integrated system for live production and web streaming, with capabilities suited to almost any broadcast need. With TC1 you can produce and distribute live video programs from diverse sources in high definition formats all the way up to UHD (including 2160/p60). TC1 fully supports NewTek's innovative NDI (Network Device Interface) protocol, placing your new system squarely in the forefront of IP technology solutions for the video production and broadcast industries.

SECTION 2.2 STARTUP SCREEN

The *Startup Screen* appears shortly after you power up your TriCaster® TC1™. This is the command center where most other operations are initiated.

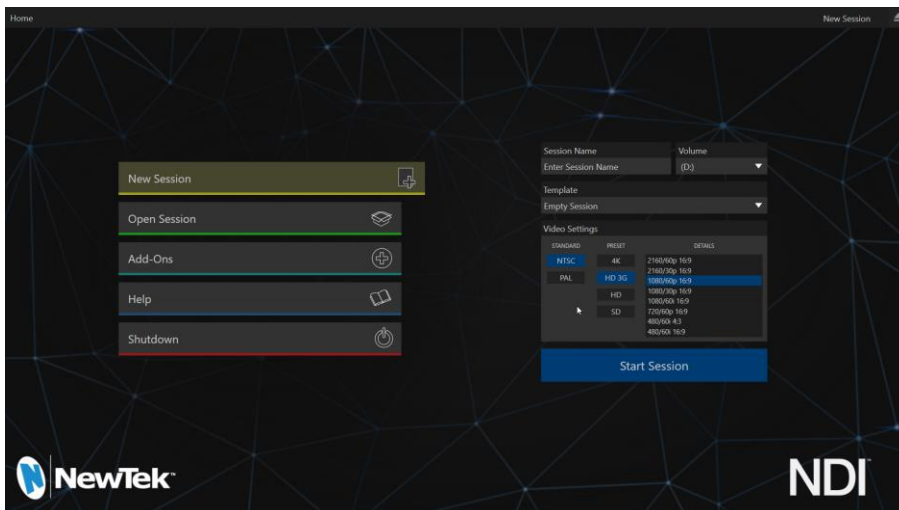


FIGURE 2-1

The *Home page* of the *Startup Screen* allows you to create (and re-open) *sessions*, each of which is essentially a custom preset an individual production or other purposes. Later, when you enter an existing session, all of its assets, settings and states are remembered.

Opening a session takes you to the *Session Page*, where you can prepare *Graphics* (including live-editable title pages), *Manage* content, and more – or you can go directly to the *Live Desktop* to begin production.

SECTION 2.3 LIVE DESKTOP

TC1'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 than similar single-purpose devices. The various features, controls and modules comprising the *Live Desktop* are arranged in horizontal bands, as seen in Figure 2-2.



FIGURE 2-2

- 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 area can be re-sized, and even completely hidden if desired when outboard monitoring will suffice. The display can also be customized to complement external *Multiviews* 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* control panes can be minimized, and are hidden from view in Figure 2-2).
- The bottom third of the *Live Desktop* holds tabbed control modules, including *Media Players* – two video players (*DDRs*) and two graphics players (*GFX*), along with a *Sound* player – and *Buffers*, *PTZ* camera controls and the *Audio Mixer*.

SECTION 2.4 FEATURES

Let's take time for a brief overview of just *some* of the key features of your TC1.

2.4.1 PHYSICAL

- Rugged rack-mount chassis; TC1 ships in both 2RU and 3RU configurations (the latter is supplied with redundant power supplies).
- Important audio, video, monitoring and network connectors are easily accessible from the rear for convenient installation in industry standard configurations.
- Audio and video connectors are industry standard – XLR and ¼" TRS audio jacks (both are balanced, line level inputs) or BNC as appropriate – to ensure broad compatibility and secure connections.

2.4.2 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 ensures that as long there is AC power, audio and video from *Input 4* are routed to *Output 1* in a case of catastrophic software condition.
- If at all possible, streaming output and recording also continue even should all else fail.
- TC1 also has a comprehensive integrated system restore feature. Operators can quickly and easily restore to factory defaults, or create a custom drive image on another volume and either restore from that, or use the backup drive to boot from if a complete hard drive failure ever occurs.
- Should a 'less than ideal' control surface connection fail, TC1 will automatically reconnect without user intervention.

2.4.3 A/V INPUT AND OUTPUT

It's worth taking a moment to consider that each and every one of TC1's NDI outputs potentially substitutes for multiple traditional outputs. For example, traditionally, it would not be unusual to be forced to use numerous physical outputs all carrying the same source – for recording, broadcast, local monitoring, and so on – each destination claiming precious hardware resources. This is not the case with TC1, which allows multiple downstream system to connect to a single NDI output.

Thus it requires no hyperbole to state that TC1 potentially provides unlimited outputs, without the expense of additional hardware. And if you require more standard SDI outputs than the four provided on TC1's backplane, the system is easily extended using any number of rack-mountable output modules.

- Connect and switch up to 16 external video sources, and even more internal sources. TC1 supports SDI video input and output, internal and network video sources, and both analog and digital audio input and output.
- Connect popular video routers to multiply hardware input possibilities.
- Professional BNC connectors provide increased durability and reliability for camera connections.
- Control supported robotic (*PTZ*) cameras via network or serial connection (may require additional hardware).

- Freely mix 16:9 or 4:3 SD formats, and output as UHD, HD and SD 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 NDI™ Scan Converter clients.
- Update imagery in *Buffer* ‘watch folders’ connected to networked graphic workstations, even while 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.
- Re-entrant *M/Es* allow you to cascade unbelievable effects in endless creative ways.
- Use switcher row color groups 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.
- Output main or custom audio mixes independently on any of the audio output connection types.

2.4.4 TALKSHOW™ DIRECT

- NewTek’s innovative TalkShow™ Direct feature connects your TC1 directly to Microsoft’s powerful Skype TX™ platform, allowing you introduce Skype™ calls from almost anywhere in the world into your programs. TalkShow Direct requires nothing more than a network connection to an external computer running the (free) Skype TX control application that provides call management.

2.4.5 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.

2.4.6 MONITORING

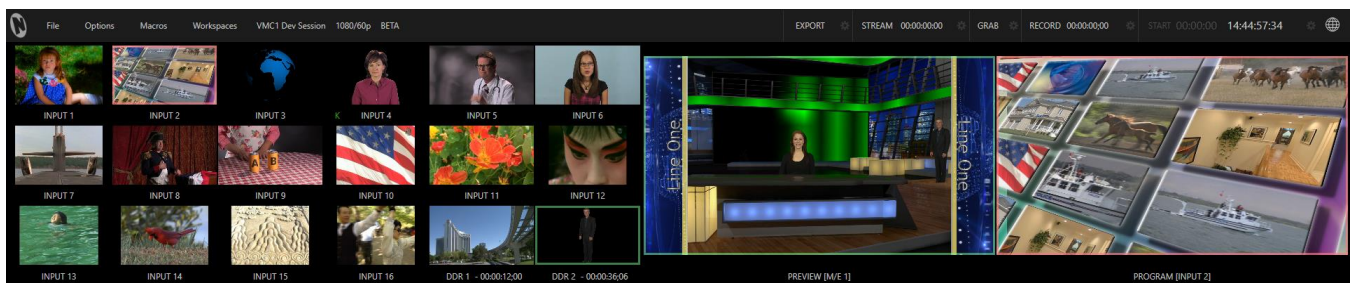


FIGURE 2-3

- TC1’s *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 desktop monitor array at left allows you to keep on any live or internal video source, including *Media Players* and IP video sources.
- External *Multiview Workspaces* offer many alternatives, including numerous multi-bridge layouts, overlays and *Event Clocks*.

- Monitor sources on the *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.

2.4.7 VIDEO PROCESSING

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

2.4.8 THE SWITCHER

TC1's powerful switcher with native support for popular professional video routers and NewTek's unbelievable NDI™ (Network Device Interface) support puts countless video sources at your fingertips.



FIGURE 2-4

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.

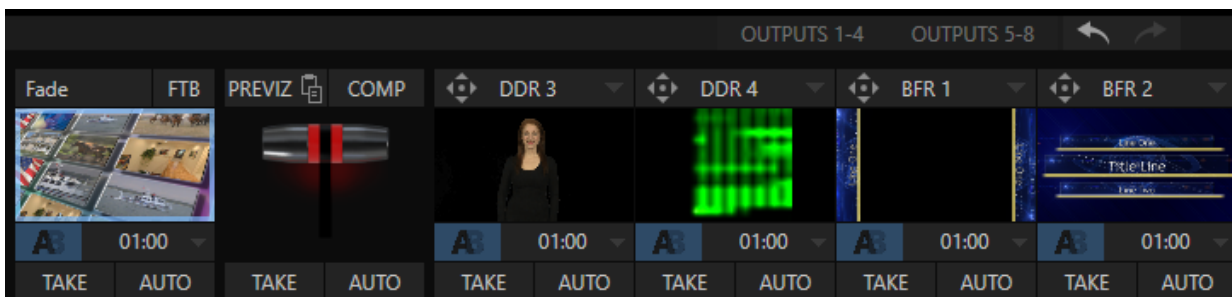


FIGURE 2-5

- Freely *hot-punch* or *transition* between external or internal video sources 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 displayed in the interface by 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

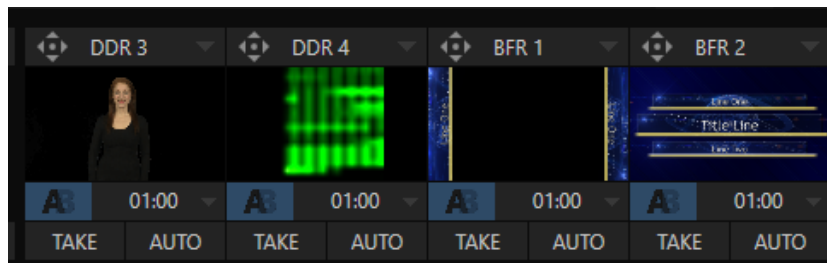


FIGURE 2-6

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 *video* feed 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.

2.4.9 M/ES



FIGURE 2-7

TC1's four color-coded *M/E* (Mix/Effect) banks provide stunning effects.

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

Each *M/E* bank supports:

- Up to four primary video sources per effect.
- Four *KEY* (overlay) channels with individual transition capabilities.
- Sub-mix functionality, with individual transitions for *A/B Background* layers and *KEY* channels.
- Individual *Scale*, *Position*, *Crop* and *Rotation* controls for all channels.
- *Buffer* support in every channel.
- Powerful *Comp* (composition) preset feature lets you animate *KEY* layer position, rotation and other attributes in full motion, as well as motion *Tracker* support.
- Convenient *MEM* system allows instant access to pre-configured *M/E* setups.

2.4.10 VIRTUAL SETS



FIGURE 2-8

- Achieve the look of large, sophisticated studio sets in a very small space with NewTek's *LiveSet™* virtual set technology.
- Virtual sets support up to four keyable video sources.
- *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.

2.4.11 RECORD AND STREAM

- Record your live-switched production at full resolution to a high quality, multi-platform, application friendly QuickTime® format.
- Recorded files include embedded timecode (on supporting models).
- IsoCorder™ technology supports up to four high quality local recordings at once, chosen from among local hardware camera inputs and all four outputs. In addition, TC1 provides control over another four optional external recorders.
- Easily grab solo still images from any input source or batch capture specified outputs.
- Simultaneous output for broadcast, projector and live web stream to in-house and remote audiences.
- Separately encode and stream two different programs 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.

2.4.12 MEDIA EXPORT

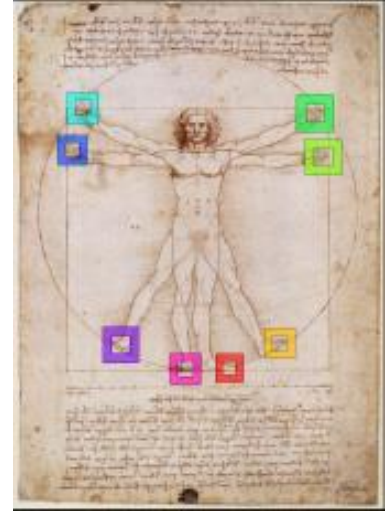
Export support makes it easy to distribute content to multiple targets in one pass. TC1 stores credentials for various social media and upload sites for you, and provides a queue for uploading and file conversion.

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.

2.4.13 AUTOMATION

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



2.4.14 HOTSPOTS, TRIGGERS AND TRACKERS

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

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

2.4.15 IMPORT

IMPORT MEDIA

The integrated *Import Media* feature provides a convenient one-stop approach to gathering productions assets, and ensuring they are prepared for use in live production.

- Batch import media files for use in *Media Players*.
- Imported files can be automatically categorized and sent to the correct locations, making them easy to use during live productions.
- Files are automatically transcoded to formats ensuring smooth playback when necessary.

2.4.16 AUDIO MIXER

TC1 provides extensive multi-channel audio control and management.

- Adjust and sweeten audio sources for your program manually or automatically. Control external audio sources supplied via SDI, analog, NDI or other format supported by installed audio drivers (such as Dante™ from Audinate).
- Control output levels for program, headphones, auxiliary outputs, recording, and stream separately.
- Convenient *MEM* system allows single-click access to prepared *Audio Mixer* setups.
- Extensive, powerful and flexible 'audio follow video' options.
- Audio automation also allows 'video follow audio', 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 meter* scales: Show *VU meter* calibration as digital (dBFS) or analog (dBVU or dBu).

2.4.17 INTEGRATED MEDIA PLAYERS

TC1's numerous *Media Players* and title system serve up graphics, titles, video clips and audio files quickly and easily during your live productions.

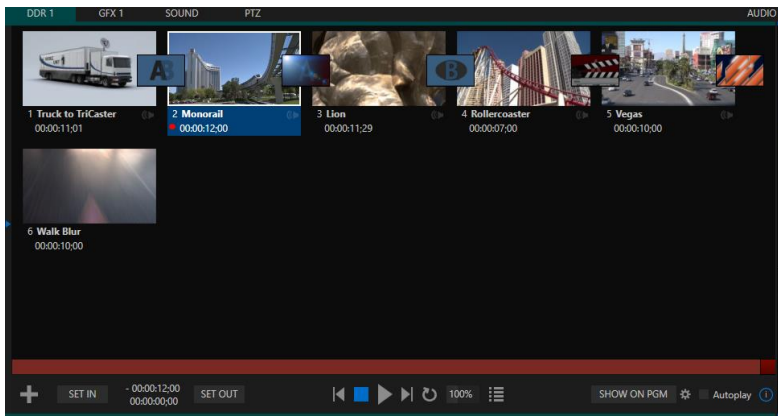


FIGURE 2-9

- Add a/v clips, sound files or still image files to *Media Player* playlists.
- Trim and re-order playlist entries.
- Add colorful transitions between clips.
- Store playlists in *MEM slots* for easy recall.
- Flexible playback controls include variable *Speed* and *Loop* options.
- Each *Media Player* has corresponding volume and other advanced audio controls in the *Audio Mixer*.
- Convenient ‘per clip’ audio level and playback *Speed* control is also provided.
- *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.

2.4.18 BUFFERS

The *Buffers* module provides quick review and management of TC1’s internal media buffer system, and is in reality a combined player and asset management tool fully supported by TC1’s *Macro* system.

Buffers can be applied in any video channel, including all main *Switcher* and *M/E* rows, or as overlays in the numerous *DSK* and *KEY* channels.

Buffer ‘slots’ can contain animated effects (compiled from your own clips using the supplied *Animation Store Creator* application), still graphics or title pages, all with full alpha channel support (the number of buffer slots supporting animation varies by model).

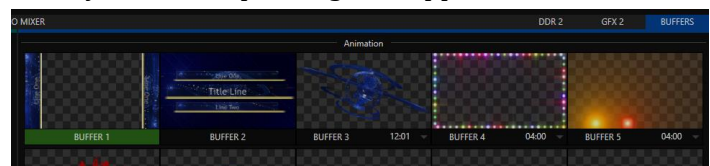


FIGURE 2-10

Animated buffers come in two types, and either loop endlessly (perfect for bugs, station IDs, etc.) or ‘auto-run’ once when displayed. 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*. In addition, each *Buffer* slot has its own set of convenient presets.



2.4.19 TITLES AND GRAPHICS

TC1 includes an extensive set of live-editable title pages in various theme packs, all ready for immediate use in your productions. Also included in TC1's integrated software suite is a special version of LiveText™, NewTek's professional titling and graphics application. LiveText lets you create your own great looking title pages and motion graphics, including scrolls and crawls that can be played back in *DDRs*.

2.4.20 OPTIONAL CONTROL SURFACES



FIGURE 2-11

TC1 control surfaces have been designed as the perfect 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 add-ons for your TC1.

In summary, TC1 gives you more combined production power than any other single broadcast appliance. Let's jump in now. First, we'll get you connected; afterward, we'll explore TC1's most important features.



This chapter explains how to connect power, monitors and audio visual sources, and external control devices to your NewTek TC1™ system. It also reviews the registration process. After completing this short section, you'll be all set to begin using your TC1.

To begin, let's review 'what came in the box':

- NewTek TC1™
- A/C power cabling
- NewTek mouse and keyboard
- Registration reminder card

SECTION 3.1 COMMAND AND CONTROL

Hint: TC1's 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.

Hint: TC1 provides four monitor ports – 1x DVI, 1x HDMI, and 1x Display port. The TC1 interface automatically runs on the monitor selected as the "main display" in the Windows control panel Display applet, which may be connected to any of these ports as you wish. See Section 3.6.2 regarding supplemental monitor connections.

2. Connect the *mouse* and *keyboard* to suitable USB ports.
3. Connect the *power cord* to an A/C power receptacle.
4. Turn on the computer monitor.
5. Press the *Power* switch located behind the flip-down front door.

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

Though not a requirement, we do strongly recommend that you connect TC1 to an uninterruptable power supply (UPS), as for any 'mission critical' system. Likewise, consider A/C "power conditioning", especially in situations where local power is unreliable or 'noisy'. Surge protection is especially important in some locales.

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

A word about UPS devices:

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

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

SECTION 3.2 LICENSE AND REGISTRATION

On launch, TC1 presents an *End User License Agreement* dialog. After you accept this, one or more *Registration* dialogs may be presented. If requested to do so, please enter the unique *Serial Number* and *Product ID* for your system.

Important note: TC1's video outputs display a watermark until the software is unlocked.

REGISTERING TC1 REQUIRES AN INTERNET CONNECTION to register and obtain your unlock code directly (registration dialogues will guide you through the steps). If your studio environment does not have Internet access, you (or perhaps your reseller, or system integrator) can register the system before moving it to the desired location.

Note that performing a standard TriCaster Restore operation (Appendix section A.5.7) returns the system to 'as-shipped' state – meaning you will again require Internet access for registration purposes. You can circumvent this necessity by restoring from a custom "User Backup" prepared following initial registration – see Appendix section A.5.7 for details.

Hint: Information on connecting TC1 to a network can be found in Section 3.13.

3.2.1 REGISTRATION QUESTIONS

NewTek's Customer Support center can help with registration questions by telephone or online chat, if that is more convenient. Please have your *Product ID* (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 registration (unlock) code for your system; 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 – see the subheading System Utilities in Section 5.2.3 for more on this, or just visit the Updates and Downloads page on NewTek's website.

ENHANCED SUPPORT (PROTEK)

NewTek's optional ProTekSM 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 3.3 RACK MOUNTING

TC1 is 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, and this is true of TC1 as well.

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 TC1 in particular requires ventilated space above the unit (1RU minimum is recommended).

Hint: When operating TC1 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 3.4 INPUT CONNECTIONS

3.4.1 CONNECT A/V SOURCES

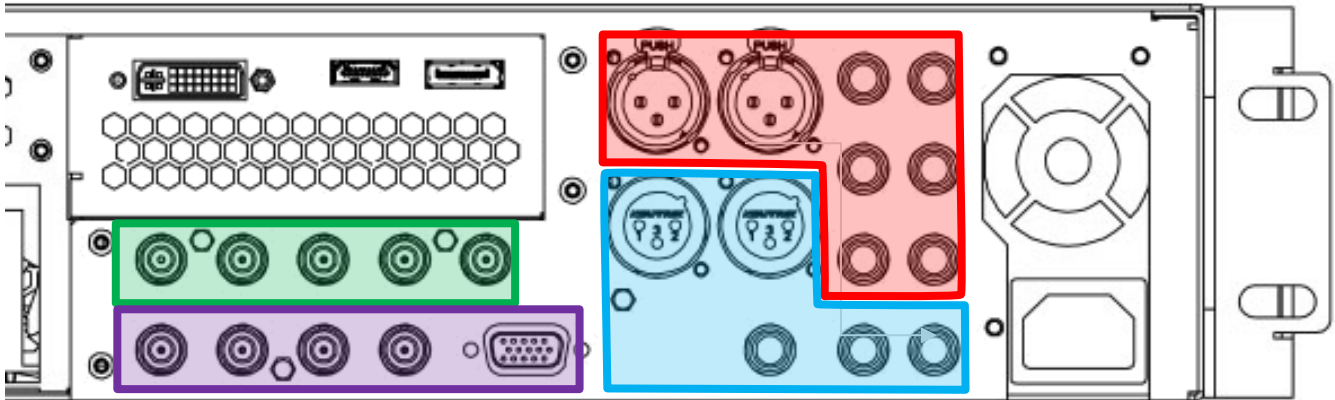


FIGURE 3-1

- **Analog audio inputs: 1-4**
- **Analog audio outputs: Master, AUX 1, and Phones jack**
- **SDI Video Inputs 1-4 and Genlock input.**
- **SDI Video Outputs 1-4 and Tally connector**

Note: Hardware details as depicted are subject to change without prior notice.

1. As desired, connect any local SDI video sources to one of the BNC connectors in the *SDI IN* section.

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

3.4.2 CONNECTING A TC1 CONTROL SURFACE

Please refer to 21.1.1 for a discussion on connecting and configuring a control surface.

3.4.3 SDI VIDEO ROUTERS

With the appropriate software installed, TC1 systems 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 TC1 by Ethernet cable, and then connect one (or more) of the router’s video outputs to TC1’s SDI inputs (assigned to *Switcher* buttons with matching numbers, which is the default), using suitable video cables.

For example, by default, router output 3 would be connected to TC1’s *Input 3* (*Switcher* button 3) for control communication between the devices to be properly linked.

- Click the *Shutdown* button on TC1’s *Home page* (Startup), and click the *Administrator Mode* at right.
- In the *Administrator Mode* panel, click *Exit to Windows*.
- Navigate to C:\ProgramData\NewTek\TC1\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 TC1 to recognize. 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 TC1.

Note: TC1 communicates with routers using individual IP address and port numbers, allowing multiple routers to be connected simultaneously. Several TC1’s can even control either the same router(s). 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, TC1 may be able to access that name and use it for *Switcher* buttons as appropriate.

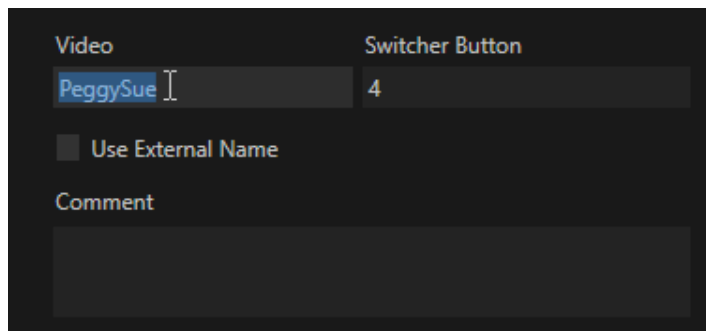


FIGURE 3-2

To enable this behavior, checkmark the *Use External Name* switch in the *Properties* panel (Figure 3-2) opened by the *Switcher* (or *M/E*) button context menu item of the same name.

BLACK MAGIC DESIGN® AUTO-DETECTION

For backwards compatibility reasons, these routers are auto-detected by default. (Black Magic® routers may use a USB control connection instead of a network. The router's firmware should be up to date. If detection fails, please contact BMD support.)

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 3.5 GENLOCK CONNECTION

The *Genlock* input on TC1's backplate is for connection of 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 supplying TC1, and TC1 itself. To connect the genlock source TC1, supply the reference signal from the 'house sync generator' to TC1's *Genlock In* connector. (See Section 3.12 regarding genlock configuration.)

SECTION 3.6 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 TC1 production session.

3.6.1 A/V OUTPUT

TC1 provides multiple video and audio output connector groups, and very flexible options for display of your live and recorded video streams. Here are some of the possibilities:

- Output a huge number of different sources – including up to four different mixed compositions, as many as nineteen more discrete NDI outputs, four internal Quicktime recorders, two local monitors, and dual streaming encoders, for a huge total number of outputs.
- All hardware inputs, all outputs, Buffers and Media Players 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 supplemental monitors.
- Stream two unique programs to multiple CDNs (Content Delivery Networks) on the Internet via a suitable network connection.

TC1 supports independent configuration of the main outputs, labeled *MIX 1-4* in the interface (the video format for these outputs is configured in the *Live Desktop's Hardware 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).

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

3. Connect TC1's audio outputs.
 - a. *Analog audio* – Connect external audio devices to the connectors in the *AUDIO OUT* section.

TC1 offers two pairs of analog audio output connectors:

- i. *OUT 1* XLR connectors provide (balanced, line level) sound from the *Master* mix.
 - ii. *OUT 2* connectors provide sound from the mix assigned to the *AUX 1* audio bus.
- b. *Digital audio* – A separate digital audio connection is not necessary for SDI or NDI output.

HD and SD Options

As mentioned earlier, for HD sessions, TC1 is able to support *simultaneous* output of both SD (Standard Definition) and HD (High Definition) video.

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.

3.6.2 SUPPLEMENTAL VIDEO OUTPUTS

As mentioned back in Section 3.1, there are three monitor ports on TC1's backplate. The operating system will have set one of these as the "main display", and this is where TC1's own interface will appear.

Hint: You can select the monitor which is the "main display" by choosing Administrator Mode from the Shutdown menu on the Home Page in Startup, then clicking Display under the Settings heading.

The two unused monitor ports on the backplane are available to connect to additional monitors, projection devices (etc.) for various purposes, including program output for IMAG (Image Magnification) installations, or as specialized monitors for the convenience of the production team.

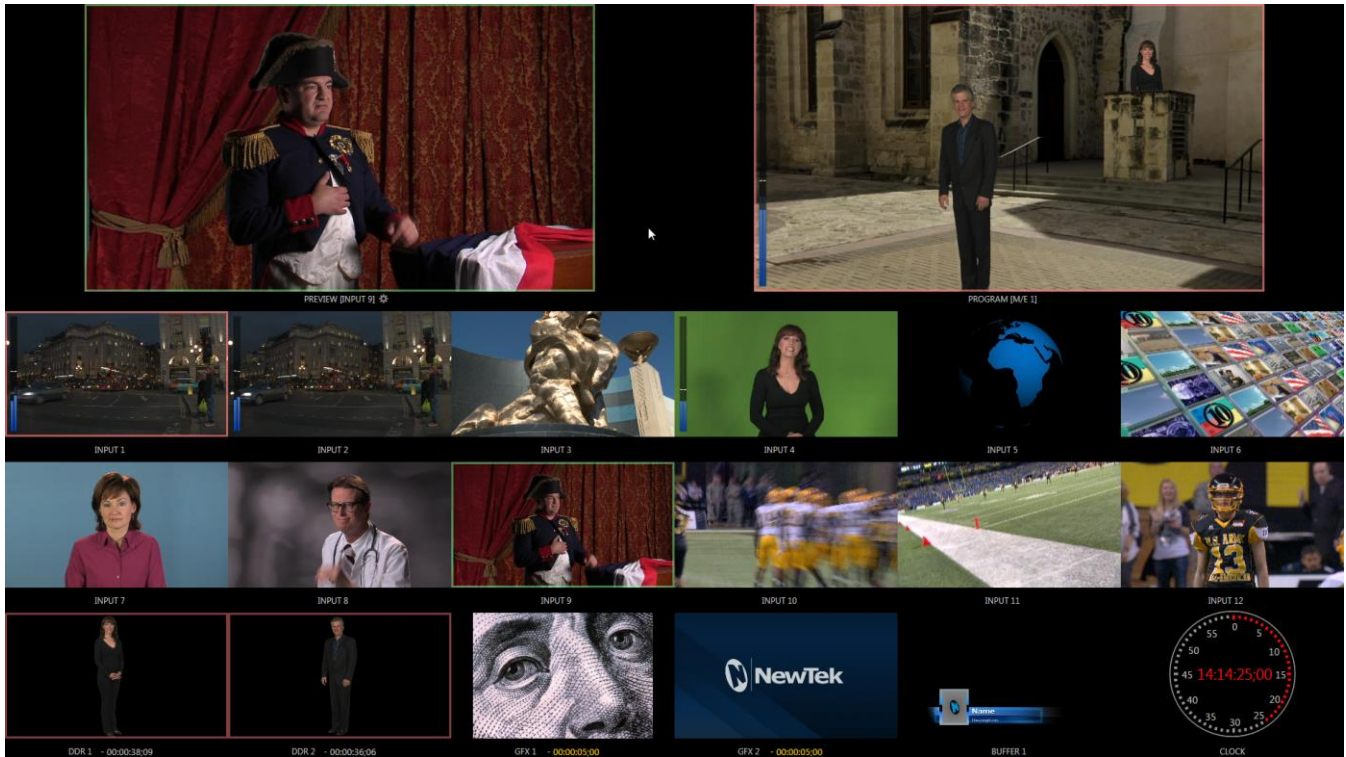


FIGURE 3-3

These supplemental monitors are referred to as *Multiview* outputs, and offer a variety of optional layouts that can be selected at any time in TC1's *Live Desktop*.

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. TC1 attempts to display output despite mismatches, but may not always succeed.

SECTION 3.7 TALLY LIGHTS



FIGURE 3-4

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

Note: Please see also third party tally solutions listed at <http://www.newtek.com/solutions/newtek-developer-network/all-partner-list>.

3.7.1 CONNECTION DETAILS

Here is a pin-out listing for TC1's HD15 Tally connector:

<ul style="list-style-type: none"> • Pin1 – LED1 • Pin2 – LED2 • Pin3 – LED3 • Pin4 – LED4 • Pin5 – reserved 	<ul style="list-style-type: none"> • Pin6 – reserved • Pin7 – GPI3 • Pin8 – GPI4 • Pin9 – GND • Pin10 – GND 	<ul style="list-style-type: none"> • Pin11 – GPI1 • Pin12 – GPI2 • Pin13 – NC • Pin14 – 3.3V (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) has a 200 ohm current limiting resistor inside TC1.
- 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 has not been implemented at this time.
- To prevent damage to internal components when making connections to the tally light jacks, care should be taken that connection to Pins designated GND (Ground) are always at ground potential.

SECTION 3.8 STARTING A SESSION

- If TC1 is not already running, power it up now to reveal the *Startup Screen*.

Hint: If TC1 is already running, and the Live Desktop or another area of the interface is visible, you may need 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 session settings (see Section 5.1 for a discussion of sessions).

THE HOME PAGE

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

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

Note: TC1 supports a variety of optional session configurations for live production. You can choose either UHD (Ultra High Definition), HD (High Definition) or SD (Standard Definition) operating modes.

SD options include both 4:3 and 16:9 (widescreen) image aspects. TC1 also permits you to select from different video standards according to your locale, whether NSTC, NTSC-J (Japan) or PAL.

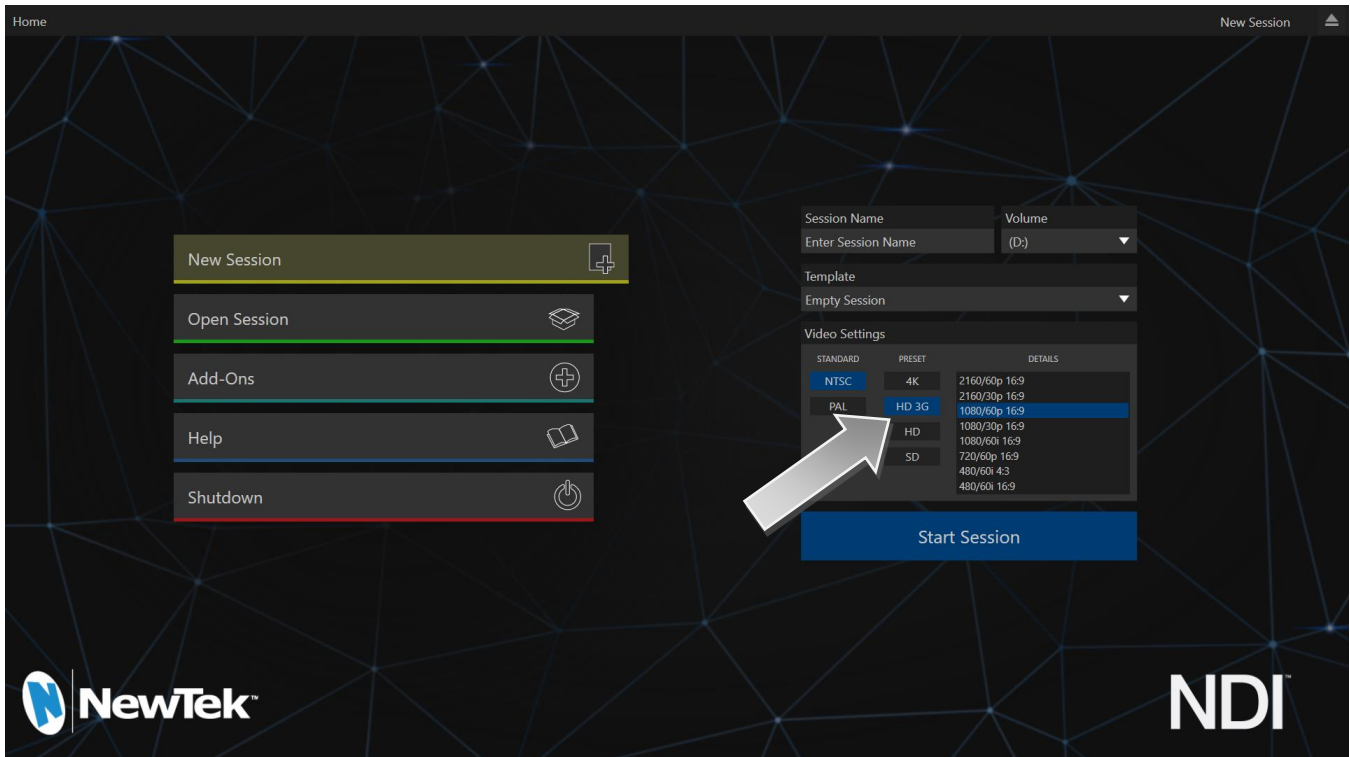


FIGURE 3-5

Continue with session creation by designating the *Video Standard* used in your locale, either *NTSC* or *PAL*. Then, for this first session, let's choose *the HD 3G* preset for *Resolution* (even if the cameras you plan to connect are SD 4:3). Finally, click the *Start Session* link below.

By default, new sessions are created on the D: (Media) drive (see Section 5.2.1 for a discussion of session *Volume* options).

THE SESSION PAGE

Clicking *Start Session* will take you to the *Session Page*. As our intention is to configure our connections (done in the *Live Desktop*), click the *Live* button on the menu at left.

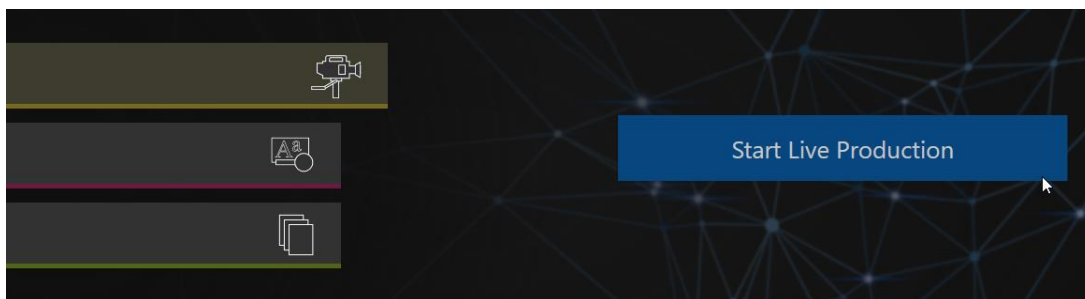


FIGURE 3-6

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.

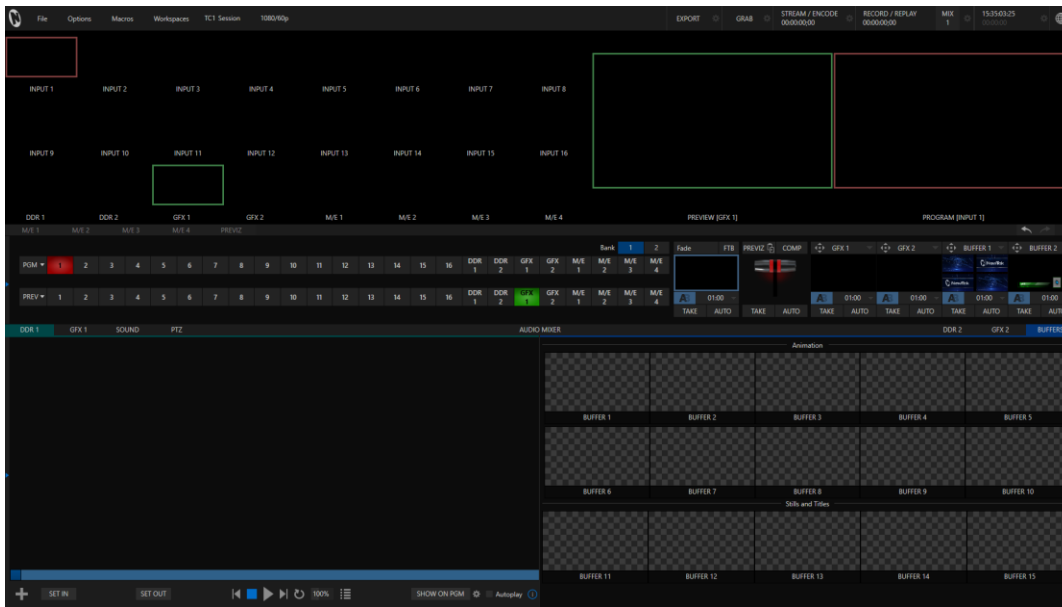


FIGURE 3-7

Initially, as you have not yet configured inputs or added content, the *Live Desktop* looks a bit barren (Figure 3-7). 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 2.3, but we’ll examine it more closely in Chapter 4, Basic – coming up soon.)

SECTION 3.9 CONFIGURE A/V OUTPUT

3.9.1 PRIMARY OUTPUTS

TC1 provides complete video input monitoring right on the *Live Desktop*. This allows you to operate it even without downstream video monitors or devices. (Really, for facilities using NDI-enabled broadcast devices and systems, there would be no necessity to bother with any traditional connections at all.)

Often, though, you will want to connect external monitors or other downstream devices to the backplate connectors in the *SDI OUT* group (see Section 3.6). 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.

Name	Video Output				Audio Output				
	Source	Format	SDI	NDI	Source	SDI	NDI	Analog Out 1	Analog Out 2
Mix 1	Selectable	Session	✓	✓	Selectable	✓	✓	Master ch.1, 2	Aux ch.1, 2
Mix 2	Selectable	Selectable	✓	✓	Selectable	✓	✓	n/a	n/a
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 just to the right of the source label below the monitor pane to open the *Hardware Configuration* panel (Figure 3-8).

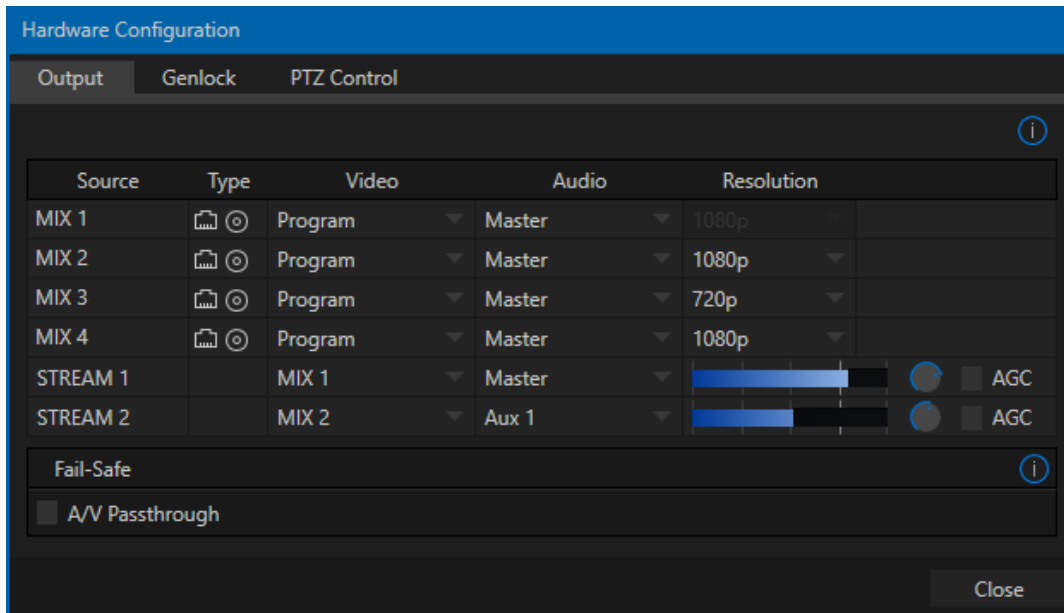


FIGURE 3-8 – DEPICTING OUTPUT OPTIONS FOR A 1080P/60 SESSION

This panel hosts several tabbed panes, including 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, including the following:

- What video source will you assign to that output?
- What audio mix or 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 ...

Hint: Resolution and color adjustments for devices connected to the various 'monitor ports' are located in the Display Settings panel, accessible from the Workspaces menu found in the main Dashboard.

OUTPUT CHANNEL OPTIONS

Let's review video *Source* selection first.

Note: The controls presented in this panel can vary depending on the current session format. For example the number of independent mixed outputs is reduced in UHD format sessions.

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 SDI OUT group on the system backplane; they also appear on your network as NDI sources.

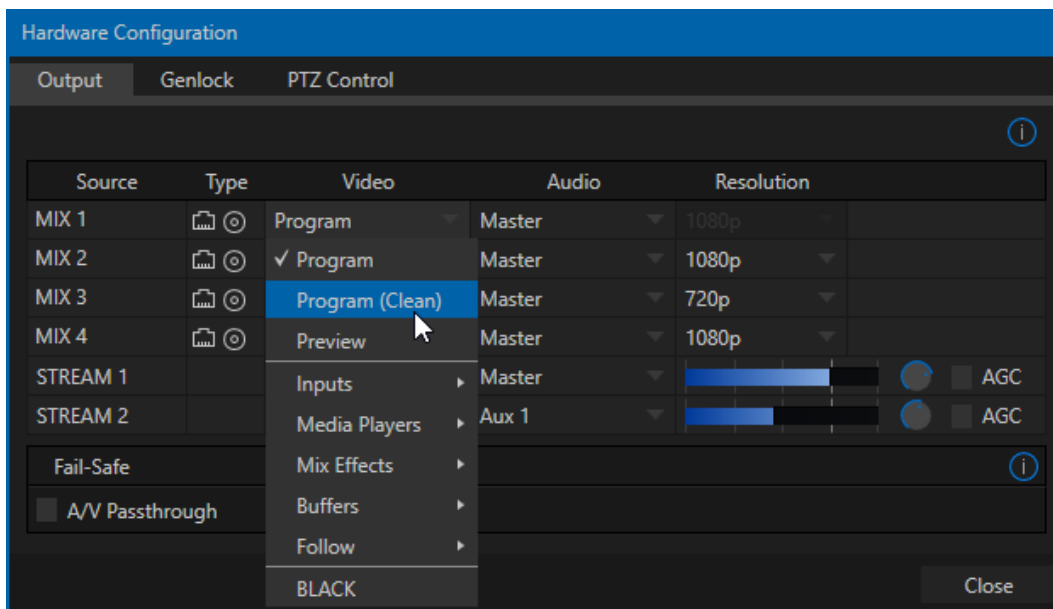


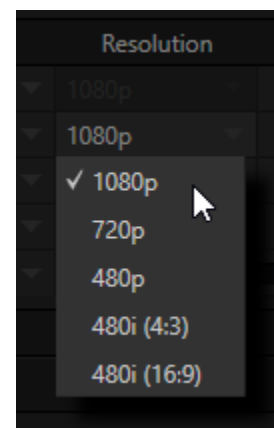
FIGURE 3-9 – DEPICTING OUTPUT OPTIONS FOR A 1080P/60 SESSION

Hint: NDI outputs are listed on supporting external systems in the format machine_name (sourcename). For example, if your system is named MyTC, the second output would be appear as “MyTC1 (MIX 2)”.

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

- *Program* output
- A clean *Program* feed
- The ‘look ahead’ *Preview*
- The feed from any external Switcher input
- Graphic or video output from a *Media Player*
- Direct output from any *M/E*
- Clean output from any *M/E*
- Output from any of the 15 *Buffers*
- *Follow* selected *M/E Program* or *Preview*, or a *Switcher* color group
- *Black*

Audio menu options include any of the *Master* or *Aux* mixes, or the sound from one of TC1’s audio inputs. The video format (*Resolution*) for *MIX 1* always matches the current TC1 session format, so its menu is locked. The *Resolution* menu allows you to independently configure the format for *MIX 2-4* (Figure 3-10) for sessions in most formats.



Note: See 8.1.7 for detailed information on all output options.

3.9.2 MORE NDI OUTPUTS

In addition to all primary outputs being provided as network sources (NDI), without any additional configuration steps required, TC1 also sends all four local SDI inputs, if in use, to outboard systems over the network as NDI sources/.

Source selection settings for video inputs can be accessed in TC1's *Live Desktop* monitoring section, so let's spend a few moments there before continuing.

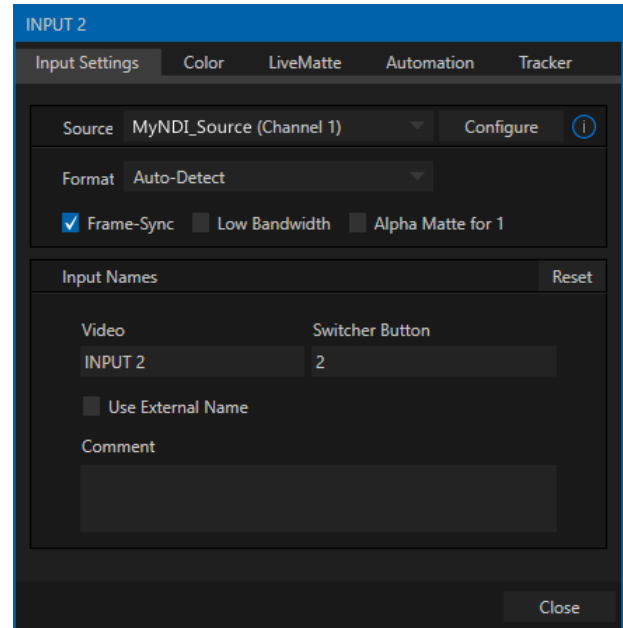
The individual monitor viewports on the *Live Desktop* can be flexibly assigned to different *Switcher* sources and outputs. Complete monitor layouts can be stored and recalled using tools located in the *Workspace* menu, located in the *Dashboard* across the top of the screen.

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 3.4.1).

1. Click *Workspaces* 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* (depending on how many monitors are connected). Select the layout labeled *A* under *Interface* (if it isn't already check-marked).

This is the default workspace for new sessions. To assign different video sources to a viewport, you could select *Configure* from a monitor's (right-click) context menu, but let's take a different approach.

3. Move your mouse over the viewport for *INPUT 1* and notice that a *Configure button* (gear icon) appears beneath it at right. Click this to open a tabbed settings panel (Figure 3-11).



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

4. Click the *Source* drop-down menu to see a list of sources you can select. Each is identified by a thumbnail icon. The four local SDI inputs and *Black*, are listed first. Additional available sources discovered by TC1 are grouped below under headings that identify the source device.

Hint: In some cases, a source's thumbnail icon may be black initially – as for example when a hardware source has not previously been connected. Thumbnails are updated periodically. If a source is no longer sending frames but remains connected, the last image seen may be shown.

For NDI sources, simply making a selection completes the connection. If you choose an SDI source, further selections may be required at times. SDI inputs default to *Auto-detect (SDI)*; in such a case, or if your connected source type matches, you'll be all set.

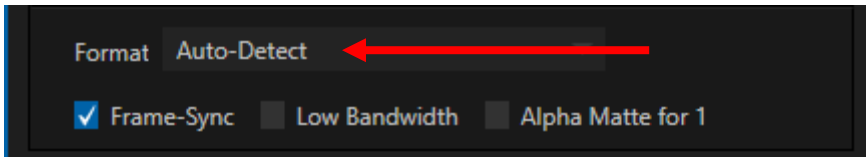


FIGURE 3-12

Otherwise (if auto-detect is unable to determine a suitable format) you can specify a format manually (Figure 3-12).

5. 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.

3.10.1 CONFIGURE A VIDEO ROUTER INPUT

Right-click on the *Switcher* row button for the video input where the router is connected (see Section 3.4.2 for more detail) to select which router input will be transmitted to TC1.

SECTION 3.11 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.

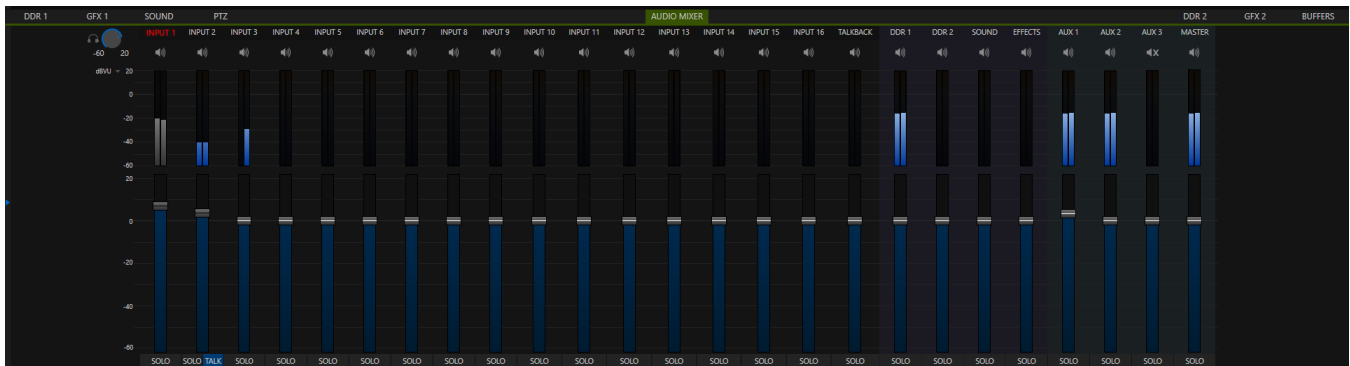


FIGURE 3-13

In addition to internal sources and outputs, the *Audio Mixer* supports sixteen different independent external audio source connections, each of which can be assigned to a nearly endless list of audio source types.

Each input and output has its own control panel with *Volume* slider(s), *VU* meter(s), and other convenient features. An identifying label sits at the top of each control panel.

Roll the mouse pointer over the label to reveal a *Configuration button* (gear) at right which, when clicked, opens the *Configuration* panel for the input.

In this latter panel, click the *Connection* menu at the top to display options for an input. You will see the four local hardware inputs listed first (after Silence) in the menu as “Input 1”, “Input 2”, etc.).

Each 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 TC1’s backplane.

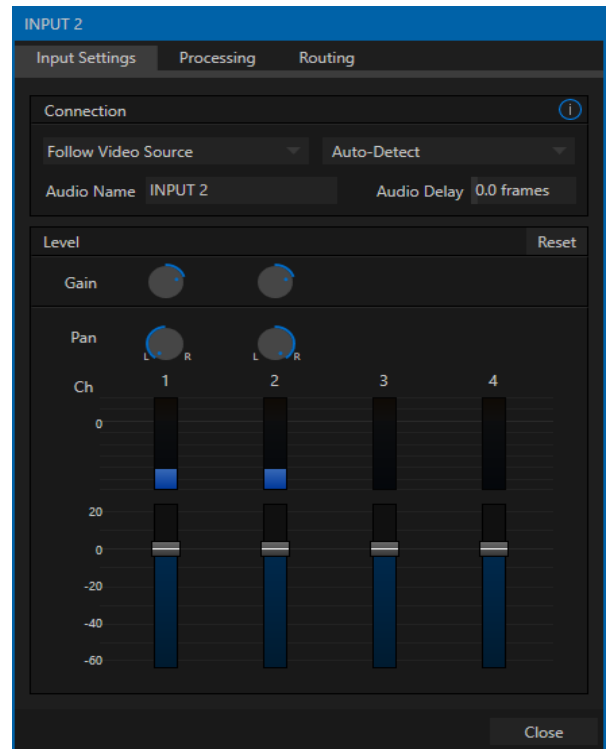


FIGURE 3-14

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

Alternatively, you can assign any of the sixteen audio input connections to ‘follow’ any video source (e.g., *Follow Input 3*), or indeed multiple sources. Beyond this, you have the option of selecting the audio delivered over the network from any NDI or (Audinate™) Dante protocol audio source.

Note: TC1’s 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 or fully corrected later. For this reason, it’s customary to configure normal operating level (also referred to as the ‘alignment level’, or 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. TC1’s audio controls follow well-established 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. TC1’s VU meters have selectable indexing, allowing you to view a traditional dB VU scale or dBFS as you please (see Section 15.10.1).

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 15.9.

SECTION 3.12 CONFIGURE GENLOCK

As you would expect, TC1 supports genlocking. 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 *Hardware Configuration* panel by double-clicking the (*Live Desktop*) *PROGRAM* viewport.
3. Click the *Genlock* tab (Figure 3-15).
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.

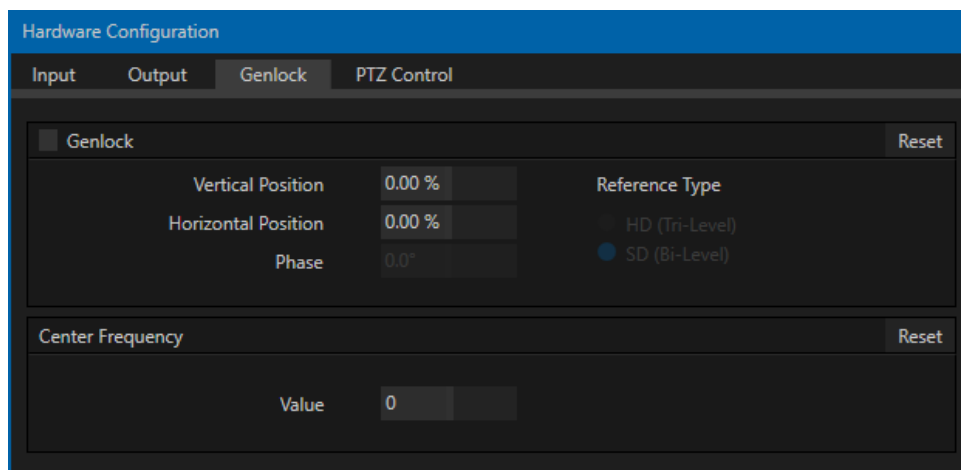


FIGURE 3-15

Ideally both the cameras and TC1 should be genlocked. If they are not genlocked to the same reference signal as the TC1 output, a TBC (Time Base Correction) operation is automatically applied. 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.

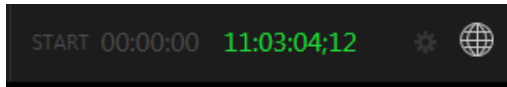


FIGURE 3-16

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

SECTION 3.13 NETWORKING

Of course, TC1 provides extensive support for NDI sources and NDI outputs across a network. Few will be surprised to find that this next generation feature requires your system to be connected to the network. ☺

TC1 actually supplies two 1 Gigabit network connections on its backplane. Generally, simply connecting a suitable cable from an Ethernet port on TC1's backplate 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, Basic Training) will introduce you to online tutorials, training materials and other assets to guide you through your experience using TC1.

Chapter 4 BASIC TRAINING



This chapter provides a little information designed to guide you to other resources that will introduce the major components and functions of your NewTek TC1®. This includes extensive online training resources, friendly and helpful online communities, and more. More detailed reference material on all aspects of TC1 follows in Part II (Reference)..

Having made the essential external connections in the previous section, you'll want to start your first practical live production session, and skim through some important fundamentals. This would be the ideal time for us to introduce you to a special feature of your TC1® – it has its very own webpage, which it serves to any web browser on your local network.

We'll talk more about the details of the powerful tools provided by this means, but for the moment we'll limit ourselves to discussing the *Resources* page.

SECTION 4.1 WEB CONTROL

Having launched a session (refer to Section 3.8 if you need a refresher), you will notice a *Help* button (represented by a globe icon) at upper-right in the *Dashboard* at the top of the *Live Desktop*.

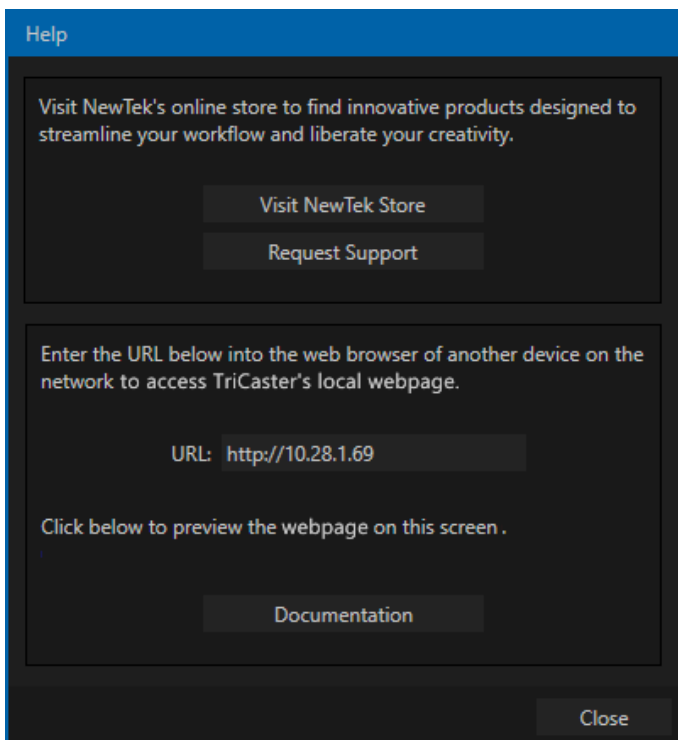


FIGURE 4-1

Click this to open a panel hosting several buttons that lead to web links, including one labeled *Documentation*. Use this to view TriCaster’s local webpage in a browser on your TC1. To view the webpage externally instead, simply connect any suitable device (be it a laptop, tablet, or desktop computer) to the same network your TC1 is on. Then open the device’s web browser, and navigate to the URL shown in the *Help* dialog.

Hint: Access to TC1’s local webpage does not require an external Internet connection, though some of the links provided on the Resources page will fail without one.

The *Resources webpage* is served directly from your TC1, and thus is always available. Not only does this mean its content is always up to date and relevant to your installed software version, it also means that you can view it on a convenient mobile device alongside your TC1.

This allows you, for example, to use an iPad® or other mobile device to follow along with the steps outlined in an online tutorial, or look up the details of a feature in the User Guide even during production.

4.1.1 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
- **Training** – online video tutorials and Operator Certification programs.
- **Extras** - updates, codecs, utilities, and the NewTek *DataLink™* browser extension (see Section 4.1).
- **Communities** – forums, blogs, YouTube™ videos, Facebook®, and more ...
- **Support** –Customer Service (including live chat) and product protection programs.

SECTION 4.2 VIDEO TRAINING

NewTek is in the video production business, and it couldn’t be more appropriate 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/Es*, *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 4.3 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 TC1: every button, menu item, feature and control is considered in this section, so you can take full advantage of your system.



TC1's Startup 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 Startup Screen's *Home Page* appears whenever you launch TC1™.

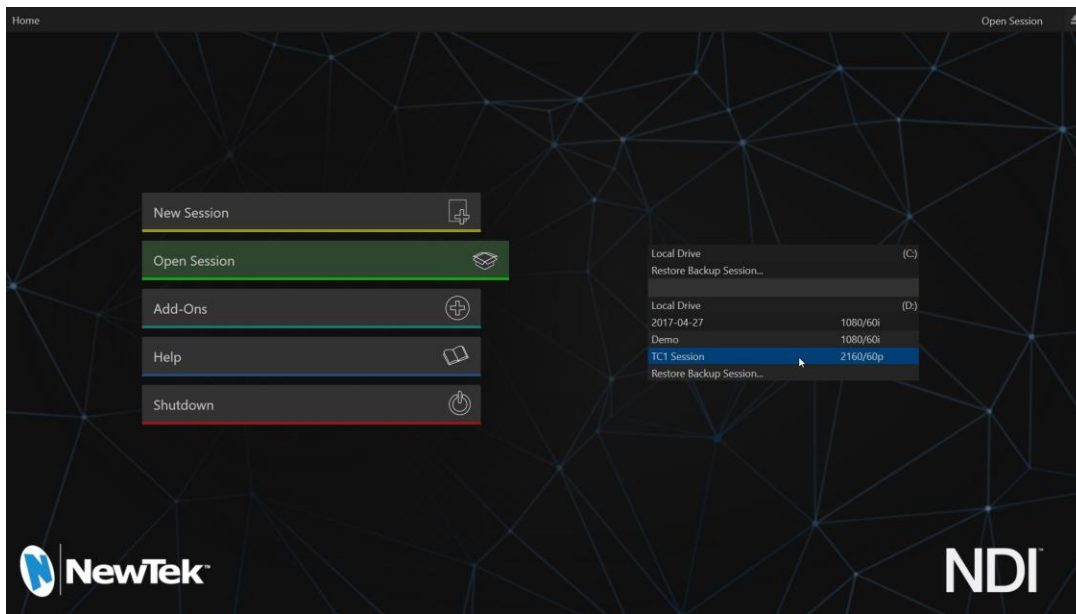


FIGURE 5-1

From this screen you will create and launch *sessions*, then choose what sort of operations you wish to perform within it by making a selection from the main menu 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 TriCaster 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 to TC1?
- 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?
 - What video mixes and other internal sources do you want to route to TC1's outputs?
 - Do you intend to configure a connection for a projection system? What external audio connections and adjustments are required?
- You might create a playlist of custom title pages in a *Media Player*, along with additional graphic elements for the *Buffers*.

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

- You could grab a series of still images from *Program Output*.
- Grab some clips from the production for replay later.
- And capture 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 all of the above 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, your TC1 automatically locates 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 on launching TC1. It is dominated by the main menu shown in Figure 5-2.

When you click an entry on the menu (such as *New* or *Open*), that item advances to the front-most position.

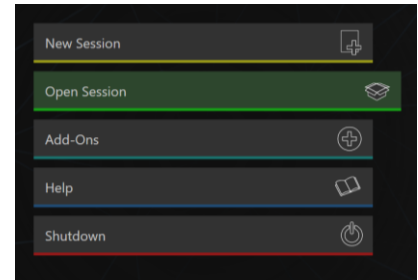


FIGURE 5-2

Choosing a button on the menu also 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 TC1 is create a session. In anticipation of this, the *New* button 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 5-3.

5.2.1 NEW (SESSION)

As just mentioned, clicking *New* on the menu 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

Continue to choose a video format suited to your needs:

- Click a format preset button such “SD”, “HD”, “HD 3G” (1920x1080/50p or 1920x1080/60p), or even “4K” (2160/30p), or ...
- Choose another suitable format using the menu just below, up to 2160/60p.

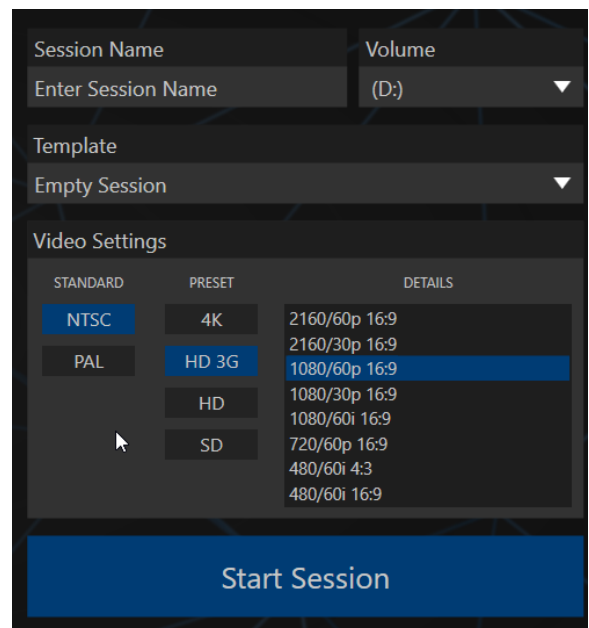


FIGURE 5-3

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 (the current date) using the keyboard.

TEMPLATE



FIGURE 5-4

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.

VOLUME

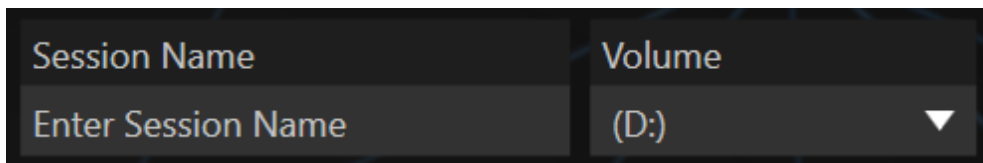


FIGURE 5-5

A control labeled *Volume* appears beside the *Session* name. This assigns a hard drive for the session (and its associated content) to be created and stored on.

Note: When using TC1's internal IsoCorder™ to record multiple sources, you may assign more than one volume to capture duties. Sessions keeps track of 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.

Note: External drives are not recommended for active use as session drives, though they may be fine for recording purposes.

FORMAT AND OUTPUT CONSIDERATIONS

Remember that for live production, TC1 can simultaneously supply output in different formats. Note that the session setting has some other ramifications, too. 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; the opposite is also true.

Note: See 8.1.7 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*.

EJECT

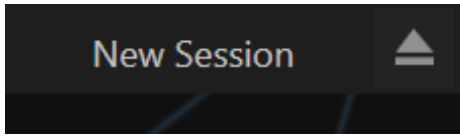


FIGURE 5-6

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*.)

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.

5.2.2 OPEN (SESSION)

If there are existing sessions on the system, the main menu on the *Home Page* will default to *Open* (Figure 5-7). Clicking *Open* causes the *Sessions List* to appear at right. This pane lists all sessions stored on qualified media currently mounted on TC1.

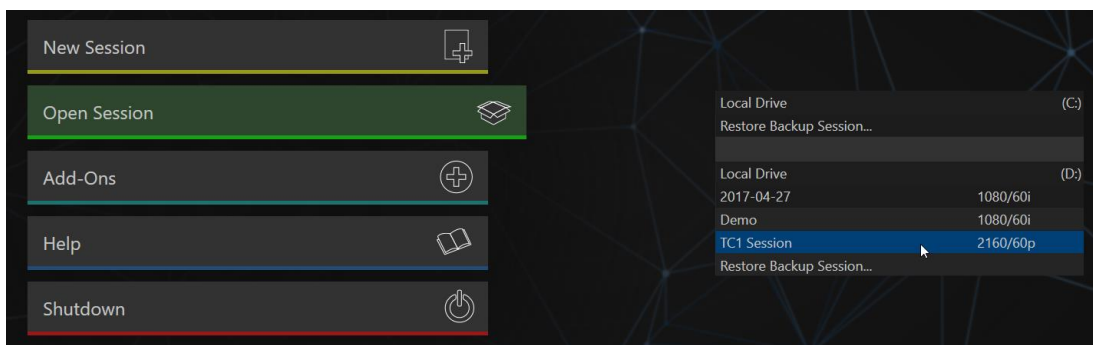


FIGURE 5-7

Available sessions are grouped under the names of the storage volume they are located on (Figure 5-7). 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.

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 *Startup 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 5-8), and use the file explorer provided to select a *SessionBackup* file.

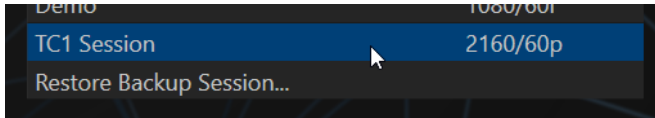


FIGURE 5-8

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

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

OPENING A SESSION

You can highlight a name in the *Session List* using the *Up* and *Down* arrow keys; then press the *Enter* key to open it (or simply click the name of a session to open it immediately). Selecting a session takes you to the *Sessions Screen*.

5.2.3 SHUTDOWN

This selection provides *Restart TC1*, *Shutdown TC1*, 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* main menu exits TC1's live production environment, and takes you to a new screen (Figure 5-9) that offers various functions and settings having to do with system maintenance and management.

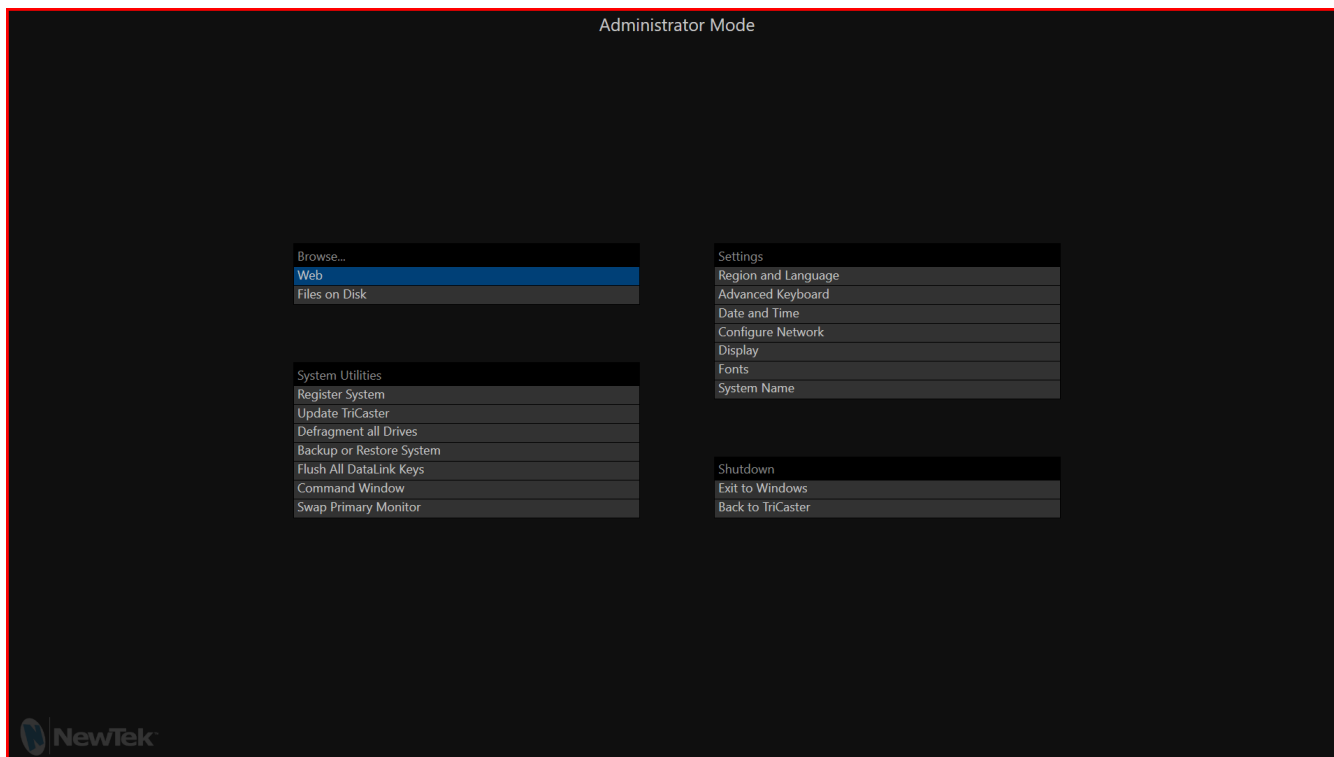


FIGURE 5-9

Administrator Mode options 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

- *Register System* – TC1 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.)
- *Update TriCaster* – NewTek may periodically provide software updates. Updates can enhance performance, security or even add useful new features. If TC1 is connected to the Internet, clicking *Update TriCaster* takes you to the Updates and Downloads webpage where you can locate the most recent software version.

Having done so, you can download and run the Auto Updater for the new version, or use the Download Tool option, which allows you to store the related files on another system for later transfer to your 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. Please refer to Section A.5.6 in Appendix A for details.
- *Command Window* – Open a system command line window, allowing you (among other things) to use advanced commands to manage your system and network settings.

SETTINGS

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

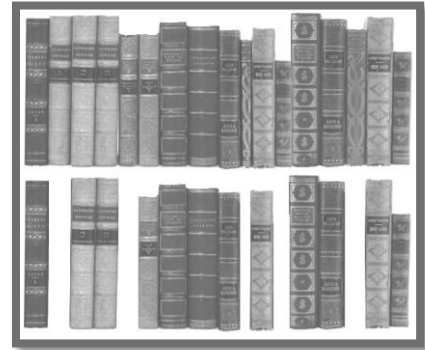


FIGURE 5-10

- *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 *Startup* screen.

5.2.4 HELP



FIGURE 5-11

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. Add-Ons

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



FIGURE 5-12

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 regarding DataLink’s many powerful source options), and much more.

SECTION 5.3 THE SESSION PAGE

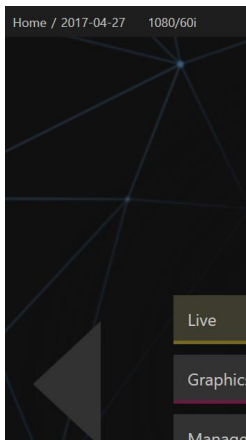


FIGURE 5-13

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 5-13). 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.

Initially, the menu in the *Session Page* offers three selections. These are discussed next.

5.3.1 LIVE

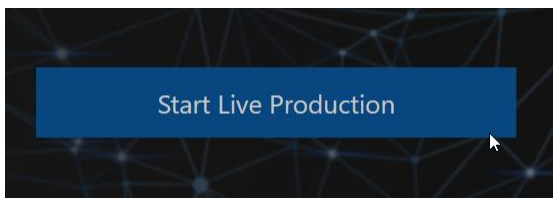


FIGURE 5-14

The menu button labeled *Live* represents the *Live Desktop*, your live production center. Clicking it presents a *Start Live Production* link in the *Session Page*’s right-hand pane; click this link to launch the *Live Desktop*.

5.3.2 GRAPHICS

TC1 includes an integrated variant of LiveText™, NewTek’s standalone titling and CG application. This version cannot be used while live, but gives you the ability to 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.

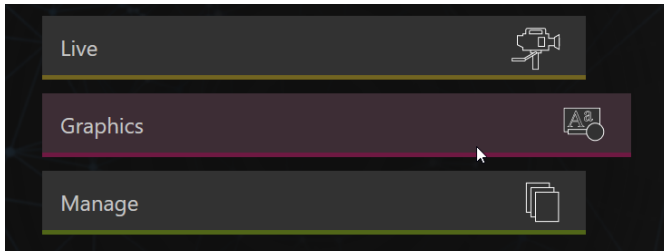


FIGURE 5-15

Selecting the *Graphics* button displays a number of related items on the right-hand side of the *Session Page*.

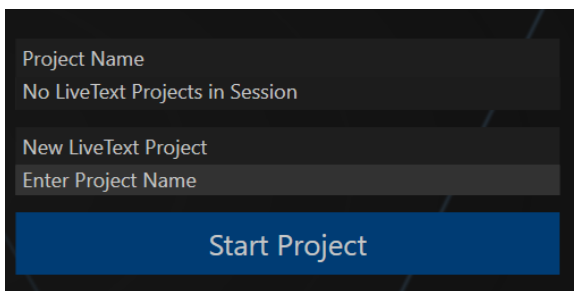


FIGURE 5-16

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*.

Note: The integrated version of LiveText cannot be accessed during live production operation. It is provided as a title page and graphics authoring tool only, not a CG server. A number of excellent third-party offerings, as well as the standalone version of LiveText (available from NewTek as a separate purchase) are listed and described in the accompanying Automation and Integration Guide.

5.3.3 MANAGE

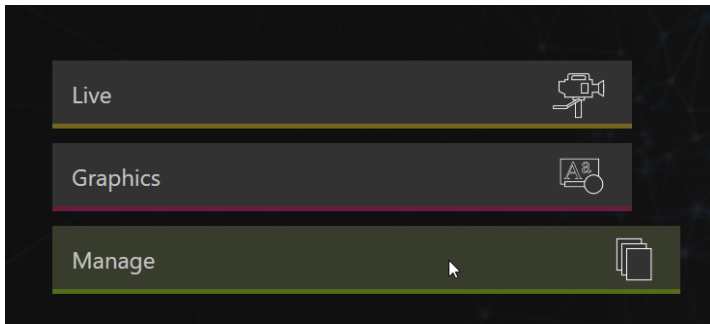


FIGURE 5-17

Various internal production modules provide filebins to permit you to manually administer files related to their projects, playlists, and so on. The *Manage* button 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.

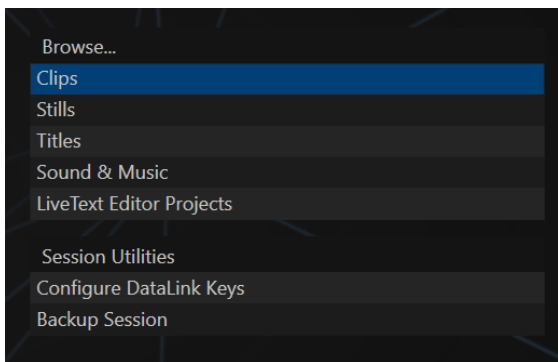


FIGURE 5-18

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.

CONFIGURE DATA LINK KEYS

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 realtime, 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.

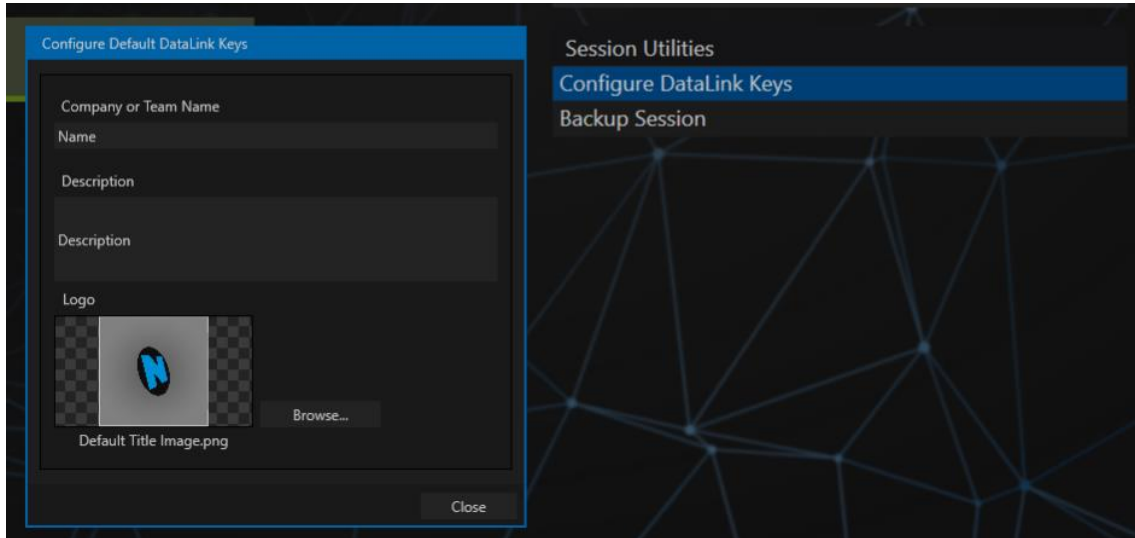


FIGURE 5-19

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, expanded coverage of its capabilities and applications 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.)

BACKUP SESSION

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: OVERVIEW



The Live Desktop is the control center for all your live video 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.

TC1's *Live Desktop* is launched by creating (or opening) a session in the Startup Screen's *Home Page*, then selecting the *LIVE* button and clicking *Start Live Production*.

SECTION 6.1 DISPLAY REQUIREMENTS

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

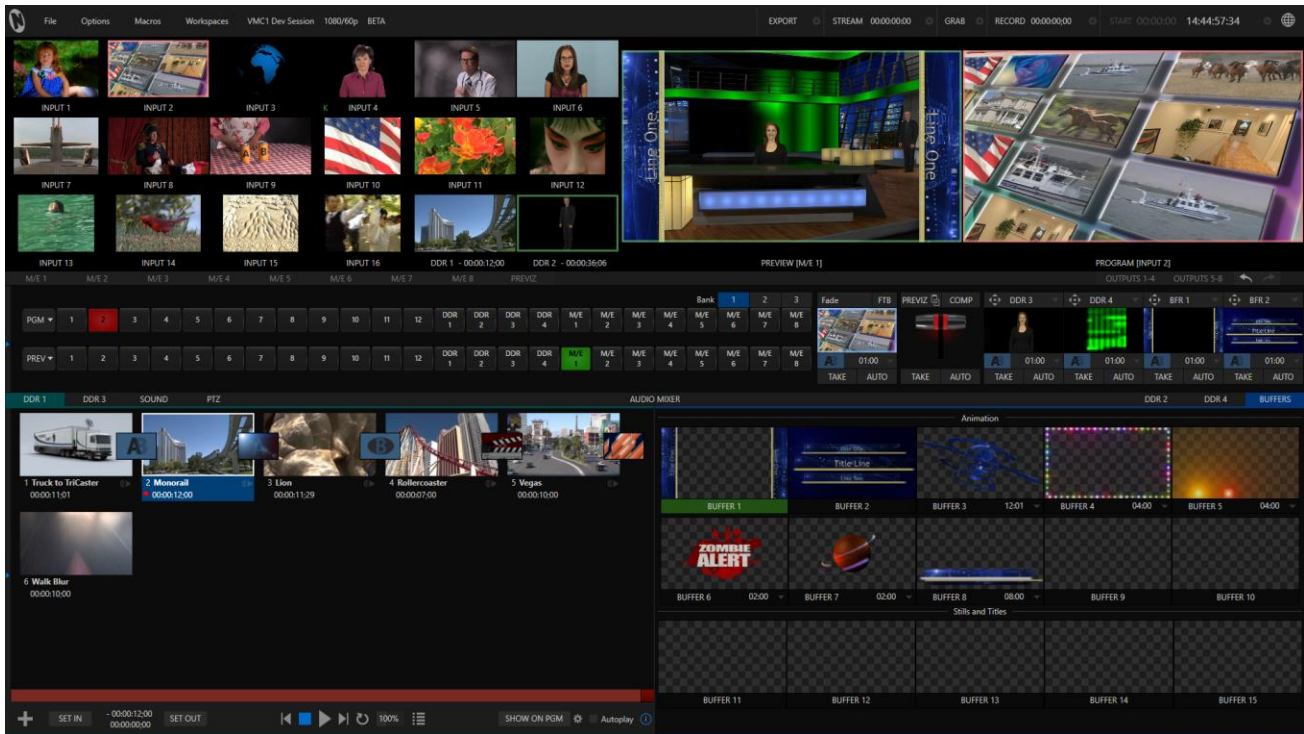


FIGURE 6-1

SECTION 6.2 OVERVIEW

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

From top to bottom, these are:

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 *DDR*s, *M/Es*, and *Buffers*) plus *Look Ahead Preview* and *Program* output
- *Waveform* and *Vectorscope* monitors

3 - M/Es

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

4 - Switching

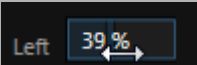
- *Switcher* rows – *Program* and *Preview* rows
- *Transition* controls – *T-bar* and *Delegate* buttons
- *DSK* video layer configuration and controls

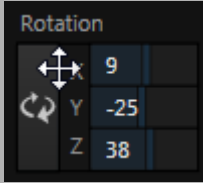
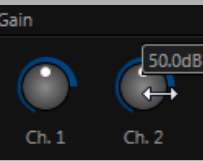
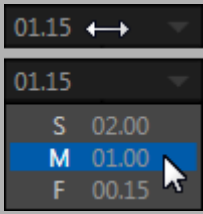
5 - Tabbed Control Modules

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

SECTION 6.3 CONTROL TYPES

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

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

	Rotary slider	Position, Size, Rotate	<p>Drag up-down to adjust one value, left-right to adjust the other value, diagonally to adjust two different values simultaneously.</p> <p>Hold down Alt while dragging vertically to modify the third value (Z) when provided.</p>
	Rotary Knob (single-value)	Audio Gain	Drag left-right to adjust the current value.
	Combo-Slider	Transition, Zoom, Duration	<ul style="list-style-type: none"> • 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 5* are, you may wish to change these labels to something more appropriate for your local needs.

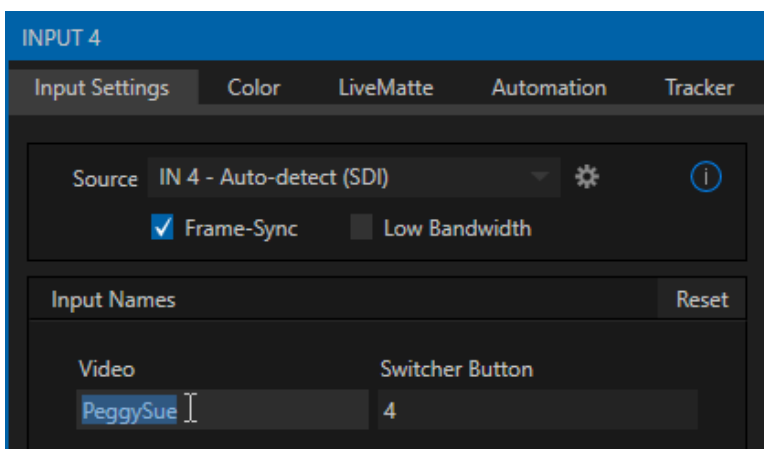


FIGURE 6-2

To do so, simply right-click on one of the following items and select “*Configure ...*” to open the configuration dialog (Figure 6-2):

- A viewport in the *Live Desktop* or on an external *Multiview*
- Any *Switcher* source button

The dialog contains several editable text fields under the label *Input Names*, 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. TC1’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* and *Multiview* are provided in the *Workspace* menu.

When a *Multiview* monitor is in use, the two *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 two monitor areas.

For example, you might show main *Program* and *Preview* monitors along with all 8 *M/Es* on the *Live Desktop*. Meanwhile, the *Multiview* monitor could display up to eight live *Camera* feeds plus *Media Players*, as well as the (program) output and *B* row selections for a specified *M/E* set to *Mix* mode.

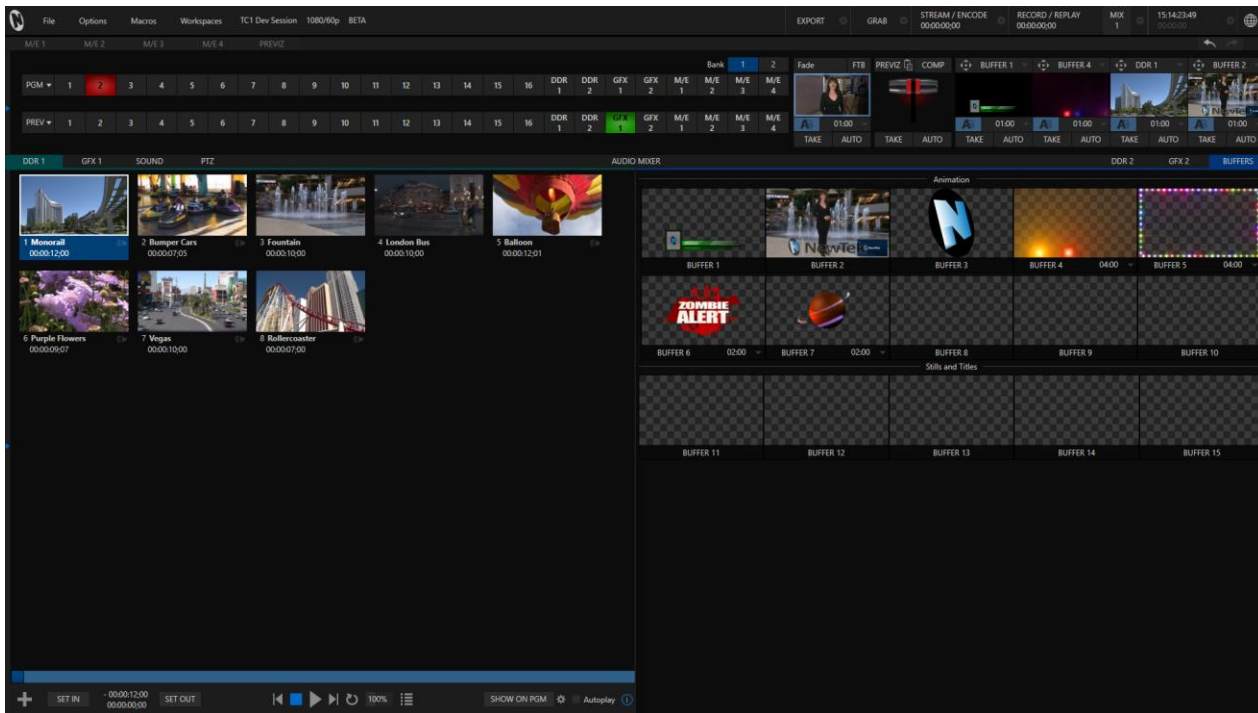


FIGURE 6-3

Notice too that you can also drag both the horizontal divider between the *Live Desktop* monitor pane and the *Switcher*, and the divider between the *Program-Preview* panes at right and viewports at left.

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 6-3), providing much more room for other modules in the process.

Hint: Reset the horizontal divider to its default locations by double-clicking it.

Click the *Mix Effects* label or an *M/E tab* between the *Monitor* and *Switcher* sections to toggle display of the *M/E* pane – or press the keyboard shortcut “m”.

A number of further workflow and interface options that can be very valuable are found in the *Options* menu, discussed shortly (Section 7.1).

Chapter 7 THE DASHBOARD



TC1's 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.

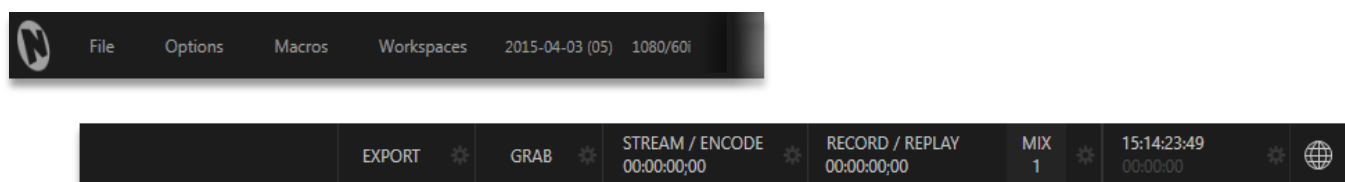


FIGURE 7-1

The various elements comprising the *Dashboard* are listed below (starting from the left):

1. *File menu*
2. *Options menu*
3. *Macros menu* (see Chapter 15)
4. *Workspaces menu* (see Chapter 10)
5. *Session Information* (display)
6. *EXPORT button* and *Configuration*
7. *GRAB button* and *Configuration* (see Chapter 19)
8. *STREAM/ENCODE button* and *Configuration* (see Chapter 17)
9. *RECORD/REPLAY button*, *Replay Pad*, and *Configuration* (see Chapter 19)
10. *Time Display(s)* and *Configuration* (see Section 8.4)
11. *Information* (see Section 4.1)

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 which are not discussed in depth elsewhere.

SECTION 7.1 FILE MENU

This menu drops down to reveal the following items:

- *Eject* – opens a sub-menu that lets you safely disconnect selected storage volumes
- *Import* – add media files from external sources to the appropriate session folders, automatically transcoding them to friendly formats for optimal playback if necessary. (The *Import Bin*'s features are similar to those of the *Publish Bin*.)
- *Share Media Folders and Buffers* (see Section 11.4)
- *Exit* – close your live production session, and return to the *Session page* of TC1's *Startup* screen (all session settings are stored on exiting)

SECTION 7.2 OPTIONS MENU

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

- *Tabs Follow*
 - Enable *Follow Preview Row for All Inputs* to display the tabbed pane for a *Preview* row source automatically on selection changes (for *M/E* selections, the *M/E* pane must be maximized in order to see the *M/E* tab update).
 - When *Tabs Follow Preview for M/Es* is checked, only the *M/E* pane selection updates (when you select an *M/E* as source on *Preview*).
 - *Tabs Follow All Delegates* 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.

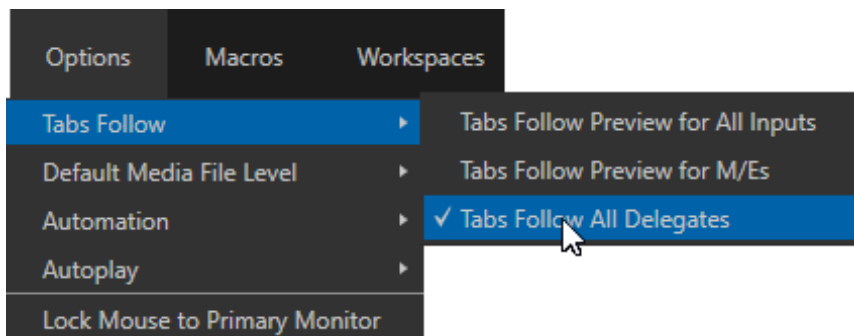


FIGURE 7-2

- *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 8.1.5).
- *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*).
- Enabling *Lock Mouse to Primary Monitor* prevents the mouse from traveling into the external Multiview display.
- *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.

SECTION 7.3 MACROS

Macros are an extremely important TC1 feature. Sufficiently so, in fact, that not only have we given them a place of their own in the User Guide (Chapter 15), 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 two groups labeled *Multiview 1* and *2*. These control the monitor viewport layouts shown on the *Live Desktop* and up to three external *Multiview* displays. *Workspace* features are discussed in Section 10.1.

SECTION 7.5 INFORMATION PANEL

An information display in the *Live Desktop* titlebar provides a number of useful items. Displayed information includes:

- (Session Name)
- (Session format)
- *Status message* display

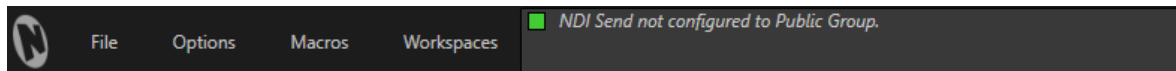


FIGURE 7-3

The *Status message* area sits next to the session information display, but is hidden when no message is shown. When TC1 needs to inform you regarding system events or conditions, text messages replace the normal information display. Status messages may pertain to operations or system conditions; they may be benign notifications (as in Figure 7-3) or cautionary. The display automatically clears itself a few moments later so as not to pose an unnecessary distraction.



TC1™ 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 TC1’s realtime Hotspot and Tracker features. The number and flexibility of TC1 outputs is astonishing, too, and we’ll discuss these fully in this chapter.

The addition of NDI™ (Network Device Interface) support provides TC1 with amazing 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

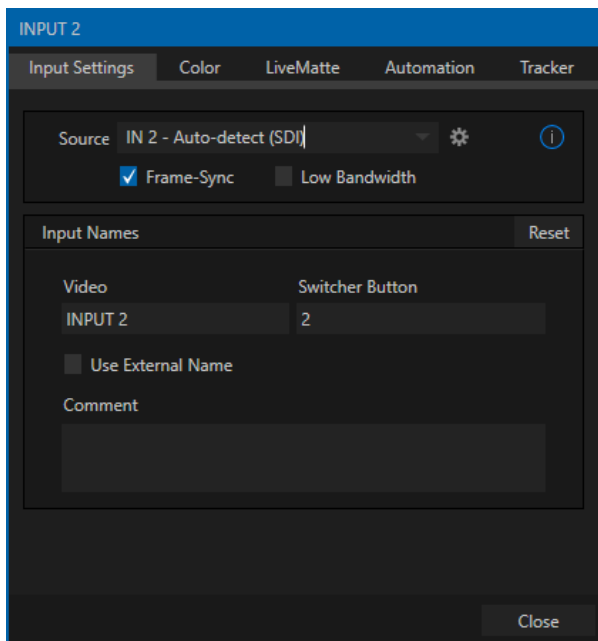


FIGURE 8-1

- Any external *Switcher* input can be flexibly assigned to either an NDI source from the network, or (as before) a local source connected to one of TC1’s SDI input connectors.

- It’s worth noting that hardware sources can be re-ordered on the *Switcher*. Likewise, default audio and video sources for *Switcher* inputs can be flexibly re-assigned (e.g., audio input 1 and video input 1 are not inextricably linked).

The assignment of one of the various supported source types to a *Switcher* button (e.g., “Input 1” on the *Switcher*) is made in the *Input Configuration* panel (Figure 8-1), introduced back in 3.9.2.

Open *Input Configuration* by double-clicking a monitor viewport, or right-clicking a *Switcher* input button and selecting the *Configure* menu item.

In the case of an NDI source, no further settings are required. If the video source is supplied via one of the hardware input connectors, additional information may be needed in some cases. Before going on to discuss *Hardware Configuration* (Section 8.1.7), however, let’s explore other features located in the *Input Configuration* panel.

8.1.1 FRAME SYNC

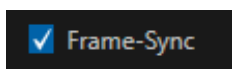


FIGURE 8-2

TC1’s internal *Frame Sync* is enabled for all sources by default, allowing you to work with a wide array of potential video sources without concerns about video timing. Disabling this option makes it possible to ensure the very lowest possible throughput latency for genlocked sources. Note that sources with *Frame Sync* disabled *must* be genlocked, and

further, must be 'in phase' (within 180° of the current switcher output); otherwise, video from the source will simply not be visible. In practice, then, disable *Frame Sync* for genlocked sources, adjust the *Phase* setting (see Section 8.2.4) until video is displayed and you should be all set.

8.1.2 COLOR CONTROL

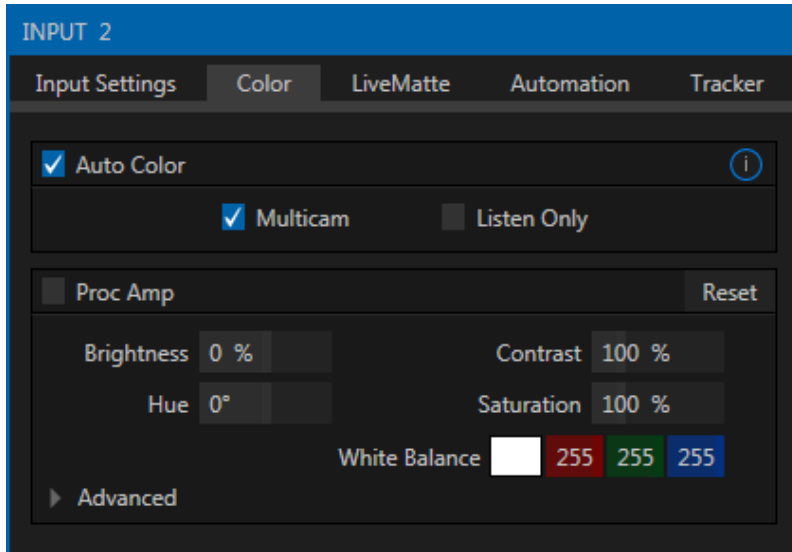


FIGURE 8-3

TC1 provides extensive color control processing options for every video source. These are hosted in the *Color* tab of the *Input Configuration* panel.

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.

To help you overcome these problems, TC1 provides *Auto Color*, a unique feature capable of dynamically adapting the color characteristics of your video sources as lighting conditions vary. For many productions, simply enabling the *Auto Color* switch is all it takes to produce a show that looks amazingly consistent.

MULTICAM

By default, each camera with *Auto Color* enabled is processed uniquely – without reference to other sources. 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 consequent *Auto Color* correction. Alternatively, one might enable *Multicam* for a number of sources, turning *Listen Only* on for all but one camera – effectively making that camera the color reference all other cameras in the group will follow.

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

PROC AMP

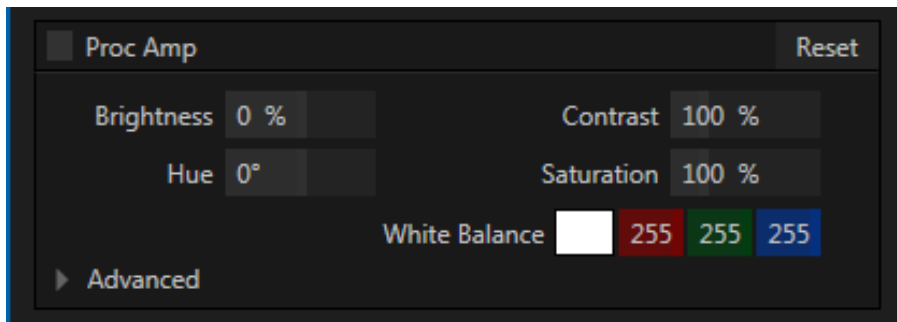


FIGURE 8-4

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

- *Brightness*: Adjustment range from -50 to +50 IRE (the default being 0). As reference, the full luminance range of the visible portion of a video signal can be thought of as ‘100 IRE units’ (named for the Institute of Radio Engineers) – ignoring minor regional variations.
- *Contrast* – Adjustment range from 25 - 400% (default 100%).
- *Hue* – Adjustment range between -180° and +180°. Adjusts the master color of the video signal from the attached source, swinging the entire image through the color wheel’s spectrum.
- *Saturation* – Adjustment range from 0-500%. Zero saturation results in a ‘black and white’ picture; increased saturation results in richer colors. High saturation values can exaggerate the color portion of the signal.

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

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

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

ADVANCED COLOR CONTROLS

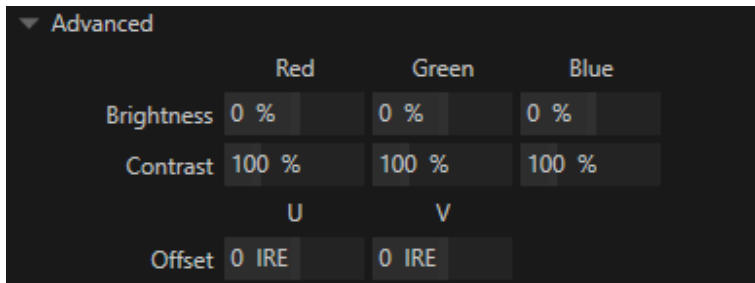


FIGURE 8-5

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

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

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

Hint: Your TC1 provides Waveform/Vectorscope monitors, an invaluable aid to calibrating your video sources.

8.1.3 LIVEMATTE

The next tab in the *Input Configuration* panels is where TC1's powerful realtime keying system for live production, *LiveMatte*, is configured. Keying is a popular and powerful method of compositing multiple images, whether photos, video clips or live camera streams.

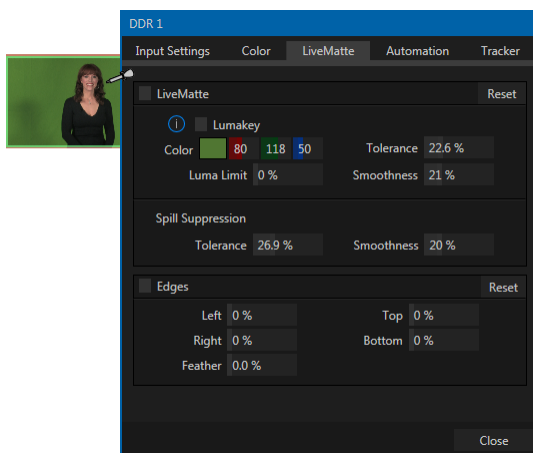


FIGURE 8-6

The process involves eliminating a portion of the image (effectively cutting a digital 'keyhole' in it) to reveal a user-defined background scene. It 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.

8.1.4 EDGES

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.

Cropping settings in the *Edges* control group can be used to remove such unwanted 'garbage' from the scene, or used independently for other purposes – such as to isolate some portion of the screen for use as a 'Picture in Picture' overlay source.

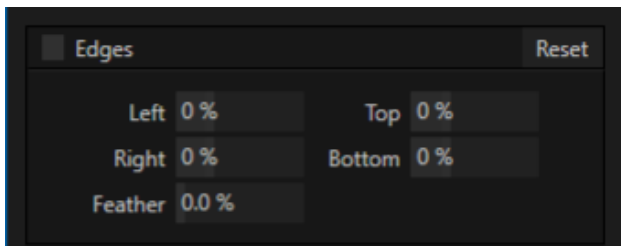


FIGURE 8-7

Essentially, the numeric controls in this group allow you to define independent margins for the frame. Drag left or right on the number fields to adjust the values interactively, or double-click a field to type a value using the keyboard. The region defined by these controls will be completely cropped. Use the *Feather* setting to soften the edges.

Hint: For added convenience, similar cropping tools are available separately in the Position panels of DSK channels and M/Es.

8.1.5 AUTOMATION

Automation is one of those wonderful things that really set TC1 apart from the mundane. 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 to a degree in Chapter 15, 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.

Somewhat obviously, automation should happen automatically based on some predetermined criteria. Thus the automatic transmission in your car upshifts and downshifts all by itself when certain conditions are met. The automatic pilot on an airplane responds to flight conditions in a predetermined way, without pilot input.

In similar fashion, the features of the *Automation tab* allow you to predetermine what will happen when certain conditions are met. Consider the *State Change* control group.

STATE CHANGE

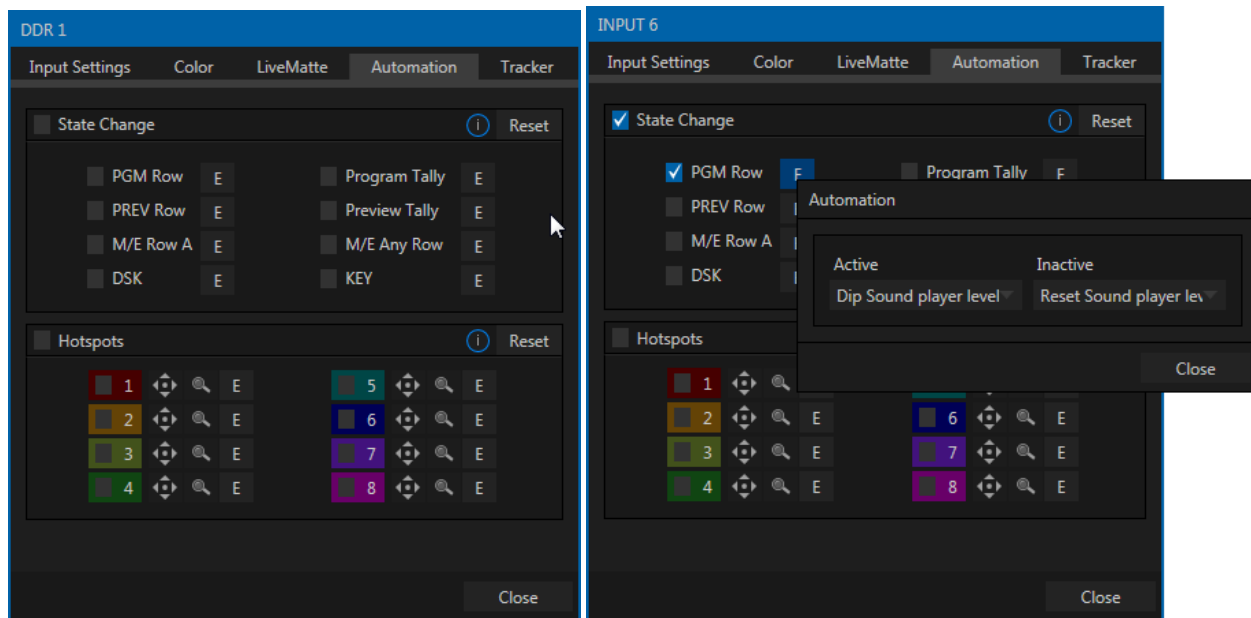


FIGURE 8-8

Click the [E] button next to a 'state' (see Figure 8-8) 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 *Camera 6* is newly selected on the *Switcher's PGM* row, the *Active* macro will run. Conversely, replacing *Camera 6* 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 all 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
- Or automatically select a different *Audio Mixer* preset when you switch from viewing a source in the B monitor of a virtual set on *Program* to displaying it full-screen
- And 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

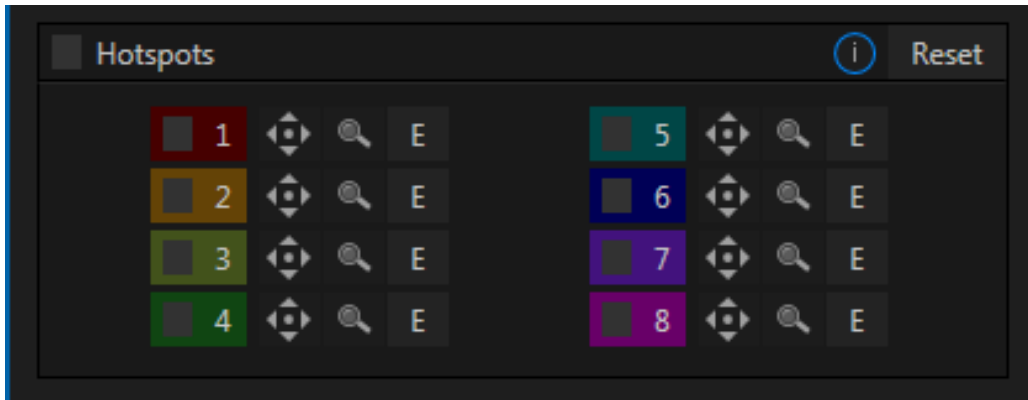


FIGURE 8-9

The lower portion of the *Automation tab* is devoted to *Hotspots* – another of TC1’s powerful interactive automation features. 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).

With *LiveMatte* properly configured, the *Hotspot* feature can trigger a macro when opaque pixels are newly detected in an active *Hotspot* (as, for example, when talent in a greenscreen set walks into that location in the frame), and a second macro when all opaque pixels move out of the region. All manner of creative implementations are possible.

Hotspot setup, options and use are further discussed in Chapter 16, *Macros and Automation*.

8.1.6 TRACKER

The *Tracker tab* provides control over TC1’s realtime motion tracking features. This feature allows you to choose a colored region of the video frame using tools similar to those found in the *LiveMatte* tab (Section 8.1.3).

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 to TC1.

In turn, *Tracker* output from one source can be used to control the placement of other video sources configured to do so in their individual *Position* panels (supplied wherever appropriate in *DSK* controls and *M/E* panes).

ADJUSTING TOLERANCE

Click the eyedropper, keep the mouse button depressed, and drag the pointer over top of the monitor showing the source you want to track (Figure 8-10). The color swatch updates constantly as you drag, until you release the button to make a selection.



TC1 makes it easy for you to adjust the *Tracker* settings by making it possible to see the result of your attempts in its monitors. Right-click on a monitor and select *Tracking Markers* from the *Overlays* options group in the menu. A yellow-shaded rectangle is overlaid on the video using the current 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.

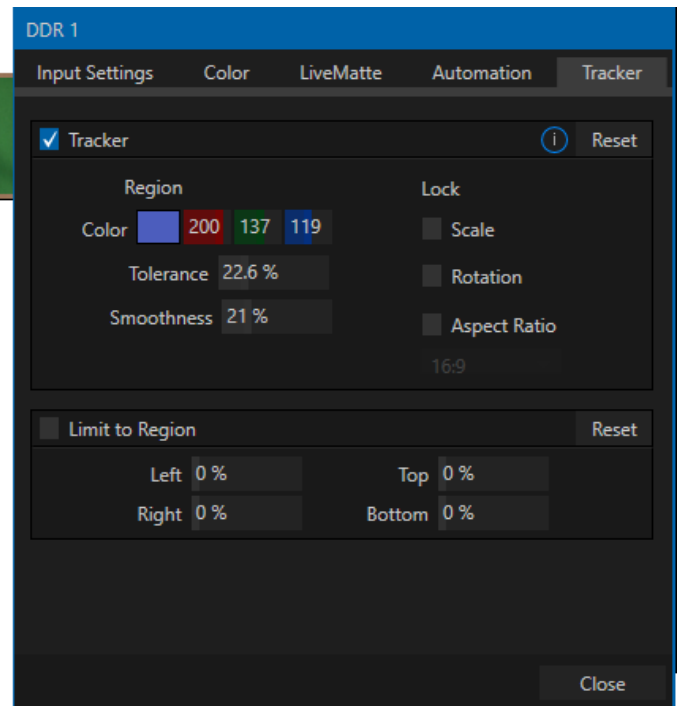


FIGURE 8-10

SMOOTHNESS

The *Smoothness* setting works just like the *LiveMatte* feature with the same name. Its impact on tracking *data* output is minimal, but it is often 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 8-11):

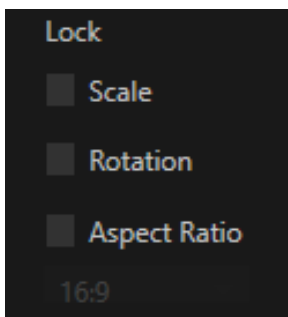


FIGURE 8-11

- 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: Generally, locking channels in this manner make it easier to obtain a very steady motion track; but just as 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.

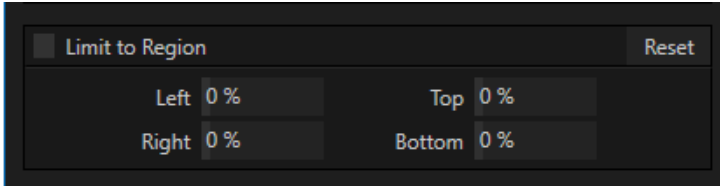


FIGURE 8-12

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.

8.1.7 LOCAL INPUTS

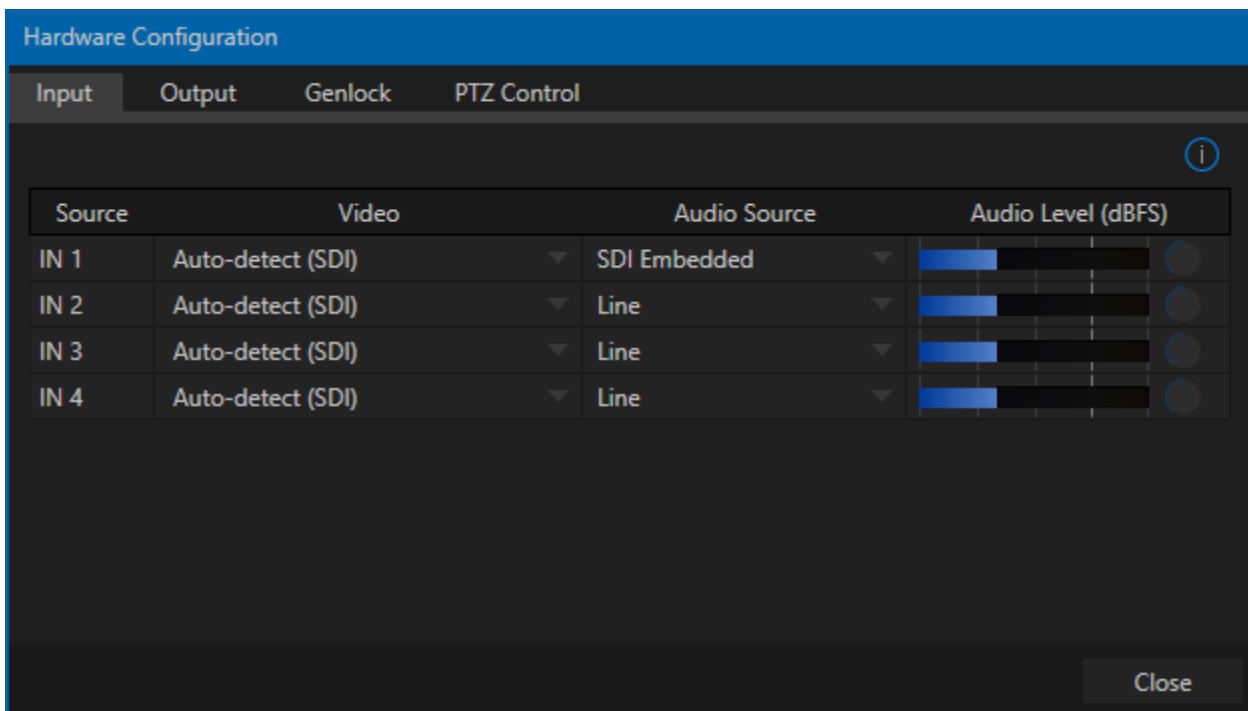


FIGURE 8-13

TC1 can usually auto-detect the format and configure local SDI input settings appropriately. You may, however, need to manually select the format in certain cases. Connection type and format options are provided in the *Hardware Configuration* panel (Figure 8-13). Conveniently, you can open this pane by clicking the configuration (gear) icon shown at right of the *Source* selection in *Input Configuration* (or you can double-click the *Program* output viewport to do so).

The *Input* tab in this panel lists the local hardware inputs in a table. Drop-down menus in the *Video* and *Audio* columns allow you to choose between connection types and, for audio, different levels (Figure 8-14).

CONNECTION TYPE

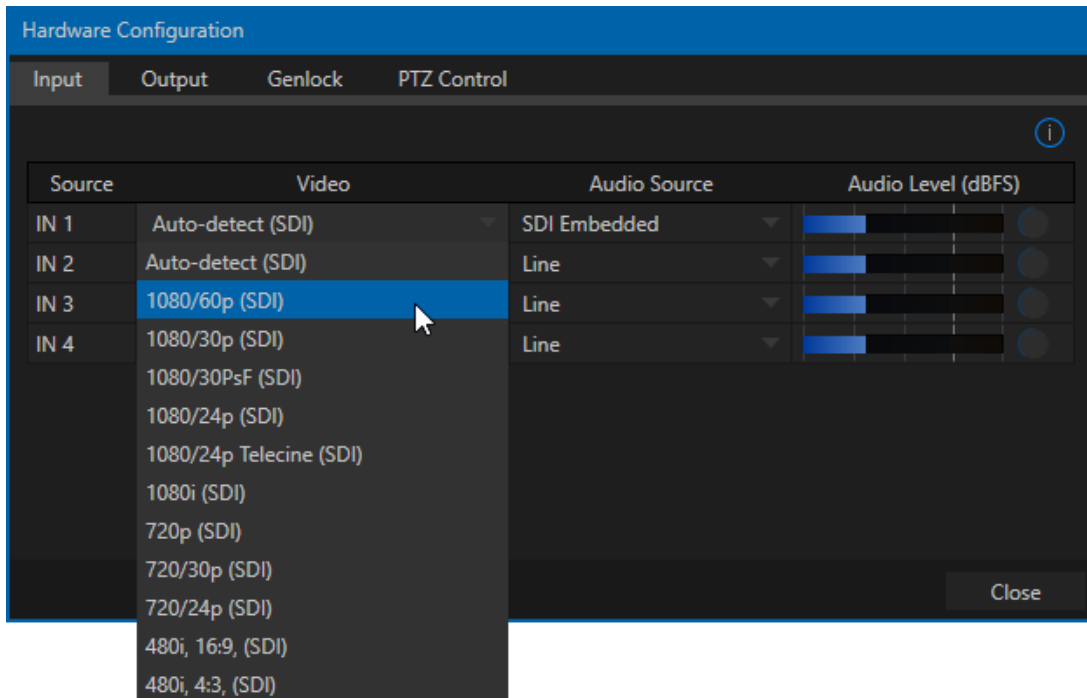


FIGURE 8-14

The *Video* menu lists appropriate options for the current session video standard – *PAL* or *NTSC*. Changing from one video standard to another requires exiting the session.

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

AUTO-DETECT (SDI)

The *Auto Detect* (SDI) feature makes configuring sources easy. Generally, you can simply connect a camera and see the signal immediately, without any need to set resolution and framerate options. Note that this feature requires that the source is supplied in an HD format for HD sessions or an SD format for SD sessions. So, for example, if you connect an HD-SDI camera in an SD session, *Auto-Detect* will work as expected.

SUPPORTED FORMATS

Other standard SDI options are described below:

1080p/60, 1080i/60

- Digital source, high definition, progressive or interlaced
- 1080/60 or ²1080/50
- 1920x1080 pixels, 16:9 picture aspect
- Connected by SDI input connectors
- Optionally carries embedded audio

1080/30p, 1080/30PsF, 1080/24p, ¹1080/24p Telecine, ²1080/25p, ²1080/25PsF

- Digital source, high definition, progressive scan, or PsF (a hybrid)
- 1920x1080 pixels, 16:9 picture aspect
- Connected by SDI input connectors
- Optionally carries embedded audio

720p, 720/30p, 720/24p, ²720/50p, ²720/25p

- Digital source, high definition, progressive scan
- 1280x720 pixels, 16:9 picture aspect
- Connected by SDI input connectors
- Optionally carries embedded audio

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

480i, 16:9

- NTSC digital format , standard definition, interlaced
- 720x480 pixels, anamorphic 16:9 picture aspect
- Connected by SDI input connectors
- Optionally carries embedded audio

480i, 4:3

- NTSC digital format , standard definition, interlaced
- 720x480 pixels, 4:3 picture aspect or anamorphic 16:9 picture aspect
- Connected by SDI input connectors
- Optionally carries embedded audio

²576, 16:9

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

²576, 4:3

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

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

² PAL connection type.

SECTION 8.2 OUTPUT CONFIGURATION

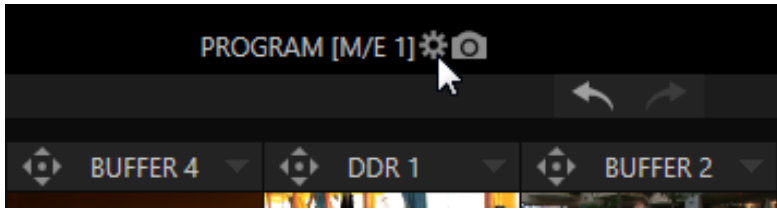


FIGURE 8-15

Roll the mouse pointer over the *Program* monitor to reveal a *Configure* button (Figure 8-15) at right in the titlebar below the display. Click it to open the *Hardware Configuration* panel.

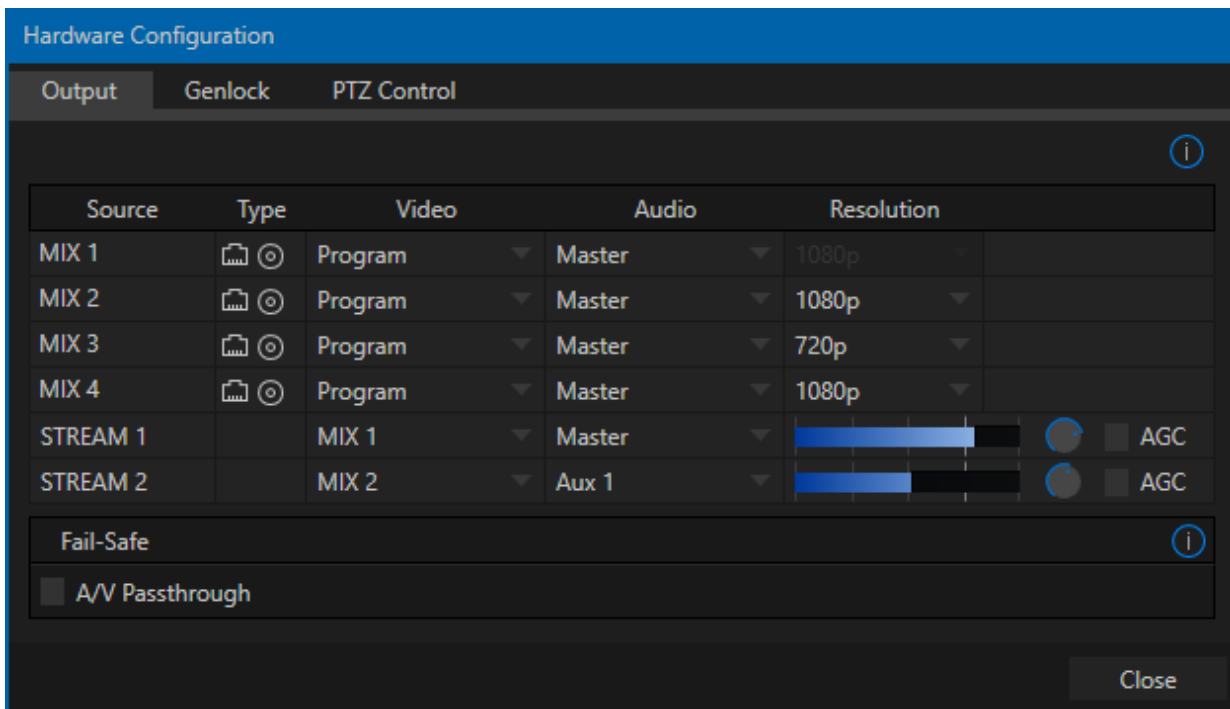


FIGURE 8-16

The *Output* tab in the *Hardware Configuration* panel contains controls governing TC1's primary outputs.

8.2.1 PRIMARY OUTPUTS

We discussed *Primary* and *Secondary* outputs back in Section 3.9. The first four entries in this panel can be considered as primary outputs, and also as 'mixed' outputs. These four video sources are always presented using TC1's SDI output connectors and also as NDI (Network Device Interface) outputs.

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

- *Resolution* menu – Output 1 is always at *session resolution*. For other primary outputs, select the video format for downstream devices you intend to connect to the corresponding output:
 - 2160p
 - 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 rather than a menu.

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* outputs offer a subset of the options available for *Outputs 1* and *2*. Any of the four mixed output (MIX 1-4) can be assigned as a STREAM output video source.

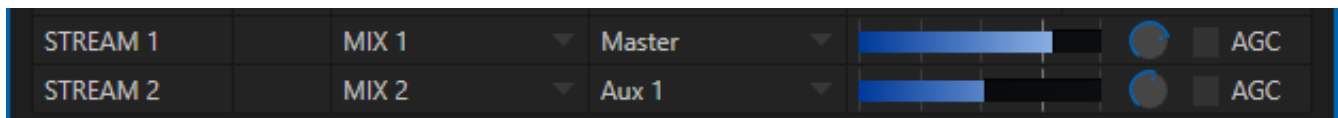


FIGURE 8-17

Hint: TC1's 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 which 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

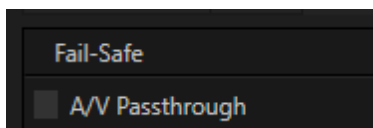


FIGURE 8-18

TC1'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 pass-through ensures that as long there is AC 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, TC1's native failsafe video passthrough mechanism (which ensures that video output continues even in catastrophic circumstances) 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. By default, A/V passthrough is off.

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

8.2.4 GENLOCK TAB

TC1's *Genlock* feature allows it to 'lock' its video output to a reference video signal supplied to its *Genlock* input connector.

This synchronizes system video output to other 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.

TC1 mixes and switches output from up to four directly connected local camera sources. Miniscule local timing differences between these may force tiny delays during switching operations, which can also contribute to throughput latency. Thus, serving i) TC1's Genlock input and 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 TC1's *Genlock* input ensures a match between TC1 video output and 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'.

Note: Digital audio is less tolerant in certain respects than analog. Some devices require SDI sources to be genlocked when mixing digital audio (whether for recording or live production).

NewTek systems, however, include dynamic audio re-sampling for each input. Genlocking of SDI audio/video sources is not a requirement. Still, genlocking sources and other production devices to a single house reference signal or genlocking the cameras directly to the TC1 output is encouraged (to genlock cameras, see your camera manual).

Genlock settings are hosted in a tab by the same name in the *Hardware Configuration* panel (Figure 8-19).

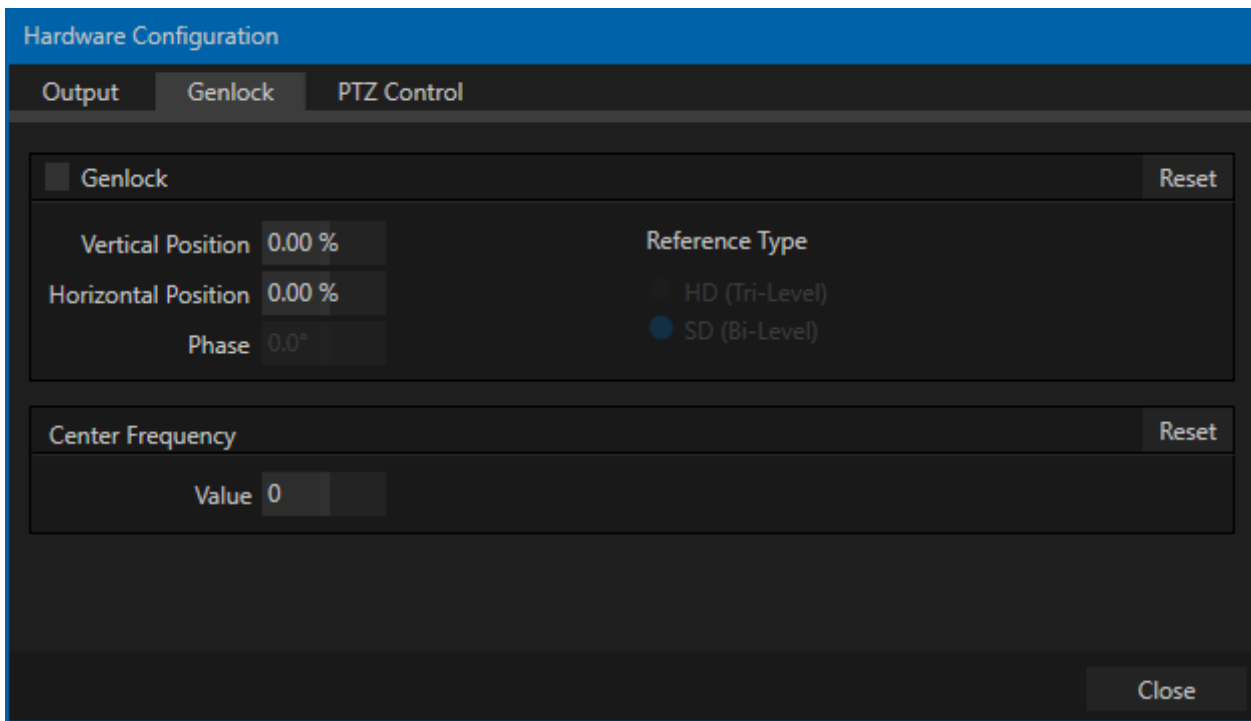


FIGURE 8-19

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.

Thus, the *Vert Position*, *Horiz Position* and *Phase* settings allow you to 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 TC1's *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.

SECTION 8.3 PTZ

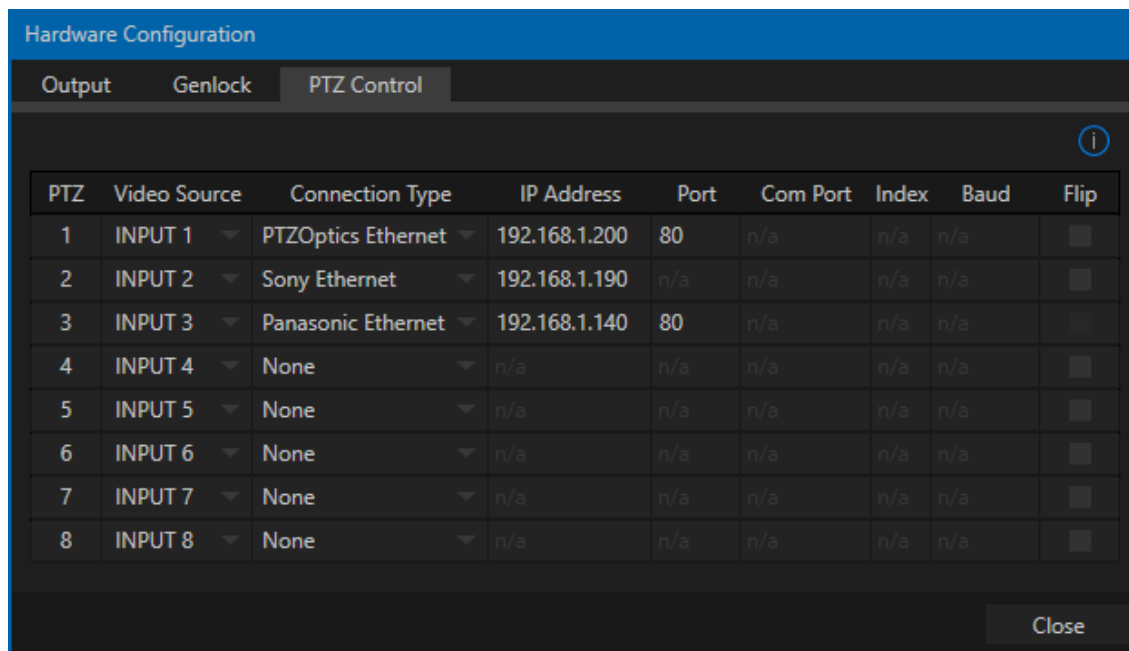


FIGURE 8-20

PTZ (pan-tilt-zoom), or 'robotic' cameras can play important roles in certain types of productions. These systems range widely in price, from a few hundred dollars to those in the 'six figure' range, with an equally diverse range of quality and features.

Generally, remote control of PTZ cameras involves sending instructions to the camera across either serial (RS232, RS422 or RS485) or network connections. TC1 provides support for both types (see note below). Connection settings shown in the *PTZ* tab (*Hardware configuration* panel) update depending on which *Camera* type you select.

Choose your camera protocol (or one similar to it) using the drop-down menu, and then enter (or select) appropriate settings for the unit. The *Flip Camera* switch inverts the image, helpful when the camera is mounted in an upside-down orientation. It also affects the pan and tilt controls, when possible (this support varies by camera).

Note: Configuring the control connection for a PTZ camera does not automatically assign it to the matching Switcher input (e.g., configuring SDI Input 2 as a PTZ camera does not assign it to Switcher Input 2).

As TC1 does not expose a serial port, you will need to use a third party USB-to-Serial Port adapter for PTZ cameras requiring a serial connection (such as RS232 or 422). Windows automatically assigns a COM port number to the adapter, usually COM 1. In some cases, you may wish to manually assign it to a specific port.

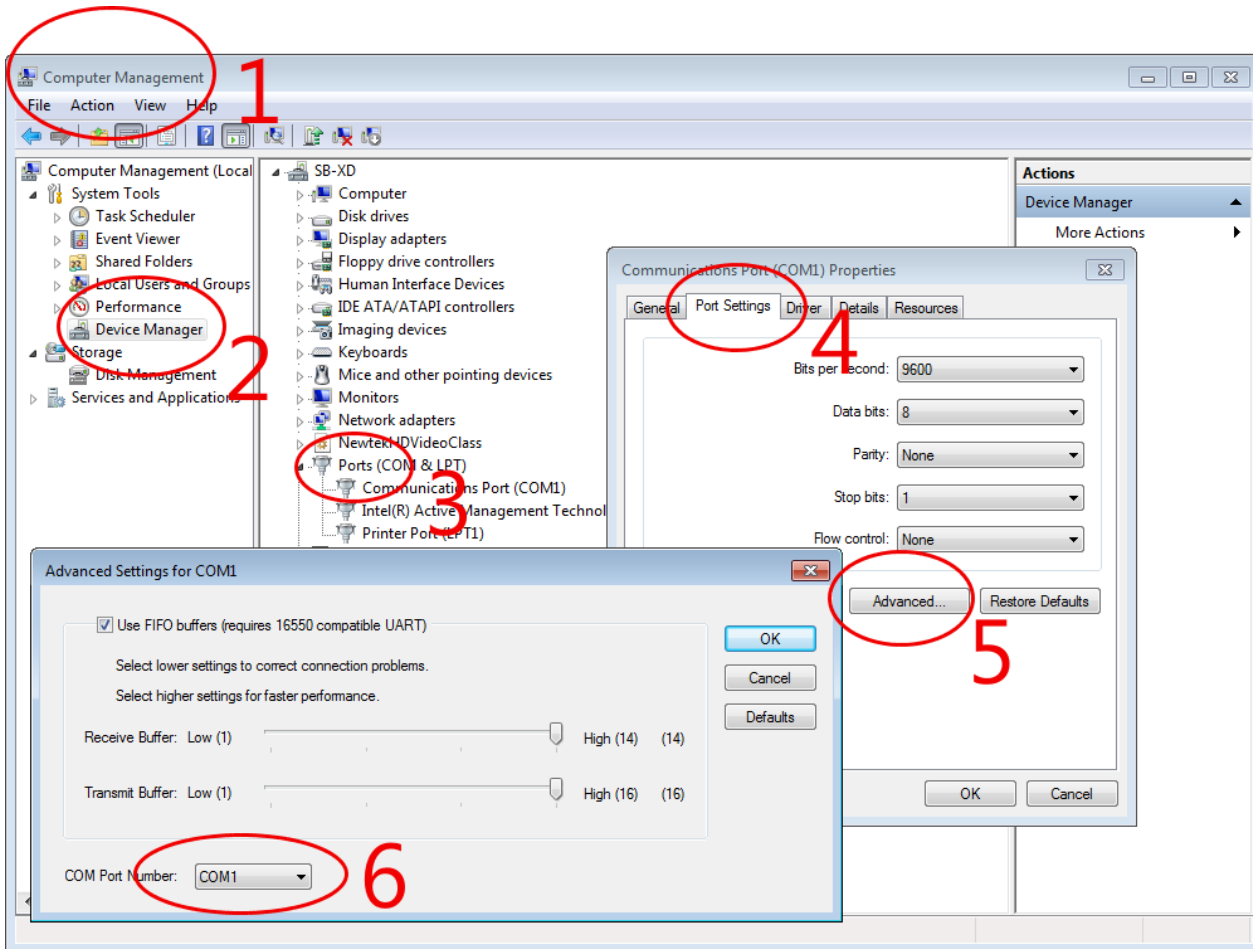


FIGURE 8-21

Exit to Windows from TC1's Administration Mode screen (Section 5.2.3) to access the controls shown in Figure 8-21. Refer to the documentation provided with your adapter for further directions.

SECTION 8.4 CLOCK CONFIGURATION

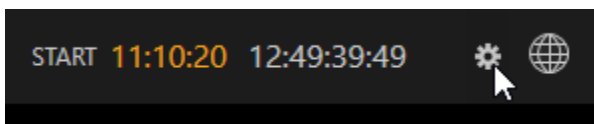


FIGURE 8-22

TC1 can display event time values based on the system clock, when necessary. 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.

8.4.1 LTC TIMECODE

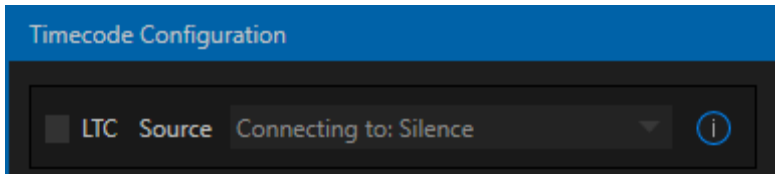


FIGURE 8-23

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 TriCaster decodes time stamps from the audible signal, using the values for clock displays and embedded timecode when recording video. 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).

8.4.2 EVENT TIME

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

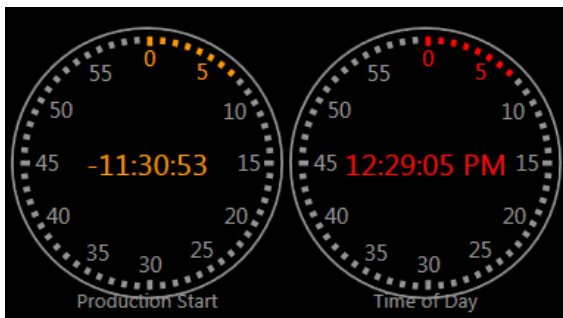


FIGURE 8-25

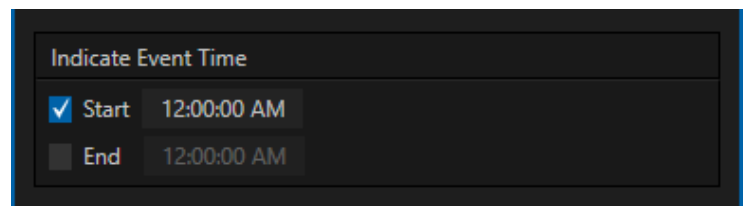


FIGURE 8-24

During live production, the *Dashboard* and as well as TC1's monitor panes and default *Multiview* layouts offer *Broadcast Clock* displays based on the current timecode. Secondary clock displays show a useful countdown to the (production) *Start* and *End* times when the corresponding switches are enabled in the *Timecode Configuration* panel.

Chapter 9 SWITCHER, TRANSITIONS AND OVERLAY



TC1's Live Desktop replicates traditional video switcher controls in easy to comprehend and use fashion. It provides numerous transitions that you can use to add interest when changing scenes, four independent downstream overlay channels, and some very useful automation.

When the *M/E* pane is minimized, 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 9-1).



FIGURE 9-1

SECTION 9.1 SWITCHER ROWS

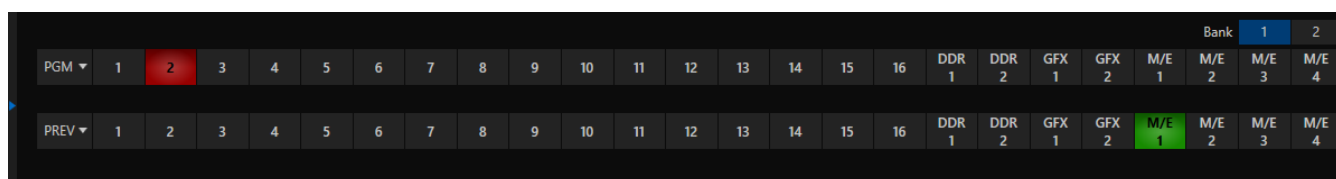


FIGURE 9-2

From top to bottom, the two main *Switcher* rows are labeled *PGM* (Program) and *PREV* (Preview). Clicking a button in the *Program* or *Preview* row selects the active video source for that row (audio sources may or may not be affected by *Switcher* activity – see Chapter 15 Audio).

The number of sources available to TC1 is so extensive that sources are organized in three 'banks'. In this arrangement, each button does triple duty, depending on which bank is currently being controlled.

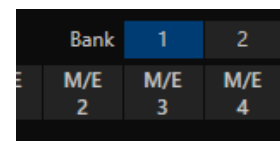


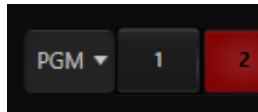
FIGURE 9-3

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 possible to 'latch' banks, either by clicking the *Bank* buttons on the screen, or by pressing the *Tab* key to cycle the currently displayed bank.

Hint: The main Switcher (and M/Es with transition effects assigned) are able to show 'selection hints' beneath their rows when the active selection is in the opposite bank.

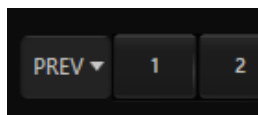
SECTION 9.2 PROGRAM AND PREVIEW

Optional video source selections for the *Program* and *Preview* rows include all external (SDI and NDI) inputs; 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* – that is, 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.



Normally, the *Preview* row selection determines which source is queued up for display in the *Background* layer by the next (BKGD) *Take* or *Transition* operation.

SECTION 9.3 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* (DownStream Keyer, or 'overlay') layers may or may not appear above (or, if you like, 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:

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



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

- It may include mixed video from both the *Program* or *Preview* rows.
- Selecting an *M/E* as source on *Program* or *Preview* can bring many more sub-layers into the *BKGD* composite, including the *M/E*'s primary *Inputs* and the dedicated *M/E KEY* layers, which are similar to *DSK* layers.

Note: Since M/Es are reentrant, the BKGD layer can at times include astonishing numbers of sub-layers .

9.3.1 SELECTING SOURCES

Video sources for *PGM* (Program) and *PVW* (Preview) rows, of course, are selected by pressing buttons on those rows. For *DSK* video layers, source selection is made using a drop-down menu above the individual *DSK* layer controls, located at right in the *Layer Control* section of the *Switcher* section.

Hint: Right-click input buttons to select sources from connected and configured SDI video routers – see Section 3.10.1 (Configuring Routers).

9.3.2 LINKING SWITCHER ROWS

It can be very useful to link two (or more) *Switcher* or *M/E* source rows together, causing them to operate synchronously. The *Program* and *Preview* rows and the source rows in *M/E* panes show a downward pointing triangle to the right of the row label. 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 9-4 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.

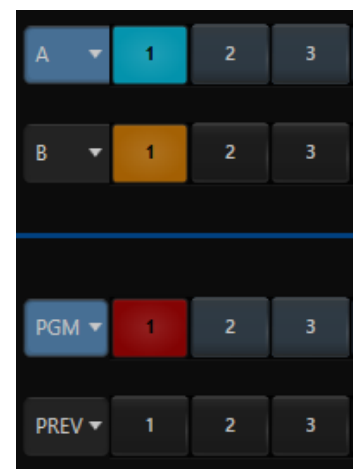


FIGURE 9-4

SECTION 9.4 TRANSITIONS AND EFFECTS

We discussed video layers in Section 9.3. With this in mind, it's easy to comprehend the layout and use of TC1's *Transition* controls.

At left in this group are the main *Transition* controls, including the *T-bar*. The larger portion at right provides *solo* control and configuration options individually for the *DSK* layers.

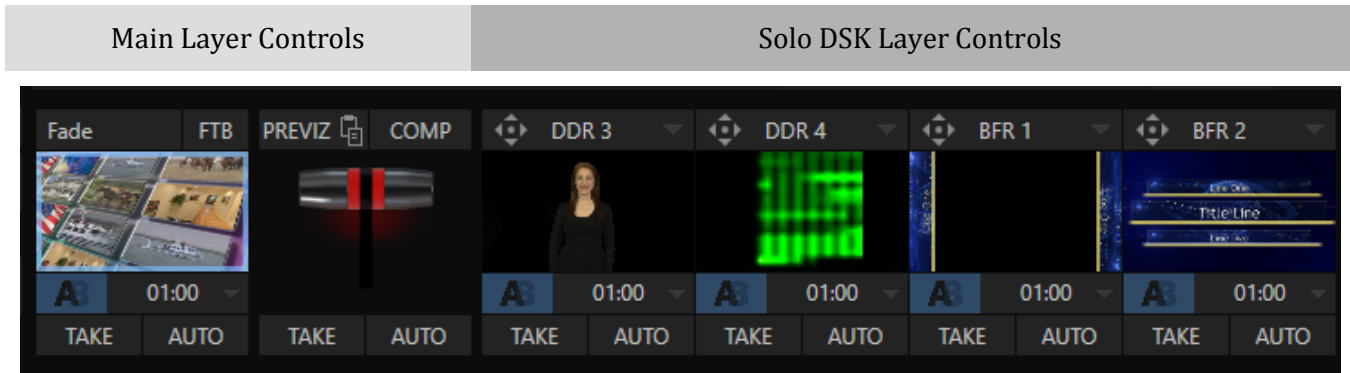


FIGURE 9-5

Let’s consider the individual *DSK Layer Controls* first.

9.4.1 DSK CONTROLS

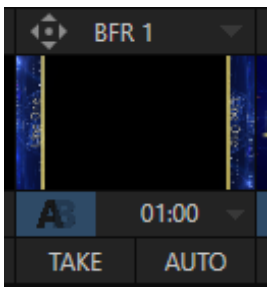


FIGURE 9-6

Pressing the local *TAKE* button for any *DSK* displays or hides the corresponding video layer (shown on top of the *BKGD* layer). Local *AUTO* buttons beneath each *DSK*’s thumbnail icon perform similarly, but apply the currently selected transition (i.e., the effect represented by the small icon shown above *TAKE*).

Hint: You can halt an Auto operation partway by clicking the button again during the transition. For DSK (and M/E KEY layer) transitions, if the effect has progressed more than halfway when halted, clicking Auto again will complete it. Otherwise it is reversed, returning the layer to its prior display state.

CONFIGURING TRANSITIONS

Each *DSK* has its own transition effect, applied if you click *Auto*. Click the transition icon for any *DSK* control area to reveal a palette of different transition icons 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 TC1’s *Custom Media Browser*.

In the *Media Browser*, you can choose from the hundreds of transition effects included with TC1, or even custom *Animation Store* effects that you prepare yourself using the included *Animation Store Creator* application. The selected effect will replace the current one in the palette.

Hint: The frequently-used Fade transition is always available in transition palette. As it cannot be replaced, no Configure button appears for its icon.

Transition durations are stored on a ‘per slot’ basis, using the numeric duration control beside the effect icon. You can select transition speeds from the menu, or drag the mouse pointer left or right over the numeric display to set a custom time, or click the numeric field directly to enable keyboard entry.

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.

ANIMATION STORE TRANSITIONS

TC1 can also employ 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 (sounds are optional). The audio level for *Effects* is controlled in the *Audio Mixer* 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 TC1's Startup screen.

DSK POSITIONING

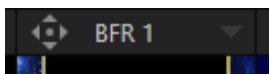


FIGURE 9-7

Each *DSK* layer has its own *Position* button and settings.

Click the 'diamond' button to open the *Positioning* settings pane for the associated layer.

POSITION

Positioning panel settings are organized into tabs. The first tab, *Position*, hosts two control groups, as follows:

1. *Position*
2. *Use Source Tracker*

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

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

Dragging left or right directly on either of the two nearby numeric controls adjusts the position on a single axis only (and allows you to change from negative to positive values, and vice versa, which is otherwise not possible).

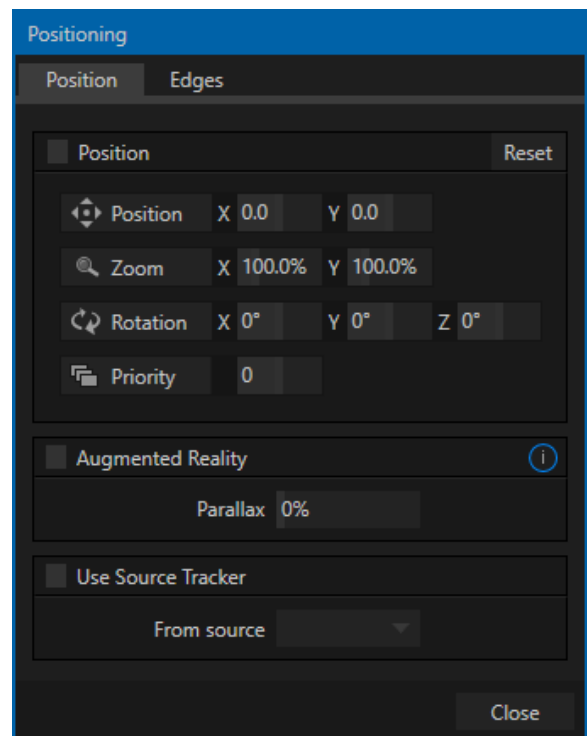


FIGURE 9-8

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

Dragging the cursor on the *Zoom* button (magnifying glass) affects the apparent size of the overlay. Again, if you drag just one of the associated numeric gadgets you can adjust 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 adjust positioning 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).

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*.

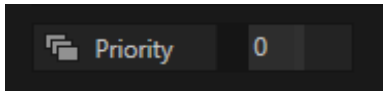


FIGURE 9-9

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.

USE SOURCE TRACKER

TC1 also allows you to assign the motion data output from the *Tracker* for any video source to the current *DSK* layer, by selecting it in this menu.

Positioner settings enabled above 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*.

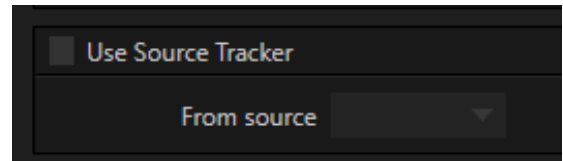


FIGURE 9-10

EDGES

The *Edges* tab (Figure 9-12) in the *Positioning* panel also has two control groups, *Edges* and *Borders*.

The *Edges* controls are similar to those found in TC1's *Input Configuration* panel. However these settings are independent, applying even when the similar option in *Input Configuration* is not active.

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

BORDERS

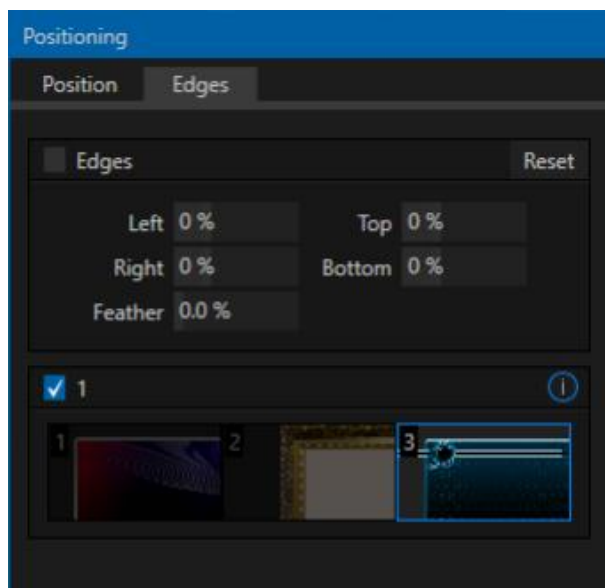


FIGURE 9-12



FIGURE 9-11

The *Edges* tab also provides each *DSK*, *KEY* and *M/E* layer with quick access *Border* preset slots (Figure 9-12). These powerful border effects can include full color overlays, backgrounds, matte layers for 'keyhole' effects, and shadows. This feature allows you to freely scale, position and rotate various 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*. Since these are per-layer *Positioner* effects, you can easily create custom multi-box compositions in TC1's *M/Es*.

In addition to hundreds of supplied borders, you can easily create elaborate custom effects using Photoshop®. A template PSD file is supplied to assist you to do so. You will find it in the Borders folder, at C:\ProgramData\NewTek\TC1\Effects\Borders.

You will find it is easy to create a custom border. You need merely define a Photoshop format file with three (rasterized) layers. The uppermost layer contains foreground elements (such as a bezel). The next layer is treated as a mask based on opacity, and defines the part of the source image that will appear in the result. The 'bottom' layer supplies a background to appear behind transparent parts of the source (as, for example, when LiveMatte is applied to a source).

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.

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

Important Note: Use files with straight (a.k.a. "non-premultiplied") alpha channels in TC1's Media Players. Premultiplied files will generally not yield correct results when overlaid on other imagery.



FIGURE 9-13

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 9-13), or set up many other elaborate effects in this manner.

9.4.2 MAIN CONTROLS

In large measure, TC1's main *Transition* controls behave similarly to their local sidekicks. What makes them especially powerful is the *T-bar* and *Transition Delegate* button group located just above.

BACKGROUND TRANSITION

Transition control settings in this section apply to the *Background* video layer only. In most respects, these tools are identical to the *DSK* transition controls discussed earlier (Section 9.4.1), but there is one difference worth mentioning.

The *Duration* menu for the *Background* transition offers two additional items compared to the similar menu in the *DSK* control groups:

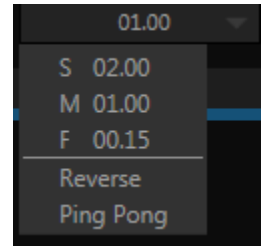


FIGURE 9-14

- *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.

TRANSITION DELEGATES

An executive maxim suggests “Don’t do anything yourself when you can delegate it”. In the *Live Desktop*, each video layer has its own small ‘confidence’ monitor. To delegate the *T-bar*, *Auto* and *Take* controls to govern one or more layers in the *Switcher* or an *M/E*, simply click the monitor for the layer you want to control – whether the *Background*, or a *DSK/KEY* layer.

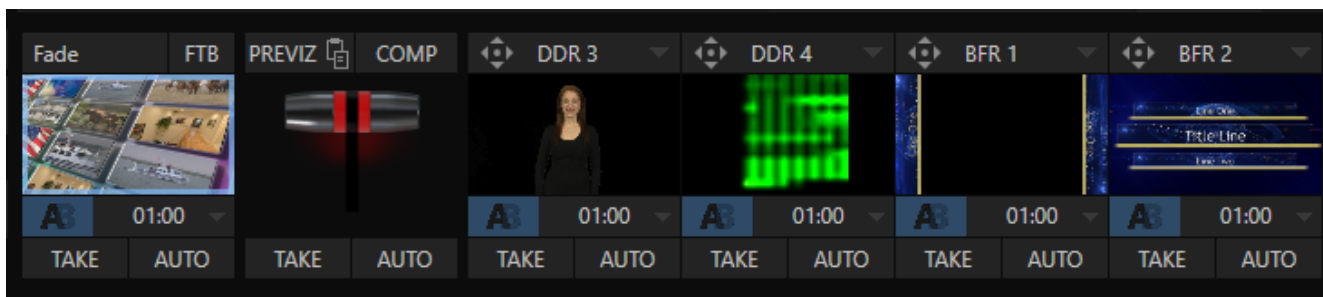


FIGURE 9-15

To delegate multiple channels simultaneously, hold the CTRL key while clicking the monitors for the desired channels. The monitor for delegated channel(s) will be shown with a blue border (see Figure 9-15).

Let’s see how applying the concept of delegating controls affects their use:

- Assign something suitable to the *DSK 1* and *DSK 2* layers.
- Click the solo *Take* buttons in the *DSK* control groups to hide these *DSK* layers, if they are visible on output.
- Click the small *BKGD* monitor left of the *T-Bar*.
- Click the main *Auto* button (below the *T-bar*).
- Now, hold down the *Ctrl* key and click the monitor for *DSK 1*. (Or, press both *the BKGD* and *DSK 1* buttons on a control surface *Transition Delegate* group at the same time.)

You have just delegated the controls to two video layers. You can likely guess what comes next.

- Press *Auto* or *Take*, and observe the result.

- Now add *DSK 2* to the delegate selection, and switch again.

The *BKGD* layer is updated, *DSK 1* is removed, and *DSK 2* is displayed.

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

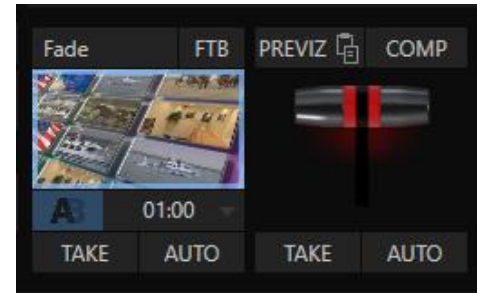


FIGURE 9-16

A progress bar beneath each of the *DSK* control groups tracks transition progress (progress bars remain fully ‘on’ when a layer is 100% displayed).

FTB

Let’s discuss the *FTB* feature next. The acronym stands for *Fade to Black*. The result of clicking *FTB* will not likely surprise you very much. *FTB* offers a convenient method of doing what its name implies – fading *Program output* completely to black. It might help to think of *FTB* as a final video layer added above all others before *Program* output, completely obscuring everything below it.

As a memory aid, the *FTB* button pulses during operation. *FTB*’s fade duration is drawn from the *BKGD* layer setting. Hold down *Shift* while pressing the *FTB* button on a control surface to initiate an *FTB* operation.

Note: Hiding or displaying FTB will trigger both Autoplay and Audio Follow Video when these settings are active for displayed Media Players. FTB also fades Master Audio to mute when displayed, and back up again when hidden.

TAKE AND AUTO

As we have seen, clicking the main *Take* button (keyboard shortcut *Enter*) performs a straight cut for all video layers that are currently selected (i.e., those whose monitors have blue borders due to you having clicked them).

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

Note that there are local (BKGD layer-only) Take and Auto buttons beneath the Background Transition icon.

T-BAR

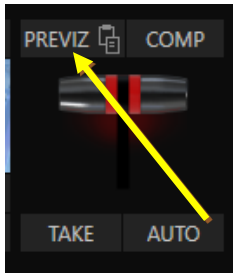
The *T-bar* mimics the similar control on a traditional video switcher, and allows you to *manually* perform a transition between selected video layers. To use the *T-bar*, pull it downward by dragging it with the mouse pointer. Drag it all the way to the bottom and release to complete a transition; 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 9.5 PREVIZ

TC1's *Look Ahead Preview* pane shows the *outcome* of the currently configured transition before it is performed. The *Previz* feature takes this capability much further, allowing you to pre-visualize effects in full motion, including T-bar operations.

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



You might use *Previz* to test your currently delegated transitions and sources before applying them. Alternatively, though, you can experiment to your heart's content. Freely change layer sources, modify *Positioner* settings, transitions or effects, layer delegates, test the result of *Take/Auto*, use *T-Bar* or *Zoom* controls with impunity. Clicking *Previz* copies the settings of the source (*Switcher* or *M/E*) into the dedicated *Previz* pane, which really can be thought of as a specialized *M/E* – but one *never* visible on output.

FIGURE 9-17

*Hint: The best way to monitor your experiments in the *Previz* pane is probably to use the “M/E Follow” Workspace.*

If, while experimenting, you arrive at a composition you like, simply click the *Paste Previz* (clipboard) gadget located beside the *PREVIZ* button in the desired destination to send the current composition 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 9.6 UNDO/REDO

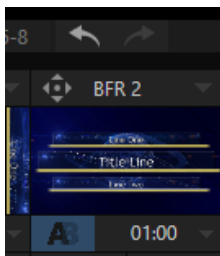


FIGURE 9-18

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.

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 9.7 SWITCHER MEMORY

A nearby *Switcher Memory* gauge (beside *Undo*) tracks how much system memory is consumed by currently selected virtual sets, transitions and effects. This display is normally hidden, appearing only when you have used a considerable amount to the available memory. If you do inadvertently overtax the effects system by pre-selecting many, many large custom effects – an unlikely scenario – you might just reach the limit, which could in turn result in dropped frames.)

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

We're going to discuss the *Comp Bin* in full soon (Section 14.8), but at this point we do want to take the opportunity to distinguish them from *Switcher* MEMs. Bumping the cursor at the left edge of the screen reveals a fully functional *MEM bin* with features that are quite similar those provided for *Comps* in both the main *Switcher* and *M/E* banks. The primary difference between *MEMs* and *Comps* is that the former retain (and apply) all settings in the *Switcher*, including source selections.

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, it refers to devices that permit us 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 Chapter 8, I/O Configuration, and elsewhere.)

SECTION 10.1 INTERFACE AND MULTIVIEW

Really, the *Live Desktop* provides *three* 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.

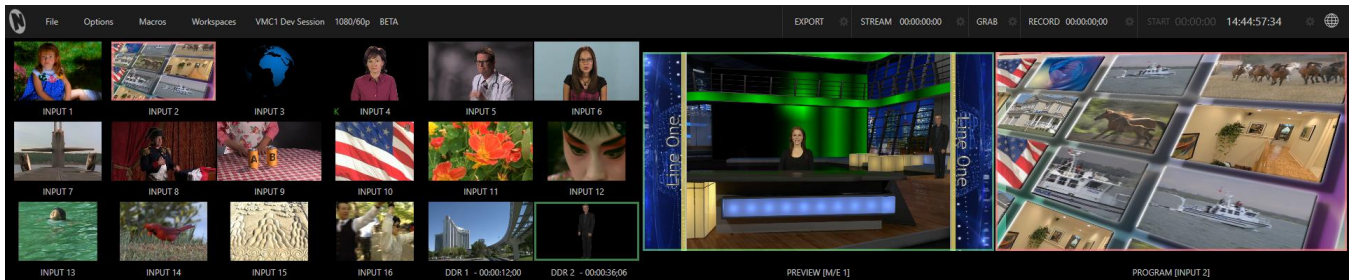


FIGURE 10-1



FIGURE 10-2

The overall layout of each of these multiview monitoring areas is governed by *Workspace* presets.

10.1.1 WORKSPACE PRESETS

TC1 provides powerful *Workspace* options. Freely switch from one preset to another for any *Multiview*, customize the display shown, recall it at a moment's notice, or reset it to a default layout using *Load Default*.

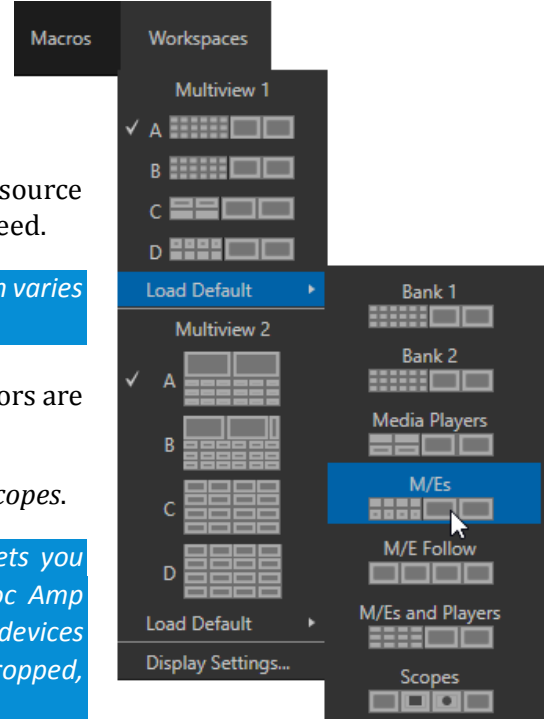
Each viewport in any layout offers diverse input or output source options, and can be further modified to produce just what you need.

Hint: The number and arrangement of Workspace presets shown varies depending on how many monitors are connected.

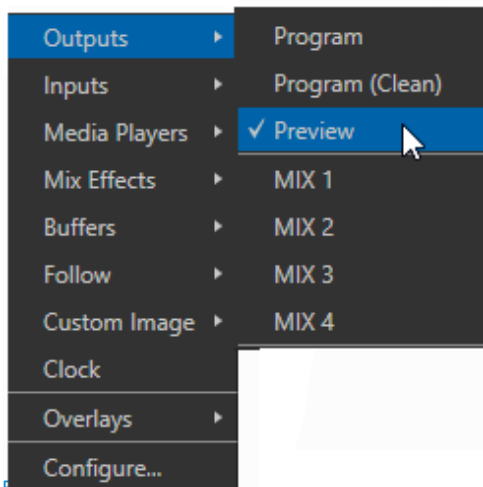
As you'd also expect, the settings you select for individual monitors are retained in the current *Workspace* preset.

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

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



SECTION 10.2 VIEWPORT FEATURES



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

In addition to the 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), and more.

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.



FIGURE 10-4

A further display you may find useful is the *Timecode Only* option that appears at the bottom of the *Media Players* sub-menu.

This displays a time counter showing the current position of the playhead in the *Media Player* (respecting the specified Player's *Warning Colors* option, too).

Below the basic source selection options in the menu, you'll find another group that provides access to optional *Overlays* for the monitor port.

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

In addition, you may choose to display *VU Meters* with the source, *Tracking Markers* (see 8.1.6) and *Hot Spot Markers* (see Section 8.1.5).

Long-standing practice when using color bars to calibrate video signal color attributes requires special video monitors with 'blue only' (or 'blue-gun') displays. TC1's *Blue Only* viewport option means you can now use any color monitor for this purpose.

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

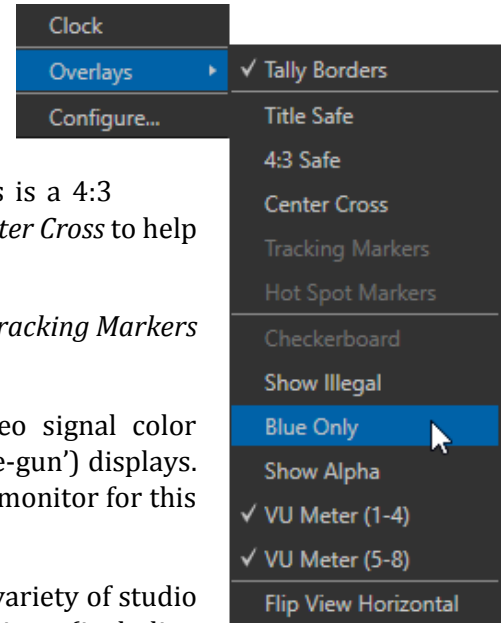


FIGURE 10-5

Note: Overlay menu options vary by source type.

One final item completes the monitor viewport options:

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

Hint: Alternatively, double-click a monitor to open the Input Configuration panel without using the menu.

In addition to features mentioned above, note that *Media Player* monitors display a convenient timecode field are shown.

Hint: When LiveMatte, Proc Amp, or Crop settings are active for a source, notification indicators are provided in the footer of its monitor.

SECTION 10.3 PROGRAM MONITOR

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



FIGURE 10-6

Normally, the *Program* monitor shows what TC1 is displaying to your principal viewing audience 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 TC1's MIX 1 output, but this is subject to assignments made in the Output tab of the Hardware Configuration pane. When you move your mouse pointer over the Program monitor, a Configure button (gear) appears just right of the source label. Clicking this button opens the Configuration panel (see 8.1.7).

SECTION 10.4 LOOK AHEAD PREVIEW



FIGURE 10-7

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 the composite result of a *Take* operation applied to all currently delegated video layers (see the sub-heading *Transition Delegates* in Section 9.4.2).

- Delegating the *BKGD* layer tells TC1 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 > M/E Follow*).



FIGURE 10-8

Complementing this feature, TC1 provides *Look Ahead Preview* monitoring capability for *M/Es* as well (Figure 10-8). The *Viewport Options* menu group *Outputs* 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 tab 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.

SECTION 10.5 SCOPES

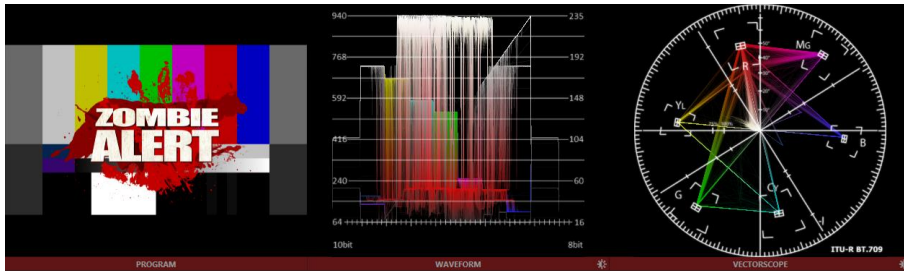


FIGURE 10-9

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.)

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 (*Shift + double-click* the control to restore defaults), 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.

Chapter 11 MEDIA PLAYERS & BUFFERS



TC1's 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 for long form playback.

SECTION 11.1 MEDIA PLAYERS

TC1 sports multiple *Media Players*, located in tabbed panes found in the bottom third of the *Live Desktop*. Here you will find four *DDR*s and a *SOUND* module. (This is also where the powerful *Buffers* feature is located.)

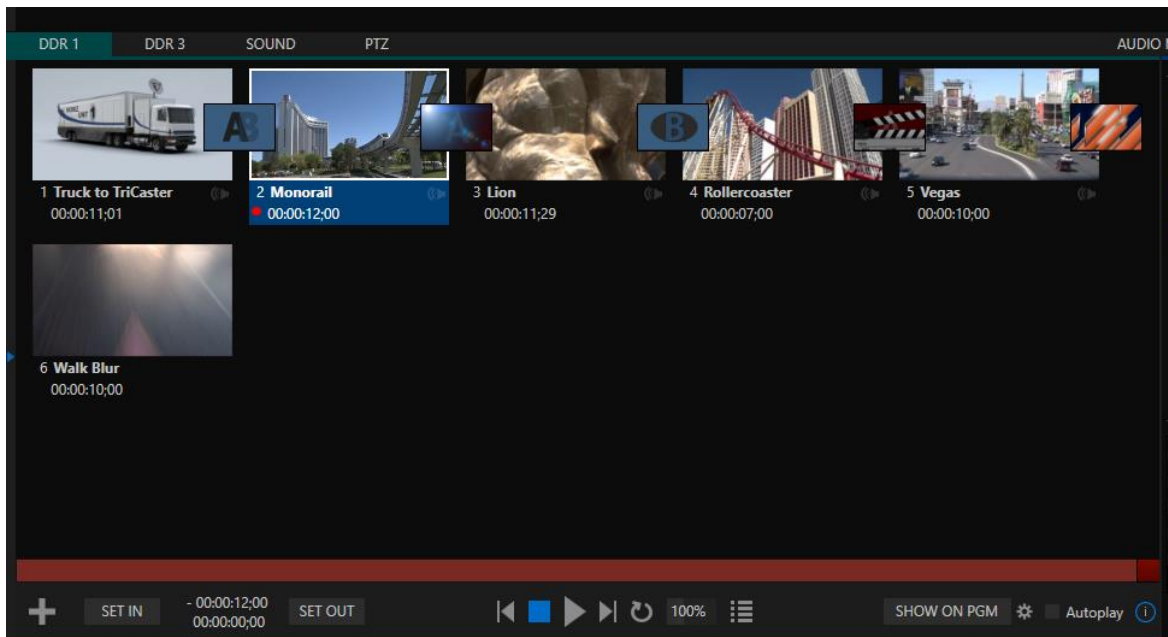


FIGURE 11-1

TC1's *Media Players* can handle a number of different media types:

- *DDRs* can display:
 - *Video clips* – including motion titles such as scrolls, and longer format 'movies'.
 - *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.
- Both the dedicated *Sound* player and the four *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).

All *Media Players* are accessed using tabs in the lower section of TC1’s *Live Desktop*.

SECTION 11.2 PLAYLISTS

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

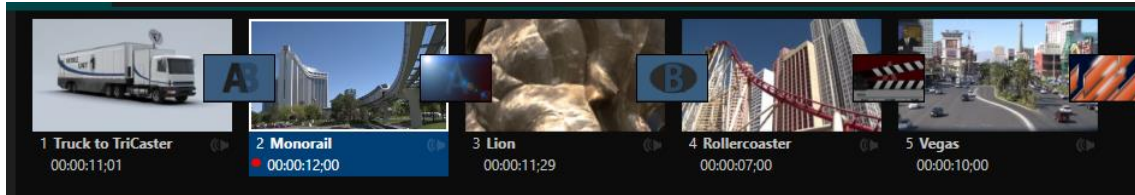


FIGURE 11-2

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.

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.

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 ‘unused’ 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, select it and press the ‘g’ key (multi-selection is supported, too).

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.

11.2.1 FILE OPERATIONS

- Click the large + (*Add Media*) button at left beneath the playlist pane to open a custom *Media Browser* (see Section 11.2.7). Alternatively, double-click in an empty part of the *Playlist* pane.

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

- Newly-added files become selected items in the *Playlist* pane.
- Drag (appropriate type) file(s) from one module's playlist to another module.
- Right-click in the playlist pane to show a menu with context-relevant items from the following list (operations affect selected playlist items):
 - *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* (Still image and title icons)
 - *Speed*
 - *Angle*
 - *Automation*
 - *Use Current Frame as Icon*
 - *Edit Title*
 - *Properties*
 -
 - *Transcode* – convert selected clips to a format optimized for realtime-playback (see Section 11.2.5)
 - *Add to Publish Bin* – see Section 18.3.
 - *Send to > Buffer n* (Still image and title icons – see Section 11.4)

- 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.

11.2.2 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%.

11.2.3 AUTOMATION

We've discussed elsewhere in this Guide (Section 8.1.5) 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.

11.2.4 PROPERTIES

DISPLAY NAME

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

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

COMMENT

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

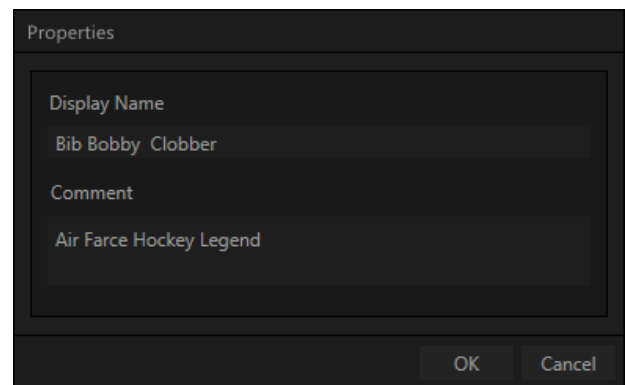


FIGURE 11-3

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.

11.2.5 TRANSCODE

TriCaster can play files in many formats, but playing some formats can place unnecessary burdens on system resources. When this is the case, the footer below the clip's playlist icon shows a special indicator inviting you to this fact (Figure 11-4).



FIGURE 11-4

Better still, the *Transcode* item in the clip context menu lets you quickly and easily convert selected clips to a file format better suited to realtime-playback (multi-selection is supported, too).

Hint: During transcoding, the clip context menu entry changes to Cancel Transcode, and overall transcoding progress is shown in the Media Player's footer.

11.2.6 TRIMMING CLIPS AND THE SCRUB BAR

Just beneath the *playlist* pane is a full-width *Scrub-Bar* (Figure 11-5). The *scrub-bar* width represents the full run time of the current clip or other media file. Drag the knob to move the playhead forward or back in time.



FIGURE 11-5

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 11-5). The lower time display shows embedded clip timecode.

Hint: For longer durations, holding SHIFT while dragging the scrub bar knob increases precision.

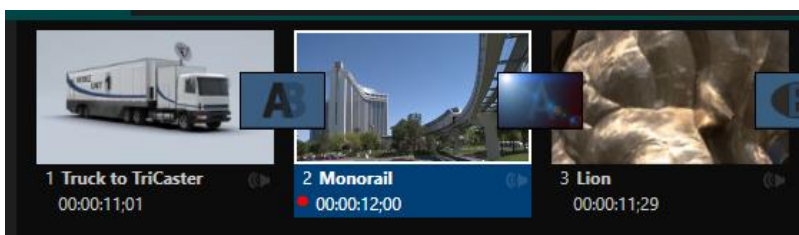


FIGURE 11-6

It's useful to note that (Quicktime only) clips that are still being captured continue to 'grow' even after addition to a *DDR* playlist (see Section 11.2.7). These growing clips, featuring the red 'recording' overlay (Figure 11-6) 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 TC1's *Media Players*. Premultiplied files will not give the correct results when overlaid on other imagery.

Hint: Monitors can optionally show a checkerboard pattern behind transparent content.

11.2.7 MEDIA BROWSER

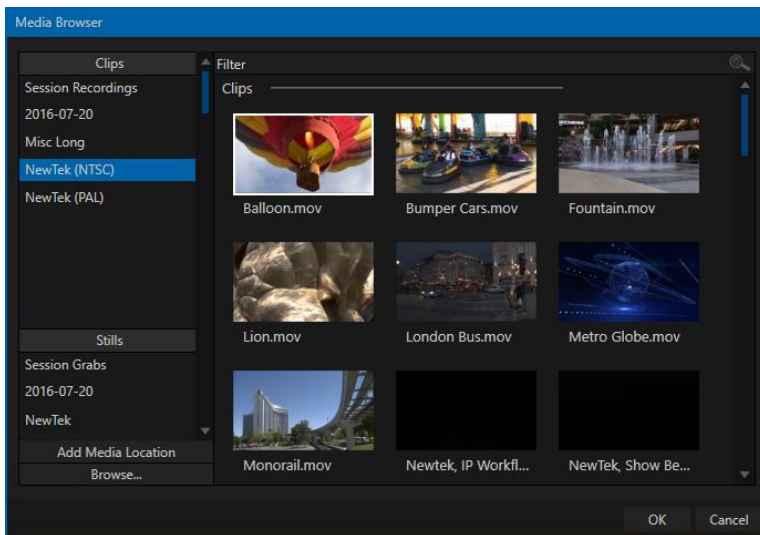


FIGURE 11-7

The custom *Media Browser* provides easy navigation and selection of content on your TC1 (or other NewTek live production system) 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*.

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 *output*.
- Wait some length of time, and begin playing the clip.
- (Of course, all of this could easily be performed by a macro, too.)

LOCATION LIST

The *Location List* is a column of favorite “locations”, grouped under headings such as LiveSets, Clips, Titles, Stills, and so on. 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 will appear under each main heading 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.

SESSION RECORDINGS AND GRABS

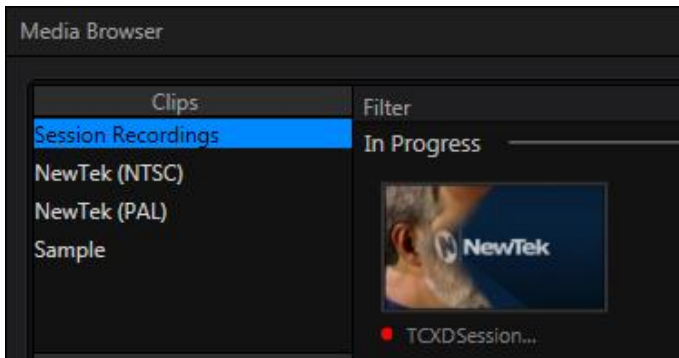


FIGURE 11-8

In addition to locations named for your stored sessions, the *Location List* includes two special entries worth noting. The *Session Recordings* location shows you all files captured in the current session, saving you time hunting through a hierarchy to find them. Similarly, *Session Grabs* makes it easy to find those still images you just snapped with TC1’s *Grab* feature.

Hint: Clips that are being actively captured are marked with a red ‘record’ overlay (Figure 11-8). 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).

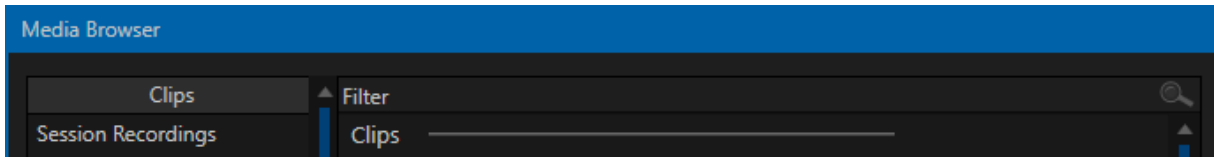


FIGURE 11-9

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

FILE CONTEXT MENU

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

11.2.8 PLAYER CONTROLS

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



FIGURE 11-10

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

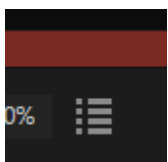


FIGURE 11-11

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 11-11) 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 all playback-related functions:

- *Previous button – go to previous playlist entry
- Stop (clicking Stop when already stopped goes to the first frame)
- Play
- *Next button – go to next playlist entry
- (Not shown) – Double-click an entry in the playlist pane to begin playback at the start of that playlist entry

PREVIOUS, NEXT AND PRESENTATIONS

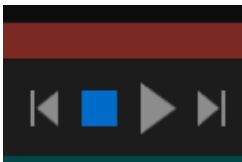


FIGURE 11-12

It's extremely useful to realize that, since TC1 supports transitions 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

FIGURE 11-14 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

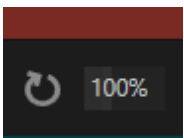


FIGURE 11-13

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

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

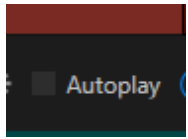
As is common for numeric input controls in the interface, drag left or right to adjust the *Speed* value, or click the slider to access a direct entry field allowing you to type a value using the keyboard.

Hint: Press Shift while double-clicking Speed to quickly reset to 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 11-15

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

11.2.9 SHOW ON (...)

Another extremely 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 (Figure 11-16) as the *Program* row of the main *Switcher*. It provides unique playback and display abilities that make instant replay a thing of joy, as well as serving other purposes.

Click the configuration button (gear) beside the *SHOW ON* button to display the panel seen in Figure 11-16.

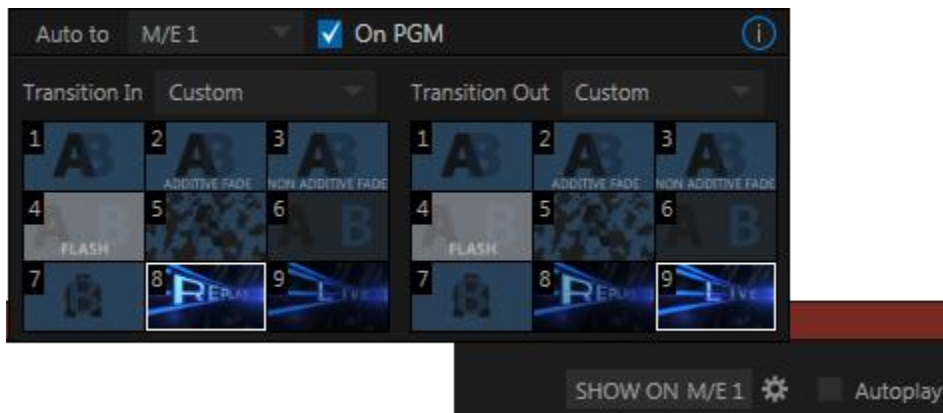


FIGURE 11-16

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 in TC1's interface, 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.

11.2.10 MEMS

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

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

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

MEM slots can be named, and 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').

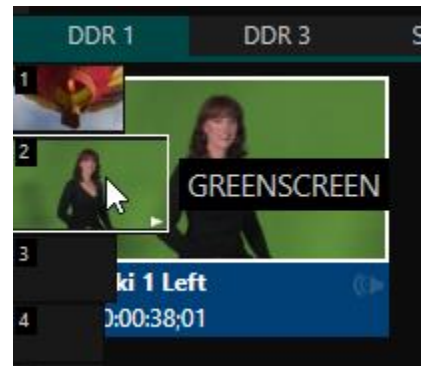


FIGURE 11-17

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 flyout *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.

11.2.11 NETWORK SHARING

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

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

- Audio
- Clips
- Stills
- Titles
- Buffers

Note: Several 'non-session dependent' locations in the main application folder are also shared. This allows applications such as NewTek's Virtual Set Editor, etc., running on external systems to export directly to TC1. These network shares are unaffected by the Share Media Folders and Buffers setting.

Transferring very large files across a network can be 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'. TC1 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.

SECTION 11.3 EDITING TITLE PAGES

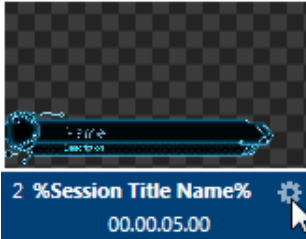


FIGURE 11-18

On mouse-over, title page icons (Figure 11-18) display a configuration (gear) icon in their lower-right corner.

Clicking this button (or selecting *Edit Title* in the icon context menu) opens the pop-up *Title Page Editor*.

Opening the pop-up *Title Page Editor* during playback is permitted, meaning *Title Page* content can be edited during both play and display (changes are detected and shown immediately).

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

When you move the mouse over text in the *Title Page Editor's* preview pane, a white bounding-box appears (Figure 11-18). If you click once inside the box it turns yellow, indicating the text object is selected, and a text edit field opens.

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

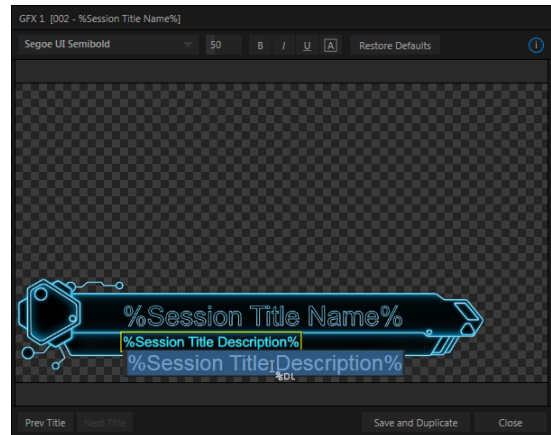


FIGURE 11-19

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.

11.3.1 HEADER TOOLS

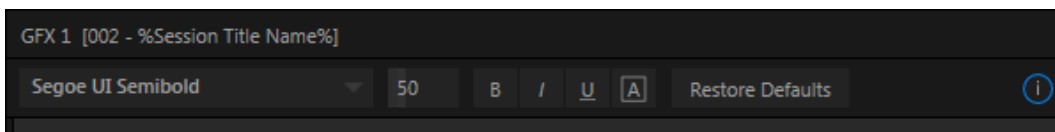


FIGURE 11-20

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

11.3.2 FOOTER TOOLS



FIGURE 11-21

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.

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

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

STAND-IN IMAGES

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

If 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 11-22). It provides the same set of *Fill Mode* options, but adds an *Image Source* box supporting direct entry.

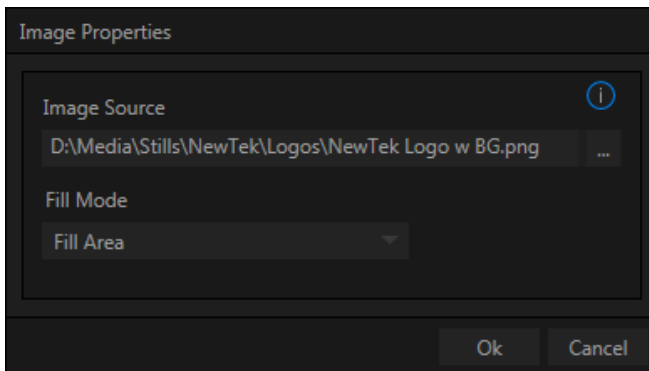


FIGURE 11-22

The *Image Source* box comes into play in connection with the next (extremely important) topic – *DataLink*.



FIGURE 11-23

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.

TC1 notifies you as to which entry boxes accept *DataLink* keys by showing a custom mouse pointer, in the form of %DL, as shown in Figure 11-23.

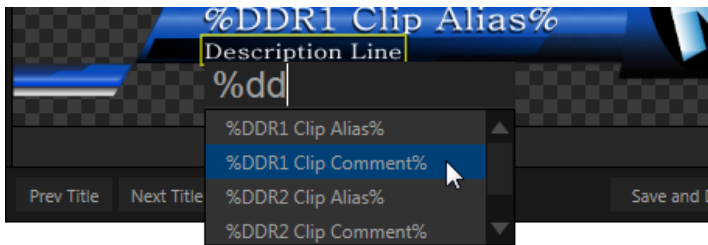


FIGURE 11-24

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 11-24).

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

There are endless uses for this technology, and a wealth of methods to provide and update the values assigned to *DataLink keys*. For 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 11.4 BUFFERS

TC1's powerful *Buffer* system provides convenient alternative graphics and animation sources for *M/Es* (including their associated *KEY* channels), the *Switcher's* primary *Program* and *Preview* rows, and its *DSK* channels. The tabbed *Buffers* module (Figure 11-25) shows icons and controls for fifteen *Buffers*.

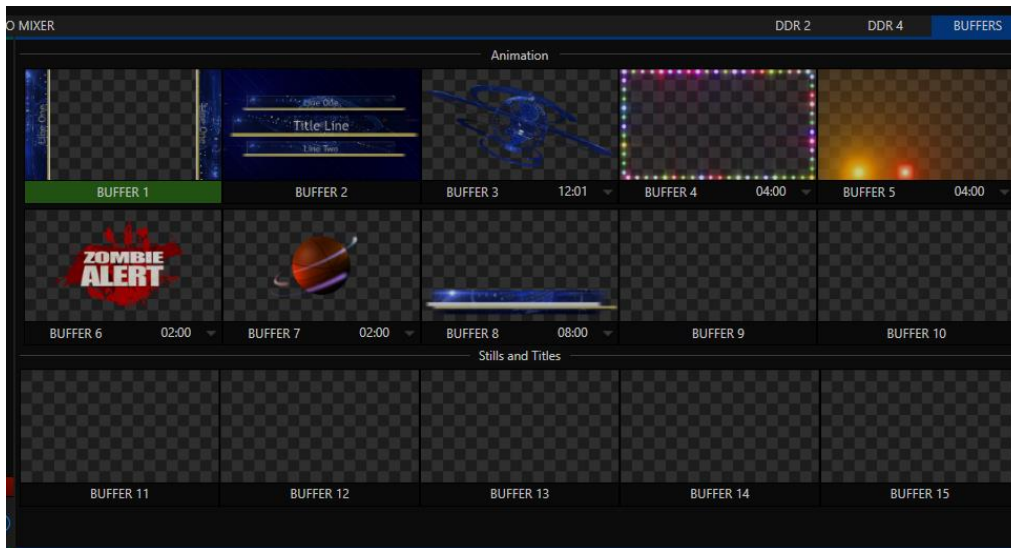


FIGURE 11-25

Buffers are sometimes even more useful than similar imagery supplied from *Media Players*. *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.

11.4.1 BUFFER TYPES

Buffers support the following media types:

- *Animation effects*

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

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

- *Graphics*

- *Images* – 24 bit or 32 bit (with embedded alpha channel) images.
- *Title pages* – editable *title pages*, identical to those served up by the various *Media Players*.

Buffers tab item selection and display is controlled by a *Buffer (BFR)* button on main *Switcher* source rows, *M/E* rows, and options in *DSK* and *M/E KEY* source menus. The top ten buffer slots support both compiled *animation effects* and graphics – *still image files* or *title pages*.

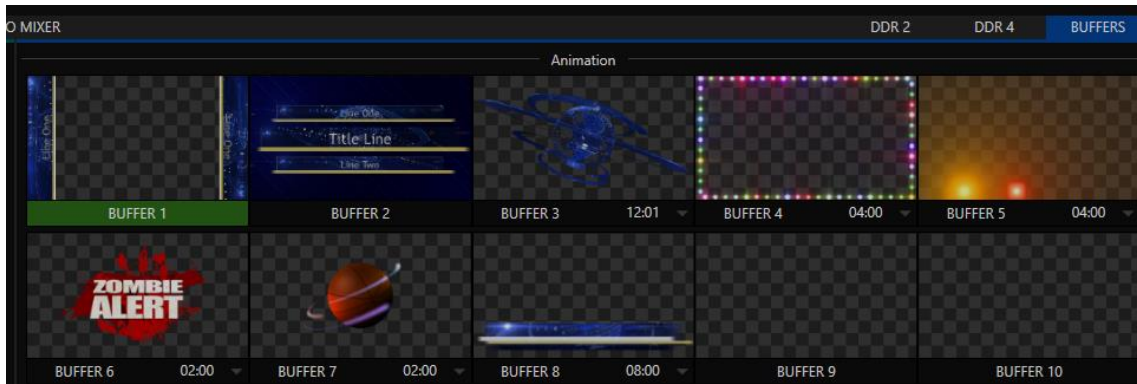


FIGURE 11-26

The remaining buffer slots are restricted to graphics content, including popular image formats along with *title pages* (i.e., .cgxml files).

11.4.2 SELECTING CONTENT



FIGURE 11-27

Assign content to a buffer slot by following the steps below:

- Click the + sign that appears when you roll the mouse over the buffer’s icon.
- Right-click a still image or title page icon in a *Media Player*.
- Choose *Send to* from the context menu (select a specific buffer slot using the hierarchical menu).

Hint: Alternatively, drag a still or title page icon from a Media Player onto a Buffer slot.

Note that, in *DDRs*, this menu item only appears for *still image* formats and *title pages*. *Animation effects* must be compiled using the *Animation Store Creator™* add-on application before they can be loaded into buffers.

(Naturally, if an image or title has previously been previously assigned to the active preset for the designated buffer, the new file will replace the current one.)

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, it no longer matters whether the item continues to be available in a Media Player playlist. 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.

11.4.3 BUFFERS MENU

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

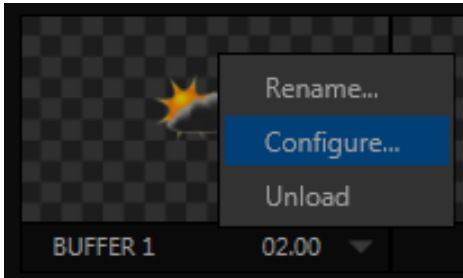


FIGURE 11-28

- *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.

Hint: A small [x] button appears over the upper-right corner on rolling the cursor into a Buffers tab icon. This button simply provides another convenient method of unloading an effect from Switcher Memory.

11.4.4 ANIMATION FEATURES

The thumbnail icon for a buffer with an animation effect 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).



FIGURE 11-29

Loading either class of animation effect into a buffer results in a time control being displayed at right in the buffer label (Figure 11-29).

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 11-29). 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.

11.4.5 SHARING BUFFERS

If you wish, you can share the *Frame Buffer* folder, which contains any *still images* used in *Buffers*, across a network. *Share Media Folders and Buffers* are easily enabled or disabled 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 top level *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.

11.4.6 WATCH FOLDERS

The *Frame Buffer* folder is a “watch folder”. When you save an image into the correct location for a given buffer, the corresponding buffer immediately updates, even if it is currently displayed. This lets you refresh overlays virtually instantly from any computer on the same 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. TC1 always shows the ‘newest’ file – that is, the one with the most recent modification date.

11.4.7 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; others that are suited to overlay, bug, or alert tasks.

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

- Main *Switcher*

- *Program/Preview*) rows – all 15 buffers are directly accessible in the *Switcher*
- *DSK* channels – choose a specific *buffer* using the *DSK*'s drop-down source menu.
- *M/E banks*
 - Select *buffer4* for *M/E* rows just as you would for the main *Switcher*.
 - *KEY* channels – choose a *buffer* for any *KEY* channel using its drop-down source menu.

Buffers allow abundant use of animation throughout your productions – as virtual set elements, layered graphics overlays, etc., all without tying up precious *Media Players*.

(Consider that in addition to the buffer cross-points in the main *Switcher*, *M/Es* support up to eight animated buffers. Given the fact that *M/Es* are re0entrant, layering possibilities are nearly endless.

11.4.8 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 assigning a desktop or *Multiview* monitor to the *Buffer* (or choosing a *Workspace* option that includes *Buffers*) and opening its *Input Configuration* panel. Of course you can also apply *Position* settings, including *Rotation* and *Scale*, in *DSK*, *M/E* and *KEY* channels.

11.4.9 EDITING TITLES

When a title page (.cgxml file) is loaded into a buffer, TC1's live *Edit Title* panel (see Section 11.3) can be opened by clicking the gear icon that appears at lower-right when you move the mouse over the icon (Figure 11-30).

Changes made in this panel take effect immediately. If the buffer is displayed, the new title will appear as soon as your modifications are complete.

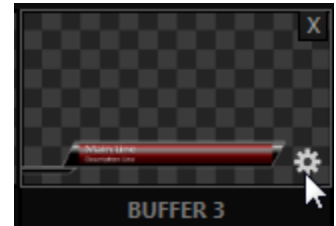


FIGURE 11-30

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. TC1's native PTZ implementation makes it easy to operate supported cameras from the Live Desktop or control surface..

As many as eight TC1 inputs can be configured as a PTZ cam, controlled directly from controls provided in the *Live Desktop* (see Section 8.3).

In addition to pan, tilt and zoom control, TC1 can also govern *White Balance* settings, *Focus*, *Iris* (or 'brightness'), and *Animation Speed* ('travel speed') settings for supported cameras. TC1 also provides a convenient and very visual *PTZ preset* system allowing you to 'lock in' your shots and access them quickly.

SECTION 12.1 THE PTZ TAB

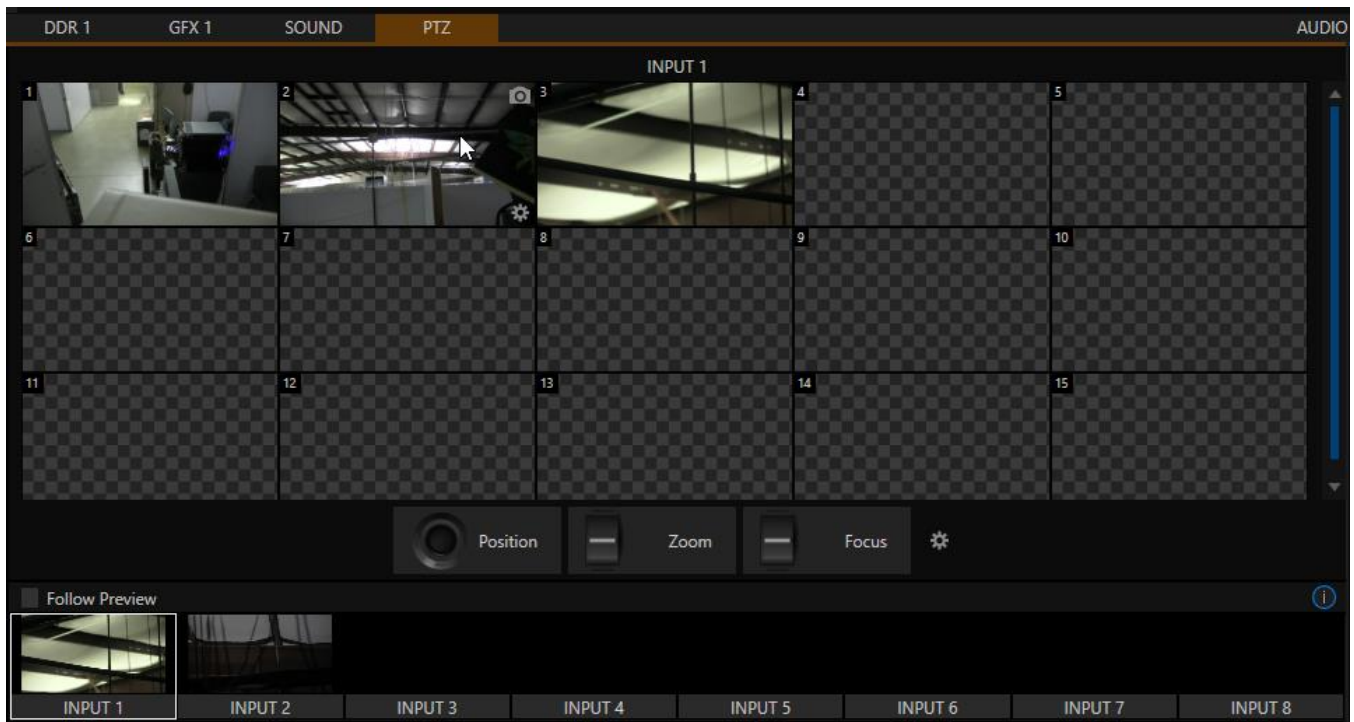


FIGURE 12-1

All of the controls and features just mentioned are located in the *PTZ tab*, located at left in the lower third of the *Live Desktop* (Figure 12-1).

12.1.1 OVERVIEW

A few steps are required before you can control a PTZ camera and use its output in TC1.

1. First, connect the camera's output to one of TC1's inputs. For example, you might connect SDI video output from the camera to the SDI IN connector 1 on TC1's backplate. Or in some cases you might bring the camera output into TC1 as an NDI signal over the network – see Section 3.4.
2. Having made an a/v connection to TC1, assign that source to a *Switcher* input – see Section 8.1.
3. Now you must establish a control connection to the camera – this is done in the PTZ tab of the *Hardware Configuration* panel – see Section 8.3.

Having performed step 3, above, you are ready to use the *PTZ* control panel (Figure 12-1), which is a tabbed pane below the *Switcher* rows on the *Live Desktop* (near the *DDR*s).

12.1.2 THE CAMERA BIN

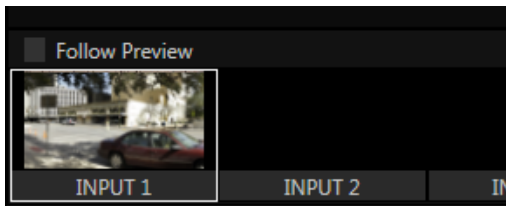


FIGURE 12-2

The *Camera Bin* (Figure 12-2), located across the bottom of the *PTZ tab*, contains icons for each PTZ camera you configure in *Hardware Configuration*. The camera being controlled is denoted by a white outline.

Hint: Cameras whose PTZ switches are disabled in the Hardware Configuration panel show dimmed icons in the Camera Bin, but may still be selected.

Enabling the *Follow Preview* switch at left in the *Camera Bin* header automatically selects the correct camera icons for you as these are chosen on the main *Switcher's Preview* row.

The icon label shows the name of the *Switcher* source assigned to this slot in the *bin*. If you haven't already done so, you will need to assign suitable PTZ cameras to these slots to establish the control connection.

Hint: On rolling over an icon in the Camera Bin, a configuration button (gear) is shown. Click this gear if you want to re-open the Hardware Configuration panel to set up or adjust the control connection settings for a PTZ camera (see Section Section 8.3).

12.1.3 MANUAL NAVIGATION

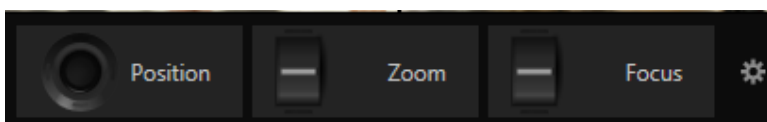


FIGURE 12-3

As set of manual *Position*, *Zoom* and *Focus* controls sits centrally just beneath the PTZ preset bin. Drag the mouse on these to make manual adjustments.

12.1.4 PTZ PRESETS

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

To configure and store a preset:

1. Use the *Position*, *Zoom* and *Focus* controls mentioned in the previous section to navigate to the desired camera angle, etc.
2. Then move the mouse over the preset icon you wish to store (or update), and click the *Snapshot* (camera) gadget that pops up at upper-right corner of the icon.

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

12.1.5 ADVANCED PTZ SETTINGS

Click the gear beside the manual *Focus* button to display the *Advanced PTZ Settings* dialog (Figure 12-4).

CAMERA SETTINGS

The *White Balance* menu offers four options – *Auto*, *Indoor* and *Outdoor* and *Manual*. (This is a global setting, and affects all presets for the selected camera.)

By contrast, the *Focus* setting, and the state of its *Auto* switch are stored individually in each preset. This is also true for the *Iris* setting, and its *Auto* switch.

Note: Support for storing a Manual focus value in presets varies by camera manufacturer and model.

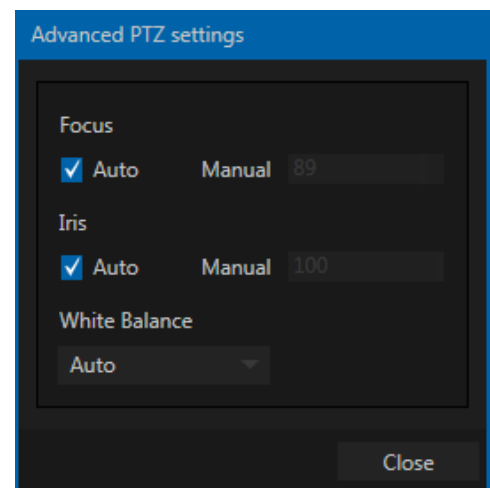


FIGURE 12-4

12.1.6 PTZ PRESETS AND DATALINK

We've discussed elsewhere in this Guide how DataLink can be used to 'self-title' your video output. To make this even better, each PTZ preset has its own DataLink keys, allowing you to give each one a name and descriptive comment that can be used in titles and elsewhere. When you roll the mouse over a preset icon, a configuration overlay ('gear') appears in its lower- right corner. Click this to open the *DataLink Settings* panel for the corresponding preset.

12.1.7 PTZ AND THE CONTROL SURFACE

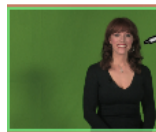
Pan, tilt, zoom control, and preset selection for connected robotic cameras are also directly supported on the TC1 control surfaces. See Chapter 21, Control Surface for details.

Chapter 13 LIVEMATTE



Although its controls are deceptively simple, TC1's LiveMatte™ implementation 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. TC1™ also relies on this method to insert talent seamlessly into virtual sets via *LiveSet*™.



LiveMatte™ controls are located in the *Input Configuration* panels for every *Switcher* source. To access them, click the *Configure* button (gear) that appears above an onscreen monitor in the *All Monitors* tab. The second tab in the (source) *Configuration* panel is labeled *LiveMatte*.

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 algorithms actually go well beyond simple chromakeying techniques to provide support realtime 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.

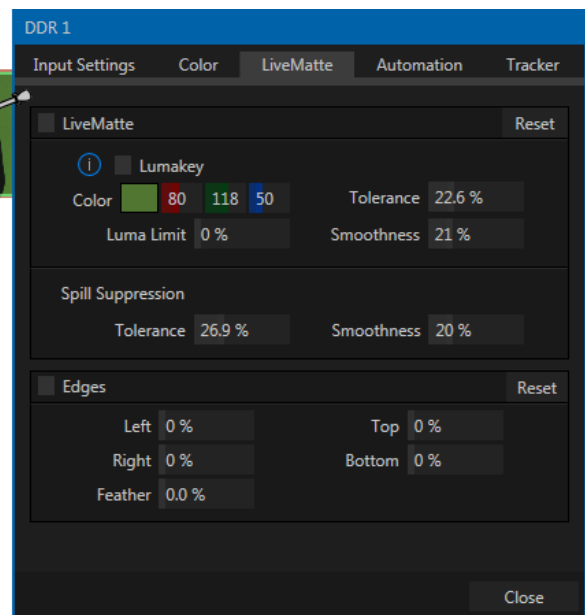


FIGURE 13-1

SECTION 13.1 CHROMAKEYING

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 television meteorologist in front of a weather map, that person is almost certainly posed in front of a green screen. The background is ‘keyed out’ and replaced by computer generated imagery.



FIGURE 13-2

Of course, if you choose poor settings, foreground areas may inadvertently be cut away as well. Good keying often requires judicious balance between ‘too much’ and ‘too little’. Let’s consider the tools TC1 provides to help you achieve a great result.

SECTION 13.2 MATTE

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

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



FIGURE 13-3

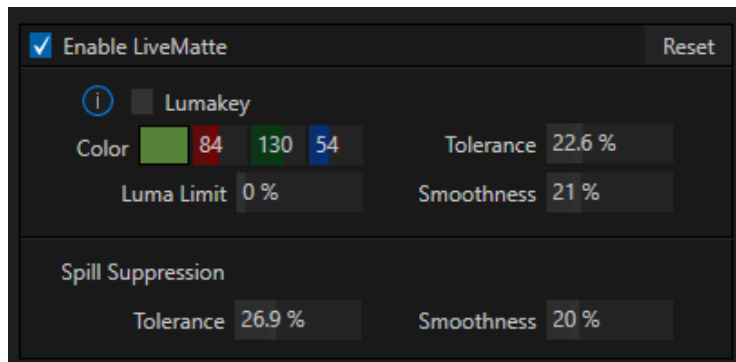


FIGURE 13-4

TC1 supplies a digital version of this traditional tool.

The controls under the *Matte* label, as you would expect, 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. 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, TC1 supplies a numeric slider labeled *Tolerance* just 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. 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. 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.

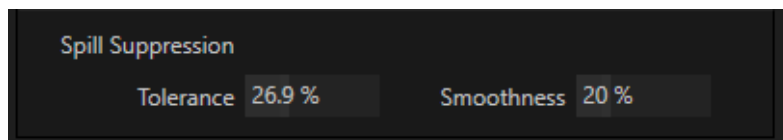


FIGURE 13-5

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).

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 TC1's potent realtime virtual set technology, called LiveSet™, is applied.

We introduced TC1's *M/Es* way back in Section 2.4.9, but it's time for us to look into these extremely powerful tools in greater depth.

SECTION 14.1 OVERVIEW

The *Mix Effects* tabs beneath the monitoring pane on the *Live Desktop* are labeled M/E 1, 2 and so on. These tabs are toggle buttons you can click to expand or collapse the *M/E* interface.

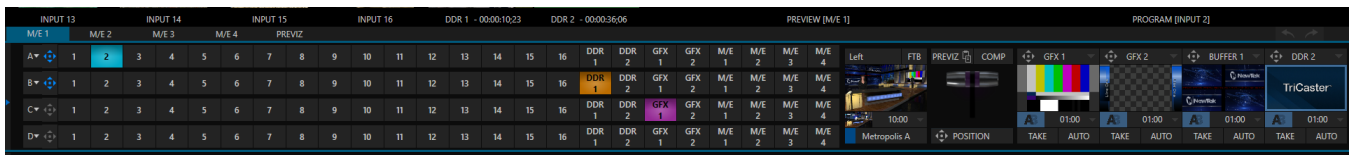


FIGURE 14-1

When expanded, the *M/E* pane spans the upper-central part of the *Live Desktop*. TC1's four M/Es are presented individually in tabbed panes, each corresponding to a button in the main *Switcher*.

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.

TC1's *M/Es* are re-entrant. This means that *M/E* buttons also appear on source selection rows and *KEY* channel source menus inside the *M/E* panels. 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. TC1 will simply show black in such cases. 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 of TC1's *M/Es* 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.



FIGURE 14-2

TC1 automatically establishes the *M/E* mode based on the type of effect you load as its *Background* effect.

Effect selection is done in the usual way using the *Media Browser*. Click the + sign gadget that appears at upper right when the mouse is over the thumbnail icon for the *Background* effect.

For the most part, you will initially see very little difference in the *M/E* panel when you change modes.

- In either mode you will observe source button rows at left labeled input with the letters *A* through *D*. The number of layers shown varies according the effect selection you make, from two effect layers to four.
- At right are four *KEY* control groups. In most respects these are identical in appearance and practice to the *DSK* controls located in the main *Switcher* (see Section 9.4.1).
- Even the central control group mimics the main *Switcher*, with its *Transition* controls and options, *T-bar* and so on.

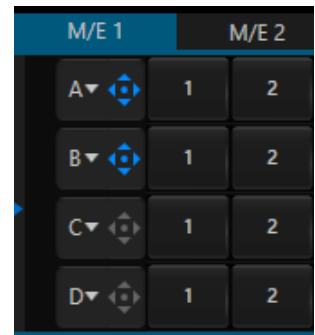


FIGURE 14-3

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 11.2.8).

To avoid undesirable consequences for *Media Player* content aired on the all-important main *Program* output, *M/E*'s in *Mix* mode trigger *Autoplay* operations within the same *M/E* only.

As well, a switch in the *Dashboard Options menu* toggles *AutoPlay*'s triggering of '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 one of TC1's primary outputs (as well as the *IsoCorder* section)

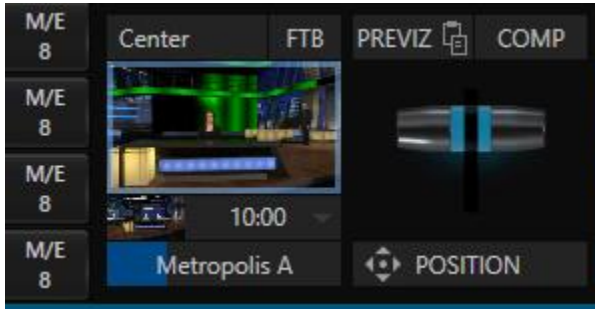


FIGURE 14-4

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 14-4), as follows:

- The *Take* and *Auto* buttons beneath the *T-bar* and *Transition icon* are replaced by a large *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/Es).

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 14-5

Position controls for all appear to the left of all input rows. Click this button to open the input's *Position* panel. These controls replicate those discussed previously, under the sub-heading *DSK Positioning* in Section 9.4.1.

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.

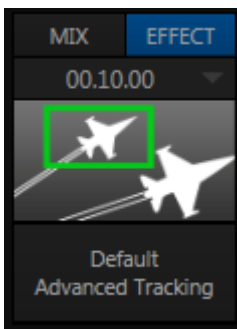


FIGURE 14-6

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

The *Advanced Tracking* effect 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.

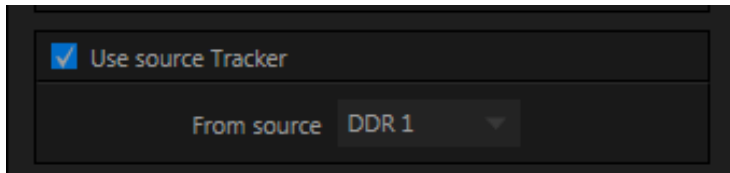


FIGURE 14-7

19. Enable *Follow Tracker* (Figure 14-7).

The result on your *Program* monitor should look much like Figure 14-8; 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 14-8

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

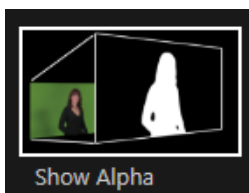


FIGURE 14-9

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 14-10

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.



FIGURE 14-11

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 14-12



FIGURE 14-13

LiveSet is one of VLC1's most powerful tools, and can dramatically enhance a production.

With it you can achieve the look of a large, sophisticated studio setting (Figure 14-13) within a very small studio space (Figure 14-12), 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 label above the effect icon in the *M/E* to open the *Media Browser* (Section 11.2.7).

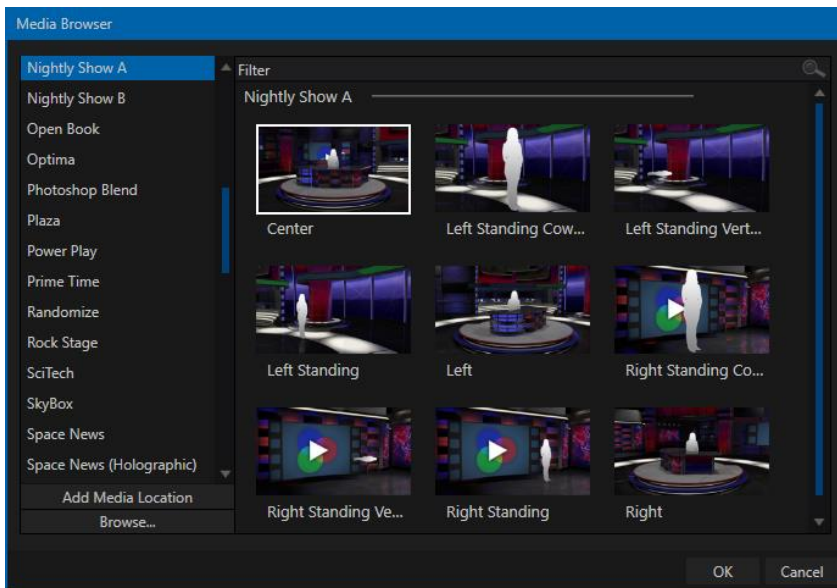


FIGURE 14-14

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 14-14 shows the content of the *NewTek* location under the *LiveSets* heading).

INPUT POSITION



FIGURE 14-15

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.



FIGURE 14-16

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 *almost* all respects, the *KEY* channels in *M/E* panes match the *DSK* channels found in the *Switcher's* main *Transition* section. Unlike the *DSKs*, though, they constitute a 'pre-main *Switcher*' sub-layer. This means that *KEY* channels are applied *before* the composition is sent to the *Switcher* (or another *M/E*). Thus content in a *KEY* channel appears beneath anything displayed via the (*Switcher*) *DSK* channels.

Likewise, *KEY* channel selection and *Position* controls largely work just like their *DSK* cousins, discussed earlier (see 9.4.1), 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

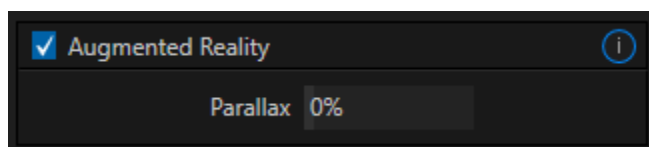


FIGURE 14-17

In one other unique and powerful departure from *DSK* features, the *Positioner* for *KEY* layers has an added feature labeled *Augmented Reality* (Figure 14-17).

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 14-18

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 14-18).

(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.

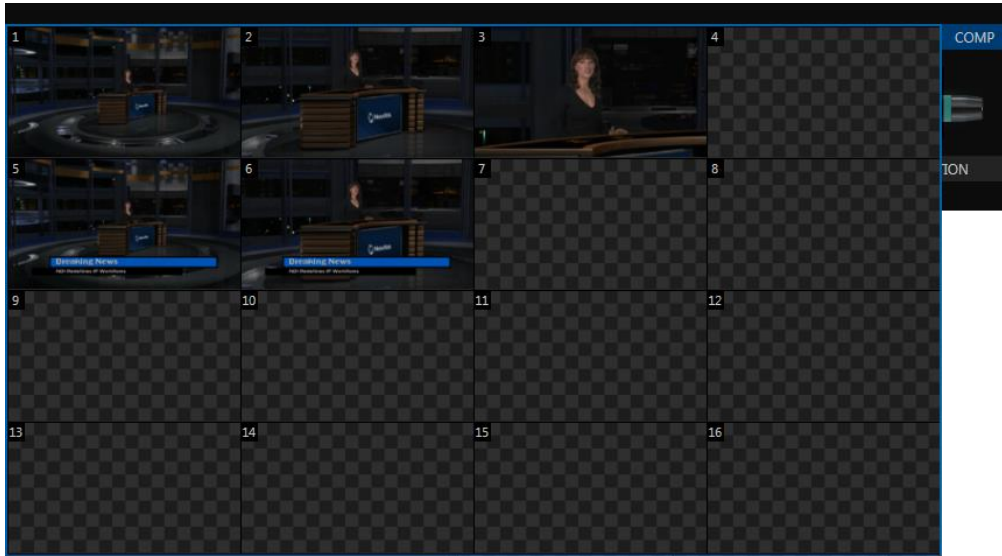


FIGURE 14-19

Different ‘virtual camera’ positions, along with other *M/E* attributes, can be stored in the *Comp Bin* associated with each *M/E*.

In particular, *T-Bar* and most *Positioner* attributes for all layers in the module are stored in a *Comp*, and are re-applied when you click the *Comp* icon later. This includes such things as cropping and edge-feathering performed using *Positioner* settings (layer source selections are not stored, nor are *Border* or *Tracking* settings).

14.8.1 MANAGING COMPS



FIGURE 14-20

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*, and clicking an empty position in the *Bin*. 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 14-20) or by right-clicking the icon and selecting *Update* in the context menu that appears (Figure 14-21).

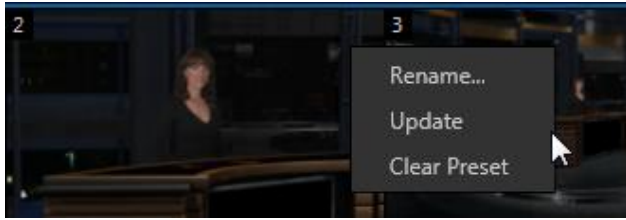


FIGURE 14-21

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*.

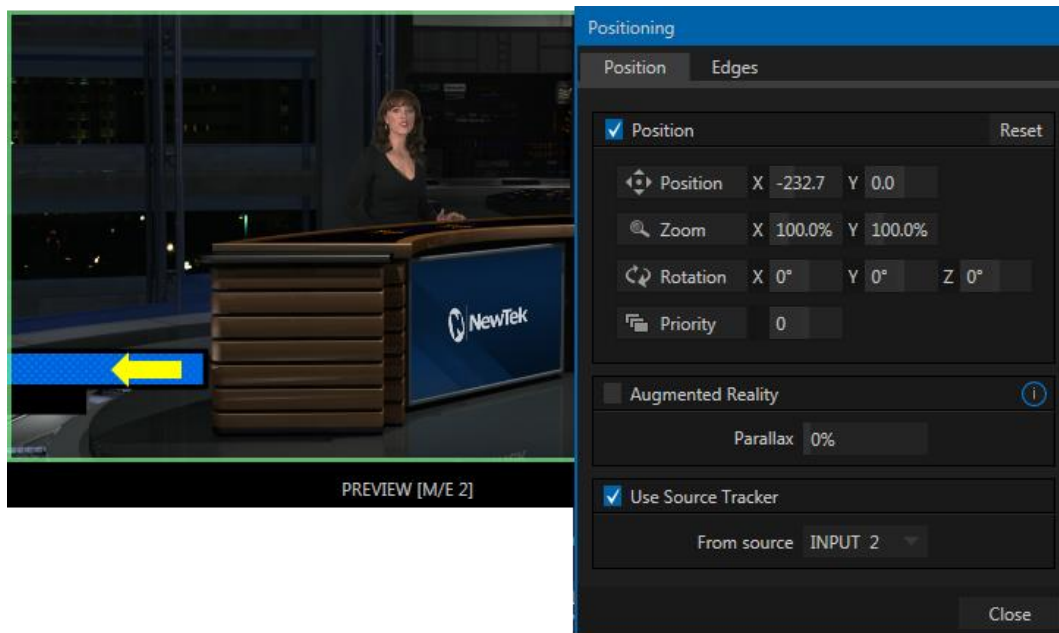


FIGURE 14-22

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

Actually, *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

We should mention again that the duration of the animation from the current state/position of a layer to the one stored in a *Comp* is controlled by the effect duration controls for each layer. This means that each layer can be animated more quickly or slowly according to your wish.

Note: The effect duration for individual layers is not stored in Comps. Rather, any animation is governed by the current setting for the layer, as established in the user interface at the time a Comp is applied.

Chapter 15 AUDIO



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. TC1™ provides 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 3.4.1 and 3.6.1. TC1 presents more precise control over individual audio sources and outputs in a tabbed pane labeled *Audio Mixer*, found just below the main *Switcher*.

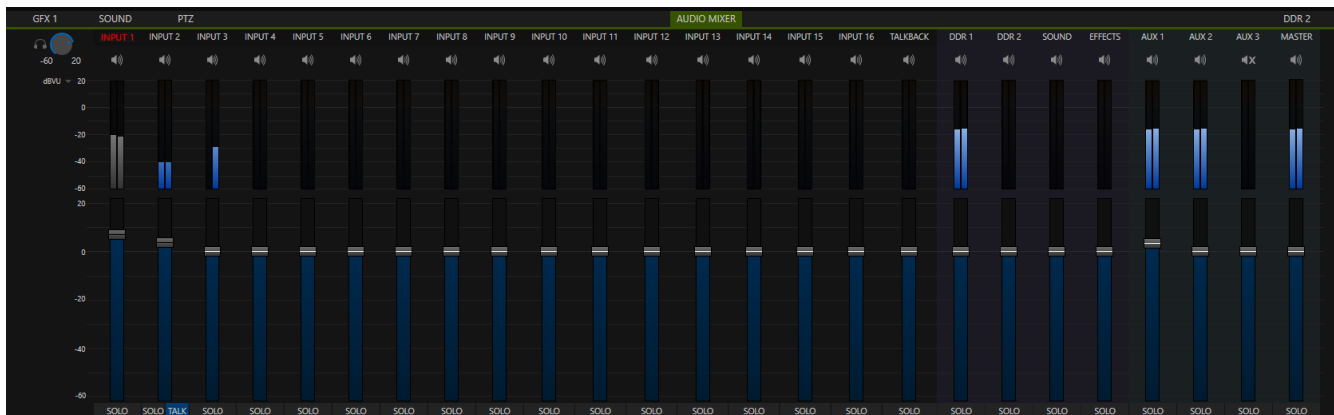


FIGURE 15-1

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
 - Controls for audio Inputs 1-16.
 - TALKBACK – a special input provided for use with SkypeTX 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.
- *Master* – controls the primary audio bus.
- Level controls for each recorder are located in the *Record Configuration* panel.

NOTE: TC1 provides stereo analog output connections that carry the first two channels of the Master and Aux 1 audio mixes.

SECTION 15.1 AUDIO SPECIFICATIONS

TC1's 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

At the extreme left side of the *Audio Mixer* you will observe a simple volume control for the *Headphones* output. By default, headphones connected to this stereo output jack will carry the first two channels of the audio signal from the bus designated *Master 1* – that is, the same audio carried by analog outputs marked as *Ch. 1* and *Ch.2* in the *OUT 1* group on TC1's backplane.

Remember that the *Headphone* output is also affected by *Solo* switches located at the bottom of each control group in the *Audio Mixer*. When *Solo* is enabled for one or more sources – or outputs – *only* the soloed sources are sent to the connector. (See *Solo* in Section 15.7.2 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.

Click the label below the *Mute* button in the *Headphone* control at left to open a small menu offering three options as follows:

- *dBVU* – most familiar to users of typical analog audio mixers
- *dBFS* – dB 'Full Scale' – the digital standard; see notes under the heading Audio Headroom in Section 3.11
- *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)

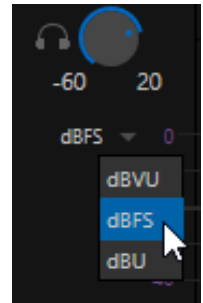


FIGURE 15-2

SECTION 15.4 EXTERNAL SOURCES

Columns in the first set of control groups are numbered as *Input 1-16*. 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, or any available NDI or Dante network audio source.

***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 15.9). Also, for reasons of your own, you may well prefer to treat various audio sources as independent of the nominally associated video input. The *Follow* (audio follows video) features play an important role in this context – see Section 15.9.5.

15.4.1 CONNECTION TYPE

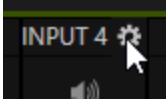


FIGURE 15-3

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 the selection of one of the supported sources.

- By default, local physical sources are listed as *IN 1* (Line or SDI), *IN 2*, and so on.
- Dante sources (network audio from systems supporting this protocol from Audinate™)
- *Follow INPUT (1-44)* – the default selection is to follow the same numbered Switcher video input
- All available NDI audio sources

15.4.2 AUDIO HARDWARE OPTIONS

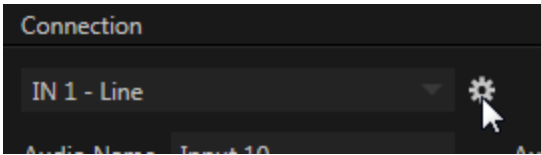


FIGURE 15-4

If you choose one of the local hardware input sources, such as *IN 1*, the connection type defaults to *SDI Embedded*. You may wish to connect to analog connectors, instead. To choose this setting, click the configuration gadget (gear) shown at right beside your *Connection* selection in the *Advanced Audio Configuration* panel.

In turn, this will open the *Hardware Configuration* panel's *Input* tab, allowing you to specify which *Audio Source* type you wish to use (Figure 15-6).

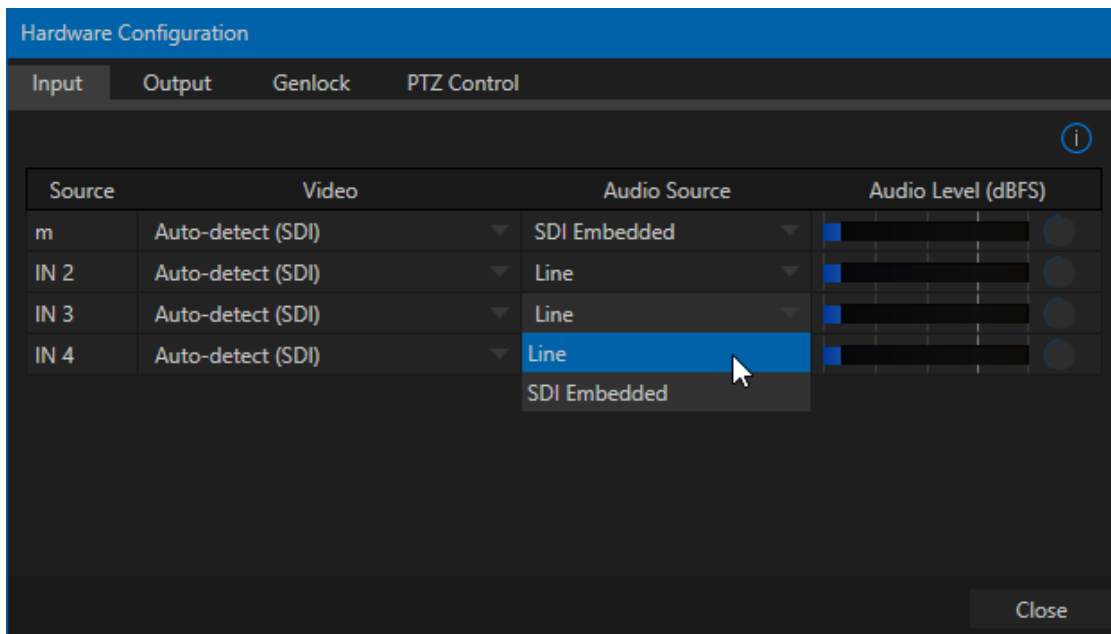


FIGURE 15-5

SECTION 15.5 SKYPE TX AND MIX MINUS

The default *Connection* option for external *Audio Mixer* inputs is *Follow Video Source*. When one of TC1's video inputs is set up this way and is assigned to a Skype TX™ channel, the audio control group is automatically assigned to govern incoming audio from that remote Skype caller.

Note that it is not necessary to use an Aux bus to configure a special audio 'mix minus' to return to the remote Skype caller in this case. The return audio for Skype TX is handled automatically, ensuring that (except when the *TalkBack* feature is engaged) the remote caller will receive a special mix comprised of the *Master* mix with the remote caller's sound removed.

Hint: See the sub-heading Sub-Mixes and 'Mix Minus' in Section 15.9 for more detail on mix minus.

SECTION 15.6 TALKBACK

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

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

When the *TALK* button is lit, audio you supply via the *TALKBACK* input (typically a microphone connected to one of the inputs on TC1's backplane, or perhaps the system *Stereo Mix* supplying audio with sound from a 1/8" motherboard audio input) is sent to the remote caller, temporarily replacing the normal mix-minus sound that remote caller would otherwise hear. At the same time, TC1 sends the incoming sound from the remote Skype caller to its *Headphone* output, enabling you to have a two way conversation off-air.

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

SECTION 15.7 COMMON CONTROLS

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

15.7.1 MUTE

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

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

One important exception to *Mute* operation involves recording. TC1's IsoCorder™ feature lets you capture any of the MIX 1-4 a/v outputs (i.e., the four primary TC1 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*.

15.7.2 SOLO

Solo implementations and options vary widely in the audio industry, but broadly speaking, they provide several 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 (after-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.
- ❖ The *Solo* feature is normally operates as what it often called 'exclusive Solo' (or 'X-Or' type). This means that enabling *Solo* for a given source disables all other *Solo* buttons.
- ❖ 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 15.8 INTERNAL SOURCES

Besides external audio sources, sounds played from internal storage volumes (including removable media such as external hard drives or 'thumb' drives) via the *Media Players* (*DDR*s, etc.) can be added to the output mix.

15.8.1 MEDIA PLAYERS

Video and audio-only files in *DDR 1 and 2* 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.

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

SECTION 15.9 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 Advanced *Audio Configuration* panel (Figure 15-6) offers many more important features and controls, however. Let's explore these now.

15.9.1 AUDIO DELAY

Audio and video arriving at inputs in sync will *maintain* sync throughout the system to output or recording. However, you should note that *upstream issues* can cause video to arrive at TC1 later than the corresponding sound.

To mitigate this sort of external problem, TC1 provides an adjustable *Audio Delay* setting.

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.

15.9.2 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.

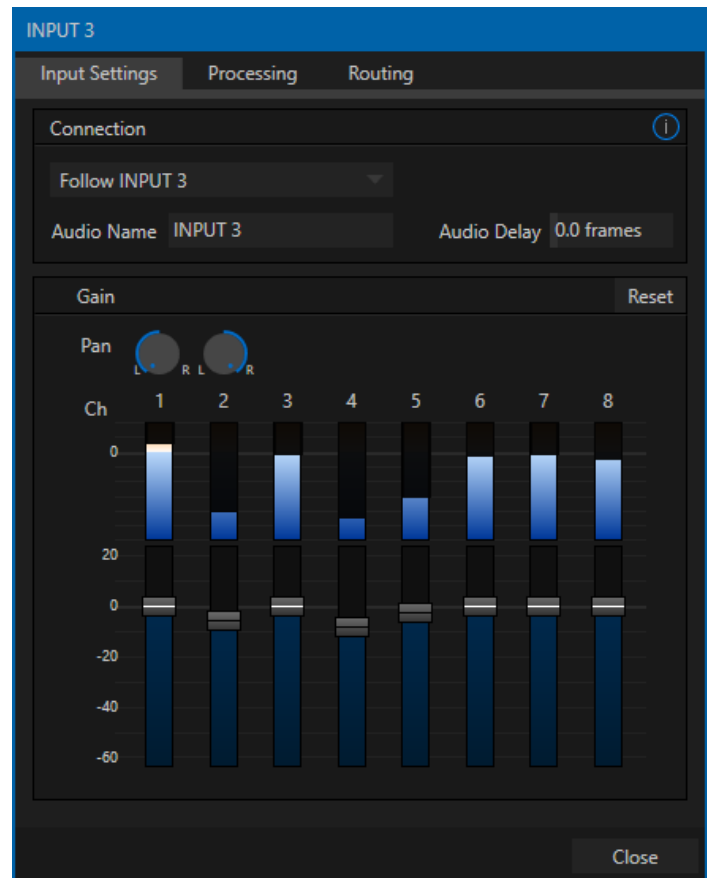


FIGURE 15-6

- 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).

15.9.3 ROUTING

A main tab labeled *Routing* appears in the *Configuration* panel for all sources (Figure 15-7). 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, prepared on an Aux bus, can serve many purposes. For example, you might wish to record a mix with all sound from talent microphones but that excludes any sound effects or music.

Secondary audio busses:

Actually, beyond the primary busses mentioned here, TC1 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 directly from the unmodified audio input associated with any single video source; really, this constitutes another up to eight additional audio busses.

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.

TC1 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.

For TC1 purposes, 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.

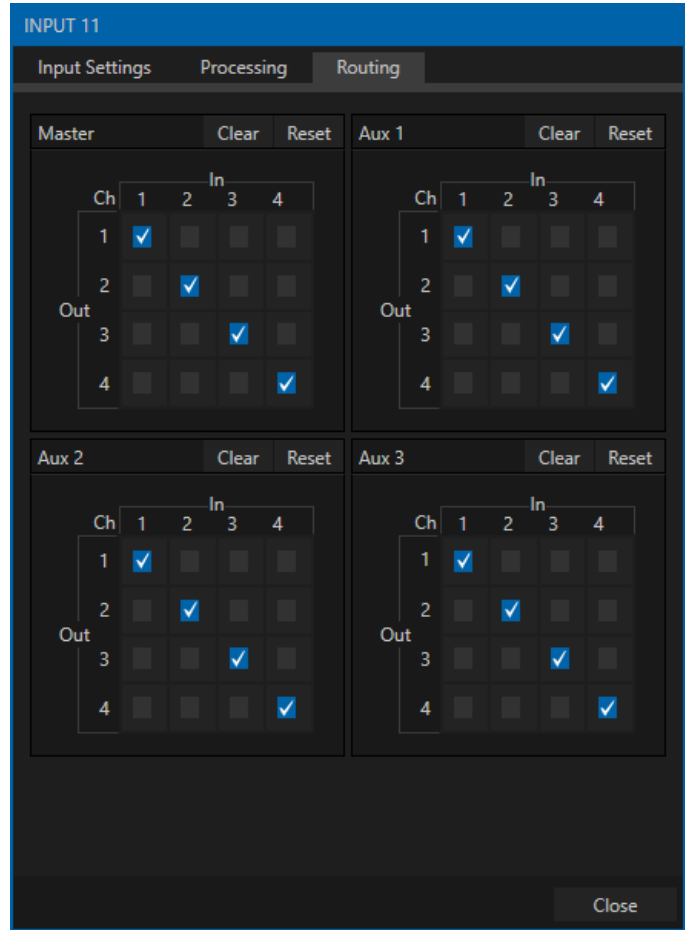


FIGURE 15-7

Note: Analog outputs 1 and 2 are permanently assigned to MASTER and AUX 1, respectively. In contrast, digital (or 'embedded') outputs are configurable in the Hardware Configuration panel.

SUB-MIXES AND 'MIX MINUS'

At times you may require specially configured audio mixes. For instance – some installations call for sending audio from one or more internal sources (such as a *DDR* or the *Sounds* player) to a secondary distribution system. Alternatively, you may want a 'clean' output from one or more sources for use apart from the main primary output mix.

Specialized sub-mixes of this latter sort are often referred to as 'mix-minus,' since one or more sources are deliberately subtracted from the main program. Mix-minus capabilities can be invaluable for productions like 'phone-in' shows. The remote caller needs to be able to hear the interviewer; but if you simply send the primary mix back to him, he is forced to endure a late-arriving echo of his own voice. Needless to say, this would be confusing and undesirable.

Hint: See also Section 15.5, Skype TX and Mix Minus for a discussion of audio return for TC1's native Skype TX channels.

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 2 from *Aux 2* to provide a mix minus to send back to your remote 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.

Hint: TC1 provides four 4x4 matrix routing panels for each source, allowing for much more sophisticated mixes than the simple example above. For example, since TC1 supports 4 channel NDI audio output, it's possible to configure your input routing such that a unique mono mix-minus is supplied on each channel. In this fashion, a single NDI output can suffice to provide all of the mix-minus needs to support the audio needs of a Talkshow VS4000 system.

15.9.4 PROCESSING

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

EQUALIZER

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

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

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

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

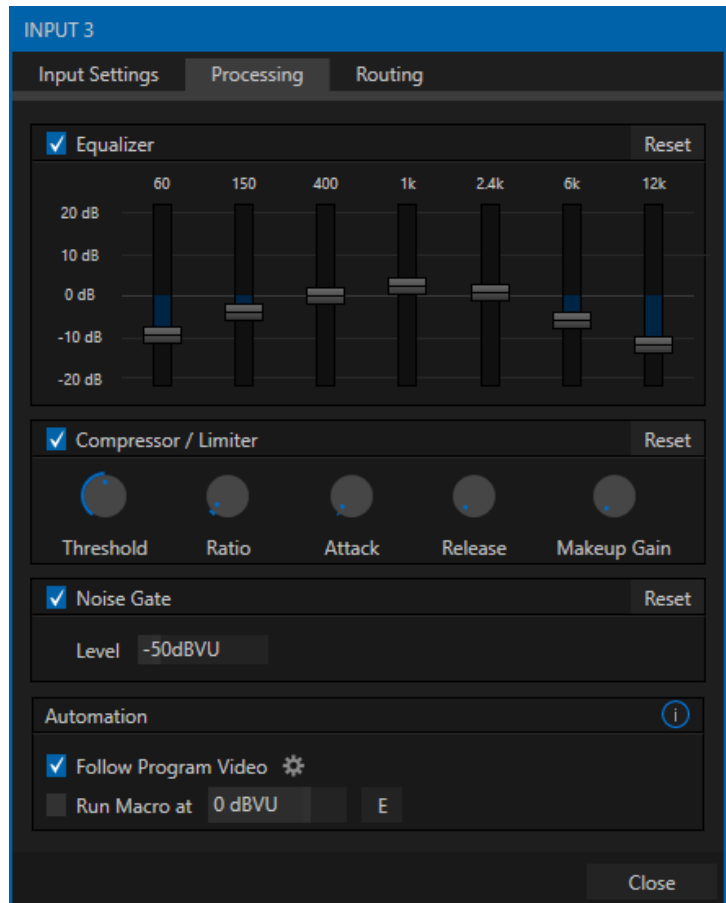


FIGURE 15-8

COMPRESSOR LIMITER

The *Compressor/Limiter* is capable of preventing clipping (see Section 15.10.1) 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. 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.

Compressor ... Limiter – what’s the difference, anyway?

Compression and limiting are not really different processes, but rather a matter of degree and perceived effect. Compression, ideally, takes the form of a subtle, almost imperceptible modulation of the sound level to bring it into a more pleasing and convenient range. A limiter is applied more for the purpose of managing, even ‘crushing’, unwanted spikes and transients.

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

NOISE GATE

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

15.9.5 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.

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*.

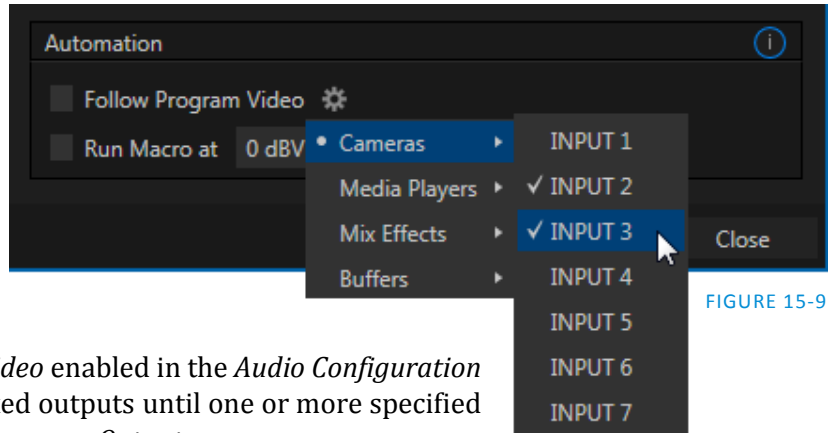


FIGURE 15-9

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 TC1'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.

SECTION 15.10 OUTPUT AND PRIMARY BUS CONTROLS

As has been discussed (Section 15.9.2), TC1 provides 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.

15.10.1 HEADROOM NOTES

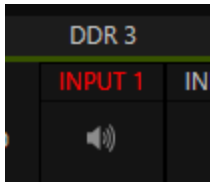


FIGURE 15-10

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: TC1 notifies you when clipping has occurred by temporarily turning the label for the problem channel red, as seen in Figure 15-10.

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.

TC1 allows for any preference in this regard, by its provision of separate *Record* (and *Stream*) level controls discussed shortly. For example, *Record* levels set at -20dBFS (set in the *Record Configuration* panel) approximates typical professional practice. This has no impact on levels at the system’s audio outputs, but all but ensures clipping in recorded files will be avoided.

Advanced users can thus record files conforming to regional standards or personal preference, substantially reduce the possibility of audio clipping in recorded files, and even adjust the level on the fly if necessary.

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

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

15.10.2 STREAM

The *Stream* controls provide a method of independently adjusting levels and processing for (stereo) audio sent to the encoder when streaming is enabled.

SECTION 15.11 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 11.2.10). *MEMs* are a convenient way to quickly store and recall audio steps and settings for different venues, productions, and users.

Chapter 16 MACROS AND AUTOMATION



Macros smooth out your workflow, reduce complex operations to a single button press, and make it easier to produce sophisticated programs. They provide many opportunities for both workflow streamlining and creative applications. (As well, macros can reduce or eliminate embarrassing operator errors.)

One of the hardest things about live switching is keeping up with the action. We're only human, limited as to how fast our fingers can move, recall and perform important sequential steps, and so on.

Macros are the answer to that dilemma. Record any sequence of events as a macro and play it back with one click. Alternatively, trigger it with a keystroke, control surface operation, or *HotSpot*.

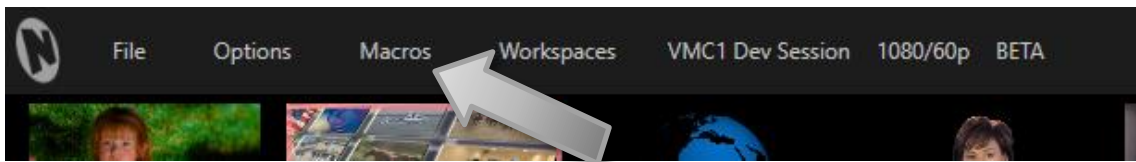


FIGURE 16-1

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 TC1's *Dashboard*.

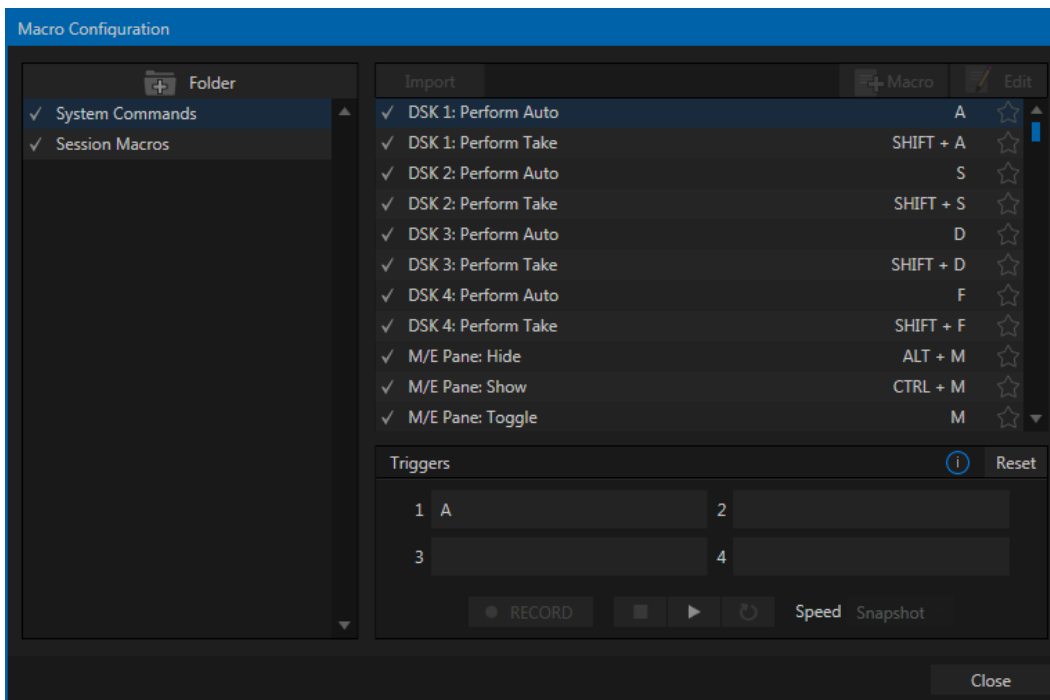


FIGURE 16-2

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.

SECTION 16.1 RECORDING MACROS

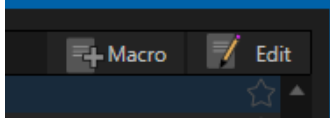


FIGURE 16-3

Creating a new macro is simple. Buttons at upper right let you add folders and macros. Click the first to add a folder and name it. Selecting a folder in the list (other than the *System Macros* folder) enables the *Add Macro* button (Figure 16-3). Click this button to add a new macro entry.

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's entry in the list tracks playback progress.

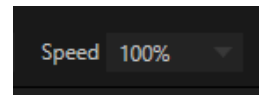


FIGURE 16-4

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.

16.1.1 SNAPSHOT MODE

One option in this menu bears explanation early on – *Snapshot*. When you choose *Snapshot* as the macro's 'speed', you essentially force it to jump to its end result as fast as the system can get there. *Snapshot* mode is very useful for macros that configure the system to a particular state.

One example would be when you want to instantly reconfigure *M/Es* with different virtual sets for a scene change; or perhaps you want to quickly disable *LiveMatte* for all *Media Players* at once. The possibilities are endless.

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

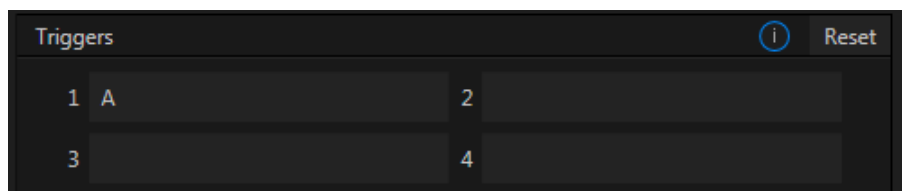


FIGURE 16-5

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* (share macros with other TriCaster users).

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 TC1's automation features elsewhere in this Guide, notably in Sections 8.1.5, Section 11.2, and 15.9.5. 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, TC1™ 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.

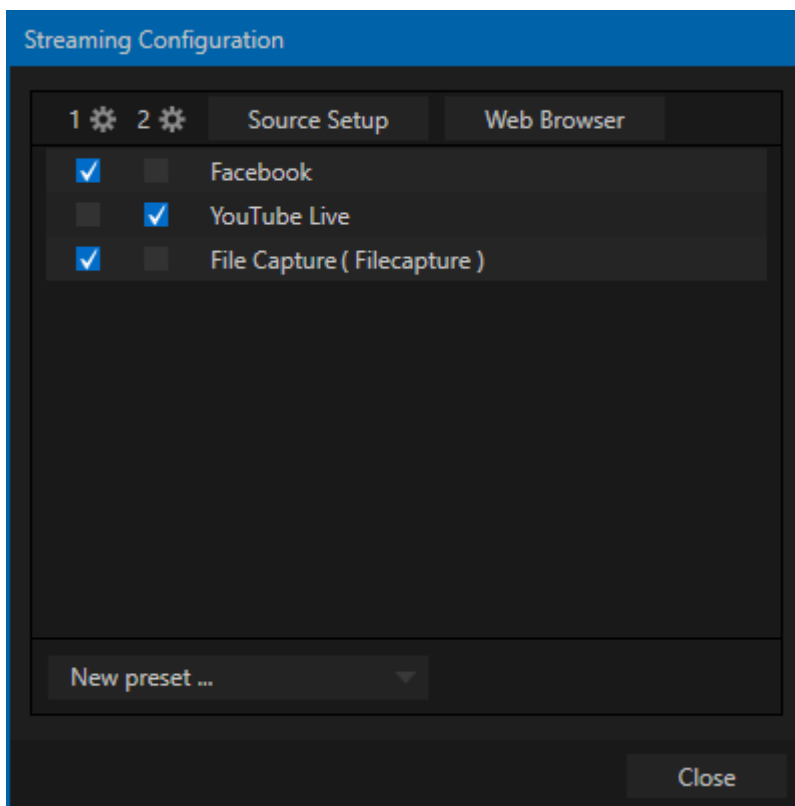


FIGURE 17-1

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 17-1), click the *Configure* button (gear) at right of the *Dashboard's* large *STREAM/ENCODE* button.

17.2.1 SOURCE SETUP

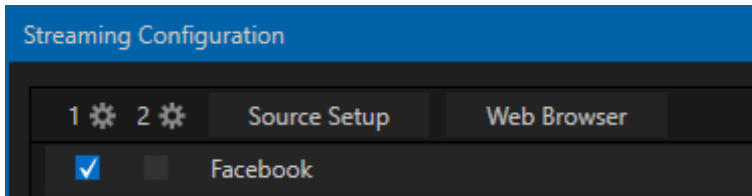


FIGURE 17-2

To assign video and audio sources to either of the two streaming encoders, click the *SOURCE SETUP* button in the header of the *Streaming Configuration* panel (Figure 17-3). Doing so opens the *Hardware Configuration* dialog, where you can continue to choose audio and video sources, and adjust audio volume – see Section 8.2.2 for additional detail.

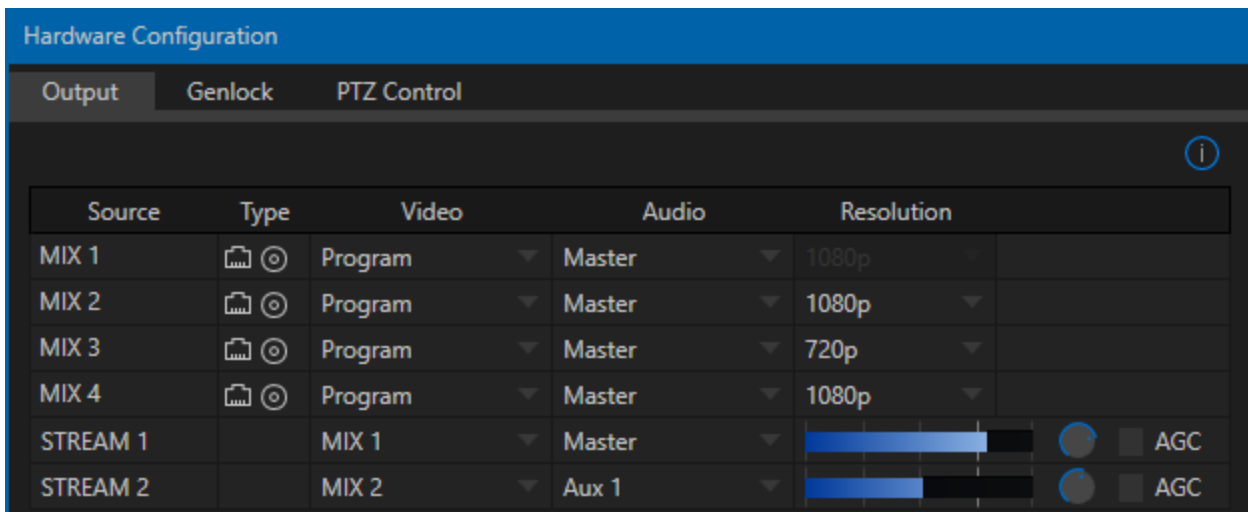


FIGURE 17-3

17.2.2 THE WEB BROWSER

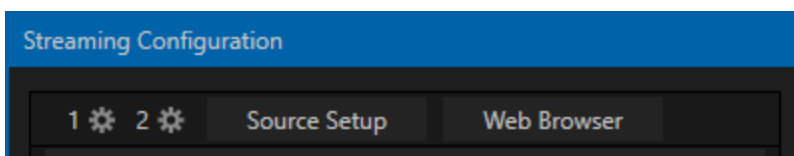


FIGURE 17-4

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.

17.2.3 CONFIGURING ENCODERS

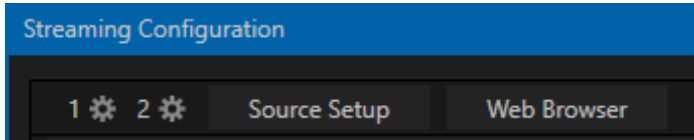


FIGURE 17-5

Settings for the two encoders are configured in the *Configure Encoder* dialog (Figure 17-6). Open this dialog by clicking the configuration (gear) icon for either encoder at left in the header of the *Streaming Configuration* panel.

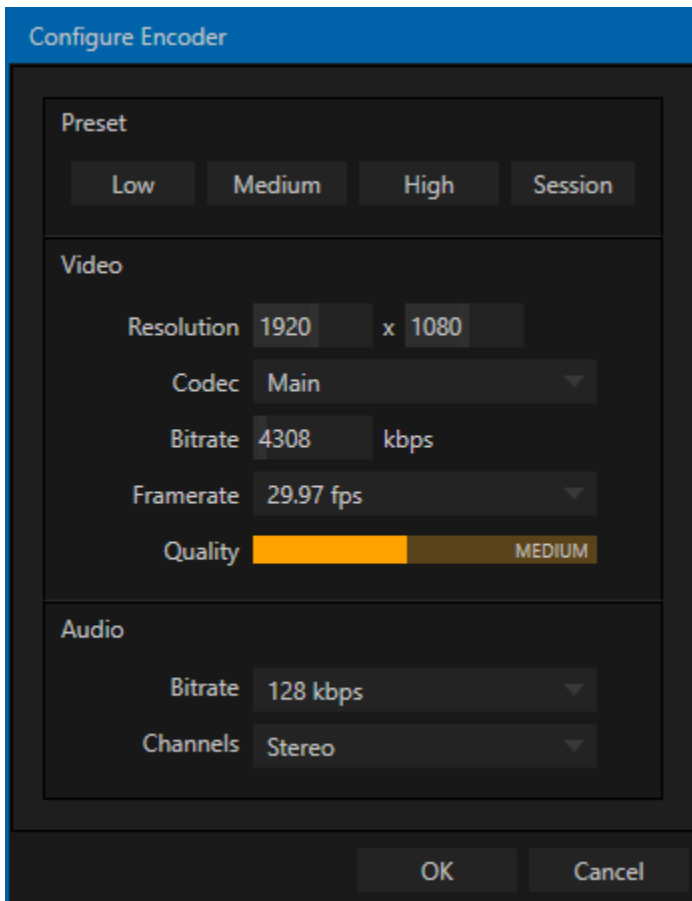


FIGURE 17-6

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.

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

At left in this panel are two columns of checkboxes; these allow you to send the output from either *Encoder 1* or *2* to the presets at right.

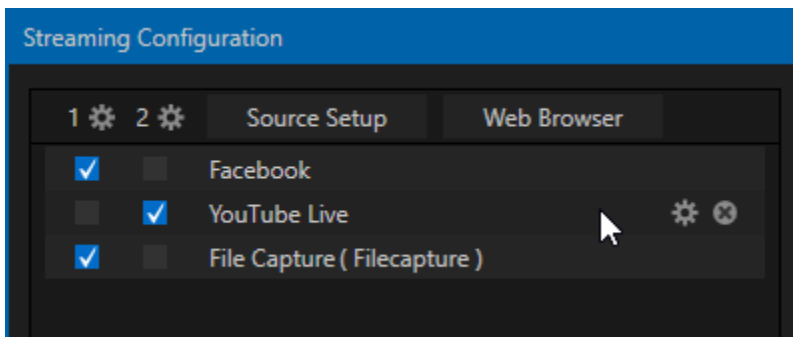


FIGURE 17-7

If you move the mouse pointer over a *Preset*, two new gadgets are shown at right (Figure 17-7). 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.

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 an encoder, simply configure and check-mark a *File Capture* preset for that encoder.

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 (some CDNs blur the boundaries between live streaming and VOD by offering DVR-style pause and rewind features).

ON DEMAND HOSTING

TC1 permits you to record live 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. Nevertheless, for all cases, TC1 gives you the tools to do the job.

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 a poor viewing experience in this case.

The client player tries to play at the specified bitrate, but (in this example) the wireless bottleneck impedes flow. It is as if you connected a fire hose on your end, giving them a high volume of data – but in the last stage of flow, the stream must pass through a small garden hose. Sadly, the final data 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 TriCaster users 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 can be used to transfer the files between systems, or simply transfer them across your 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 lavalier microphone, if not a directional or shotgun microphone to be sure you record only the audio you really want.

SECTION 17.8 DIAGNOSTICS AND TROUBLESHOOTING

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. TC1 gives you 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.

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 now - 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, and perhaps backup recording devices.

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 program stream from TC1.
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 TC1.

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®

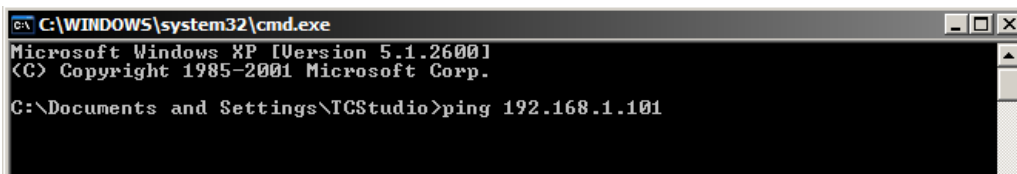
1. Click the Apple icon at upper left on the Desktop, and select About *This Mac*.
2. Click *More info ...* in the panel which opens.
3. Click *Network* in the *Contents* column at left.
4. The IP number for the system will be listed in the right hand pane.

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.



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
C:\Documents and Settings\TCStudio>ping 192.168.1.101
```

FIGURE 17-8

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 17-9. A success ping will display a report like Figure 17-10.

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

C:\Documents and Settings\TCStudio>ping 192.168.1.101

Pinging 192.168.1.101 with 32 bytes of data:

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

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

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

FIGURE 17-9

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

C:\Documents and Settings\TCStudio>ping 192.168.1.101

Pinging 192.168.1.201 with 32 bytes of data:

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

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

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

FIGURE 17-10

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.

17.8.2 SPEED TESTS

Are you sure your upload bandwidth is adequate to the bitrate you've set for your stream? Why not test and make sure. Again, 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>

17.8.3 IS IT REALLY A TRICASTER ISSUE?

With regard to streaming issues, don't overlook the fact that TC1 is just one of the pieces of the puzzle. There are many others that are just as important. One useful thing to try is to check the streaming file. Use a File Capture preset to archive the streaming output file locally, and then examine it to see if it has any problems. This file corresponds exactly to what TC1's encoder is sending the downstream server. In cases of sync problems, low frame-rate problems, audio popping problems, etc., if it's an encoding issue, the problem will be seen in this file. On the other hand (if the file looks good), then the issue has to be downstream of TC1.

Chapter 18 EXPORT



TC1's Export features allow 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, TC1's *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 user interface of TC1's *Export* feature 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 18-1).

Notice the *Export Media ...* item at the top. This opens a panel which allows you to choose and manage media files you wish to export. We'll discuss this panel soon.

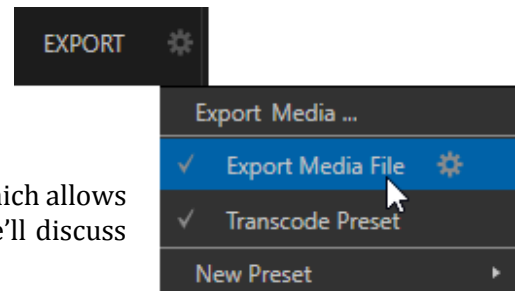


FIGURE 18-1

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 a single item (a default transcoding preset which cannot be deleted.)

Notice that each preset listed in the menu can be checked or un-checked. Check-marked entries determine which *Export* targets are *automatically* assigned to media files that are newly added to the *Export Bin* (by any method). The presets for each item can also be modified at any time right in the *Export Media* panel.

Hint: When the mouse pointer is over a preset in the Export menu, two gadgets are shown at right; the familiar gear icon 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 permits you to create a custom preset that will subsequently 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

TC1's *Export* feature 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.

Note: See also A.4.3 , (How Do I) Avoid Delays When Session Media is Offline?

18.2.4 TRANSCODE

The *Transcode* and *FTP* target options let you handle various file conversions and publishing to local (or networked) storage volumes. This is a very useful output alternative, 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. You can select such options as AVI or Quicktime, or perhaps select a preset prepared specifically for a target device, such as optical media (*DVD*) or *Mobile Devices*.

18.2.5 WATERMARKING

To avoid unauthorized use of private or copyrighted media, you may want to add a watermark before exporting it to public sites. The *Watermark* feature in the footer of the various *Export* preset configuration panels allows you to select a suitable overlay image.

The image you select will be composited onto exported video or still image files. It should normally be a 32bit still image file (supported formats include popular formats such as PNG and Targa) that positions the watermark correctly in the frame taking into account the resolution and aspect of exported files.

SECTION 18.3 EXPORT MEDIA BIN

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 18-2), which allows you to manage the list of clips and still images you wish to export.

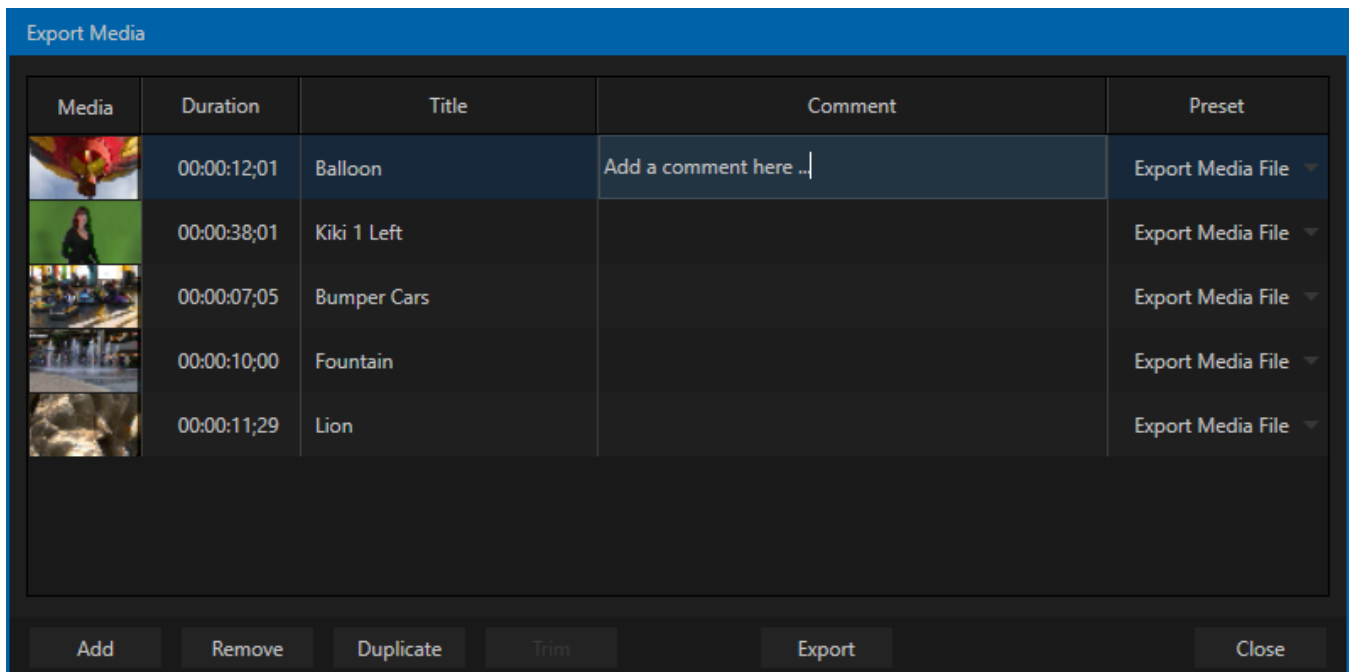


FIGURE 18-2

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

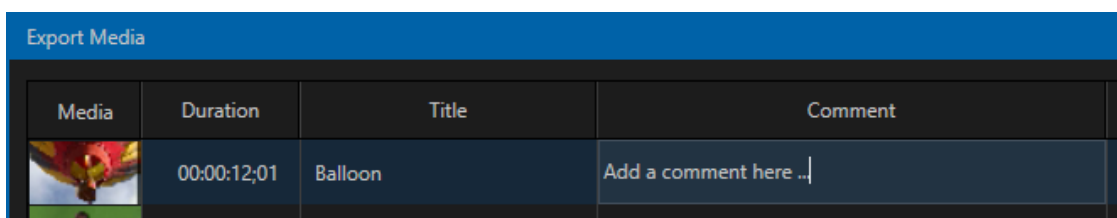


FIGURE 18-3

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 in the *Export Media* bin 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 an active export target.

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

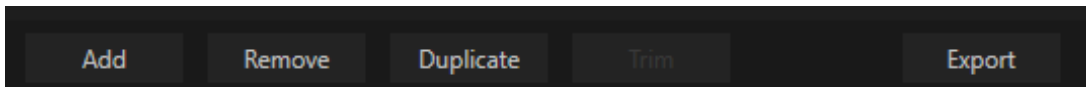


FIGURE 18-4

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 18-5

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 18-5) 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 18-6

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, TC1 makes it as simple as possible to share your media.

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:

- First, TC1 lets you flexibly add both stills and clips to the *Export Media* bin with a single click, keystroke or button press. You can easily add items from the playlist of a *Media Player*, or directly from the *Grab* and *Record* features (see the headings File Operations in Section 11.2, 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 Queue* additions.

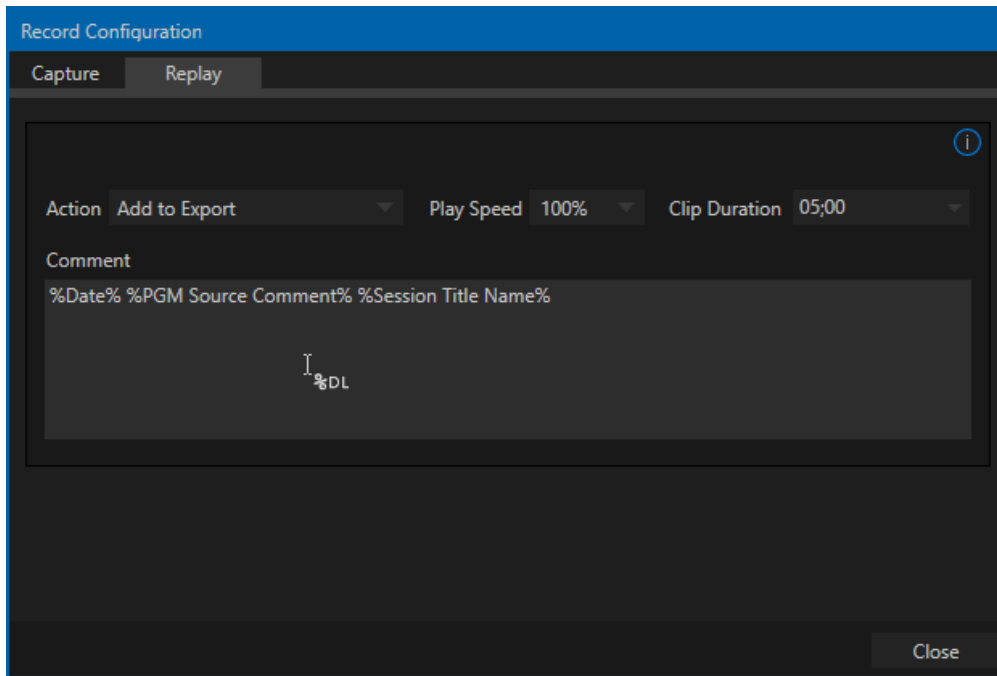


FIGURE 18-7

Better still, the *Name* and *Comment* fields in *Grab* and *Record* support *DataLink* (compare Section 11.3.3). 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 18-7).

Chapter 19 RECORD AND GRAB



You will often want to capture video clips from external sources, as well as to record your own live TC1™ 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

TC1® provides a great deal of flexibility when it comes to capturing your production, selected elements of it, and a wide array of internal and external sources (with embedded timecode).



FIGURE 19-1

This is all very helpful for post-production purposes or even for immediate playback from a *DDR* during your production.

NewTek's *IsoCorder™* technology brings even more powerful capability to TC1's *Record* feature. With *IsoCorder*, it's possible to record up to four local video sources as production quality video files simultaneously, perhaps mix of input and output channels.

As individual outputs are configurable, this also allows you to capture *Program*, *Program (Clean)*, individual *Switcher* sources, *M/Es*, and more.

In addition, you can also control capture of another four external NDI sources that support remote control recording, in addition to a convenient, separate audio-only (MP3) file.

Recording is easily enabled by clicking the large *RECORD* button in the *Dashboard* (Figure 19-1). A time counter is shown to track the length of clips you have recorded, and a horizontal VU meter beneath the button assures you that you are capturing audio.

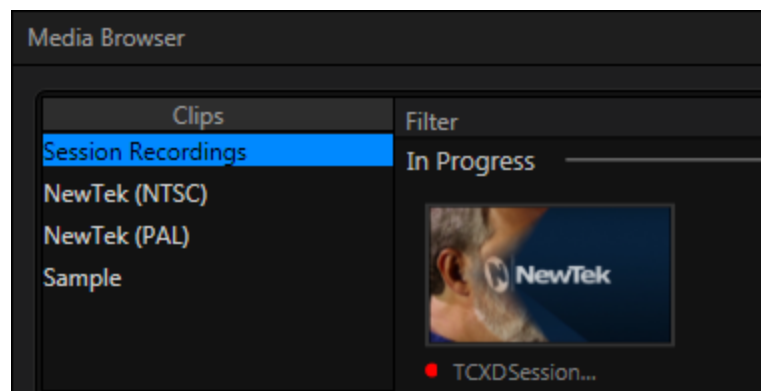


FIGURE 19-2

Note: It is not necessary to interrupt recording to Ladd 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.

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

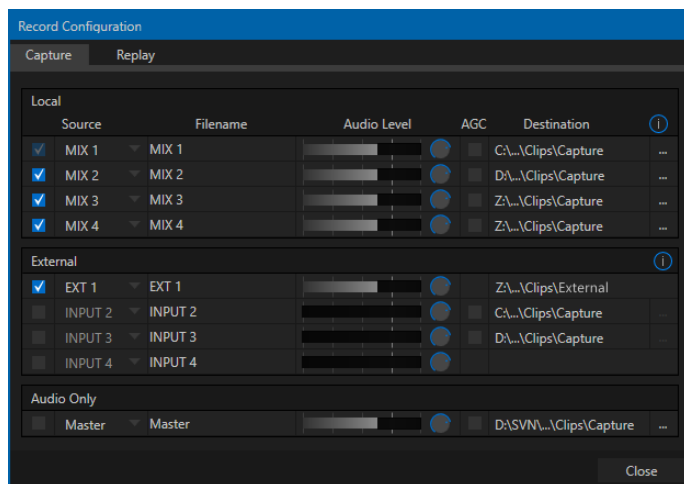


FIGURE 19-3

Record Configuration is organized into two tabs – *Capture* and *Replay*. The first of these (Figure 19-3) allows you to define the individual recordings you want to capture.

FILENAME

TC1 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 realtime 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.

VIDEO

Drop-down menus in the *Source* column let you choose which video channel will be captured. TC1 provides numerous source options.

Selecting any *Mix* entry gives you access to a variety of useful video source combinations and formats, as defined in the *Output* tab of the *Hardware Configuration* panel. In addition, local hardware inputs can be designated as a *Video* source. (Note that *Mix* outputs can be configured to use any single source, too.)

Note: The same source cannot be selected for multiple recordings. For example: "IN 1" cannot be selected as the source for line one and two, the result will allow only one of the redundant lines to be checked.

AUDIO LEVEL

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

DESTINATION

Click the [...] button to select a path as on an available storage volume as target for each recording.

Caution: It is recommended that any single drive be tasked to capture one or two video sources at most. A warning message is displayed if you exceed this number when assigning Destination settings. TC1 does not prevent you from exceeding this limit, however, when you are confident that very fast volumes are capable of handling the load.

QUICKTIME

TC1 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.

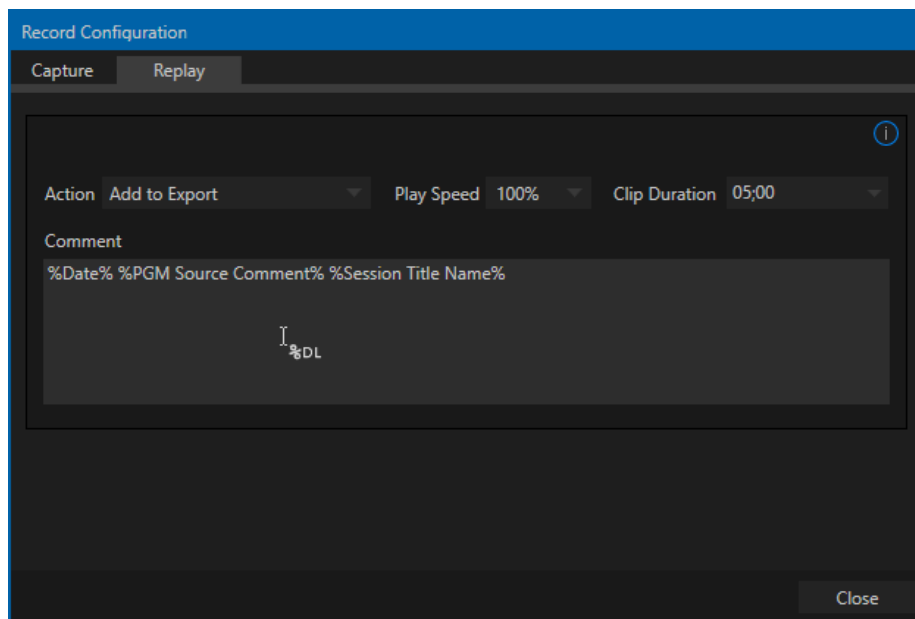


FIGURE 19-4

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 (1-4) and Show* takes advantage of the powerful *Show On* feature in TC1's *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 so much as a hiccup. Enabling the *Export* option will add clips to the *Export Bin*.

CLIP DURATION AND PLAY SPEED

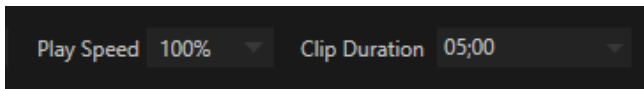


FIGURE 19-5

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.



FIGURE 19-6

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. Notice the buttons (labeled *MIX 1, 2*, etc.) just right of the recorded time display in Figure 19-6. 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*.

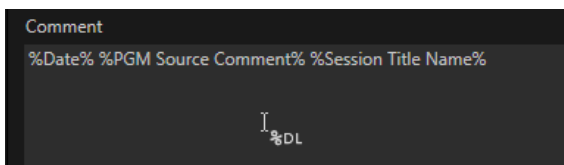


FIGURE 19-7

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 tC1's *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 include newly captured images at the end of 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 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).

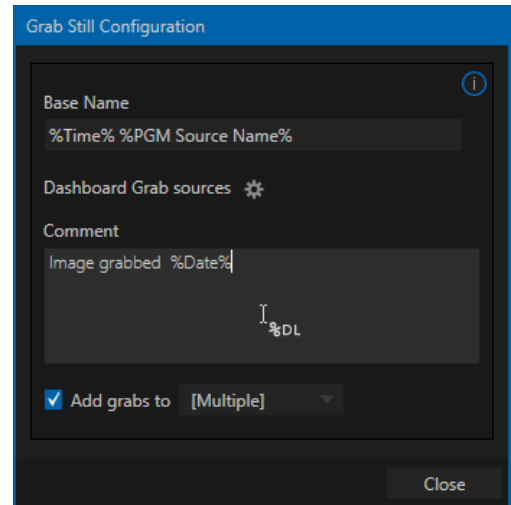


FIGURE 19-8

INPUT

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

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

Chapter 20 AUTHORIZING TITLE PAGES



A networked computer system running NewTek's (extra cost) LiveText™ application delivers live titles and CG pages to TC1 network inputs, and can also author pages editable right in the Media Players and Buffers of your TC1. Also included is an integrated version of LiveText with the offline page authoring capabilities you need to create title pages with 'live-editable' text and image elements for use in the Media Players.

An integrated version of the LiveText™ application is supplied with your TriCaster to provide a convenient way to create title pages that are editable while live when added to a *Media Player* or *Buffer*. LiveText is a full-blown professional character generator program, and a standalone version for external use as a live title source is available at extra cost.

In this chapter, then, we will consider matters related to using LiveText in the TC1 environment. The full LiveText manual can be accessed from the *Help* button in TC1's *Startup Screen*, or the *Resource* webpage served by TC1 to your local network and available in the web browser of any connected device.

Hint: The integrated version of LiveText on your TriCaster is provided for offline (non-live) title page authoring, and is not available during live production.

SECTION 20.1 SESSIONS, PROJECTS AND DISPLAY

LiveText *projects* are launched from the *Session Page* of TC1's *Startup Screen*. After creating a new session or opening an existing one, click *Graphics* on the main menu (see Section 5.3). This reveals options and links at right, discussed previously in the *Startup Screen* chapter just mentioned.

LiveText uses the current session settings for output to TC1's video outputs, new projects (created within the LiveText *File* menu or from the *Session Page*) and bitmap file exports. If you use LiveText's *File* menu to *Open* a project whose settings do not correspond to the current session settings, TC1 will attempt to display it on its hardware video outputs, if possible.

LiveText sends output from the canvas to TC1's outputs continuously while running. 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 T1's LiveText interface.

When LiveText is running, TC1's primary video outputs conform to the session format.

Note: It is possible to use LiveText's File menu to open a project that does not correspond to the current session settings. TC1 will attempt to provide video output, but it's possible that a given monitor may not display it correctly.

20.1.1 FILES/FILEBIN

LiveText's file dialogs (for File>Open, File>Add, File>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' paths, thus are not permanent. That is, for a given session, the path the *Quicktab* refers to is established at launch time. For this reason, the TC1 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 sent to the session folder inside TC1's main *Clips* folders. 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 TC1's *Media Players* (*DDR* or *GFX*) 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 11.3).

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 to TC1 using the *Send to Live* options in *LiveText*'s *File* menu.

Chapter 21 CONTROL SURFACES



This chapter introduces the TC1 control surfaces offered by NewTek^(tm), 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.

NewTek TC1 provides astonishing live production power. With a matching control surface, all that power is right at your fingertips.

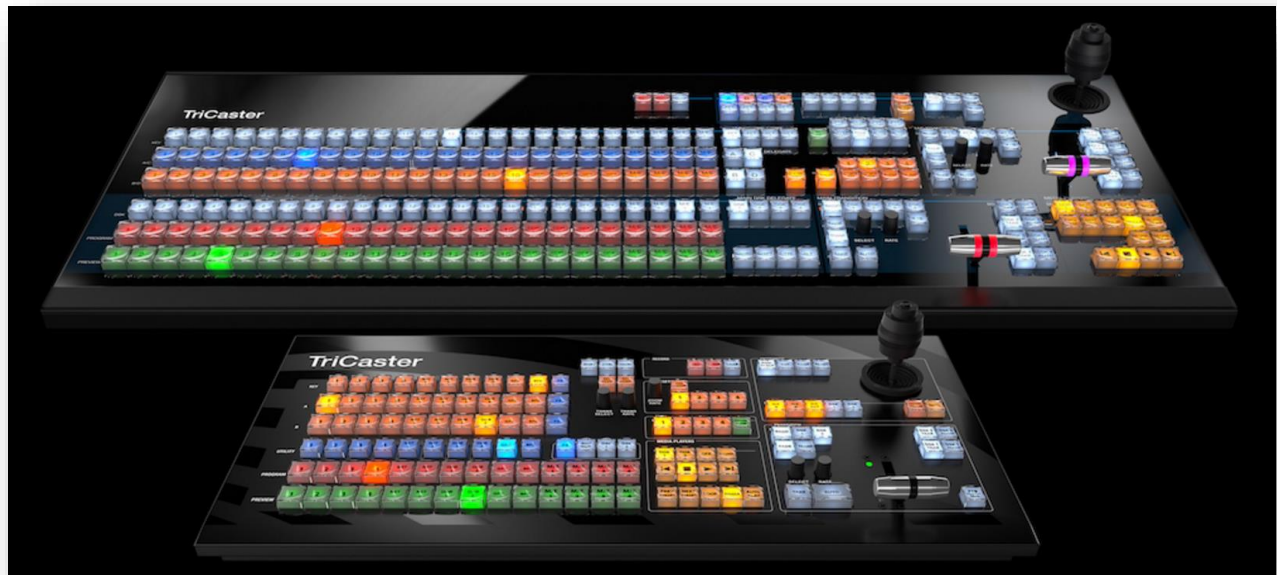


FIGURE 21-1

Two different TC1 control surface models have been prepared for varied requirements. In large measure the functionality provided and workflow is similar, regardless of whether you choose TriCaster[®] TC1LP or TC1SP

Hint: The “LP” in “TC1LP stands for “Large Panel”. With that hint and Figure 21-1 above, you’ll probably be able to solve the riddle known as “TC1SP”. ;)

SECTION 21.1 TRICASTER TC1LP

This large and 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 NewTek TC1 is on. Both TC1 control surfaces require a standard, 3-prong AC power connection.

** The control surface and your TC1 should be connected to the same subnet.*

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 TC1 unit as described next.

21.1.2 PAIRING

TC1 systems automatically detect 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 TC1, or both of these conditions.

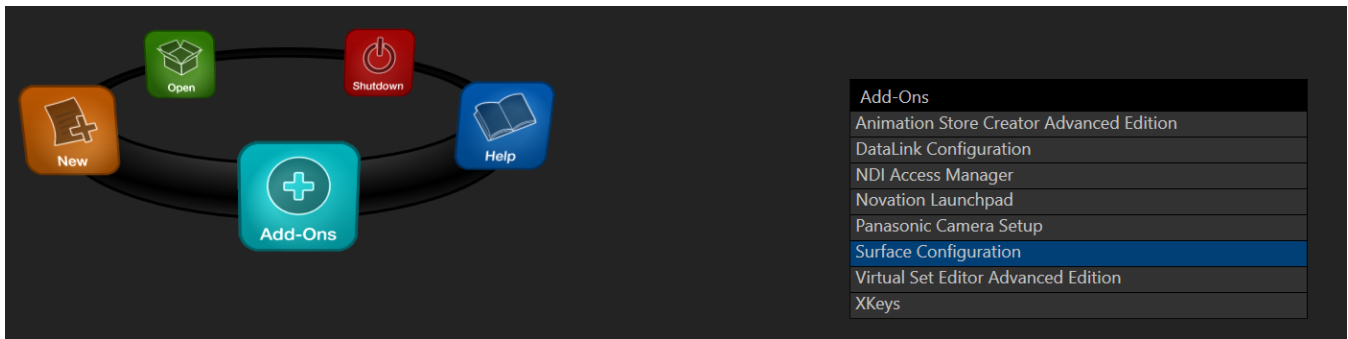


FIGURE 21-2

To allow you to manage these control connections, a *Surface Configuration* utility has been included in the list of TC1's *Add-Ons*.

1. Click the *Add-Ons* button on the main menu on the *Home page* in TC1's *Startup* pane to show the list of installed add-on applications.

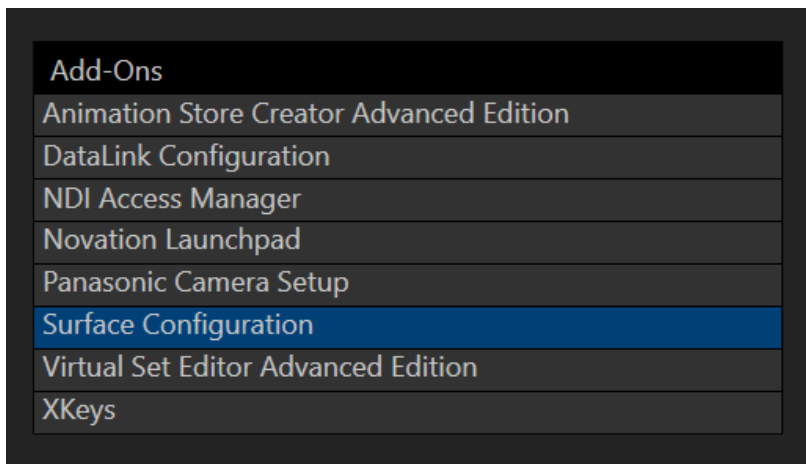


FIGURE 21-3

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.)

TC1 will now accepting control instructions from the check-marked entry.

Note: TC1 communicates with network connected surfaces on channel 1. Any other channel setting will fail.

21.1.3 CONTROL LAYOUT



FIGURE 21-4

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 21-5):

- 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**

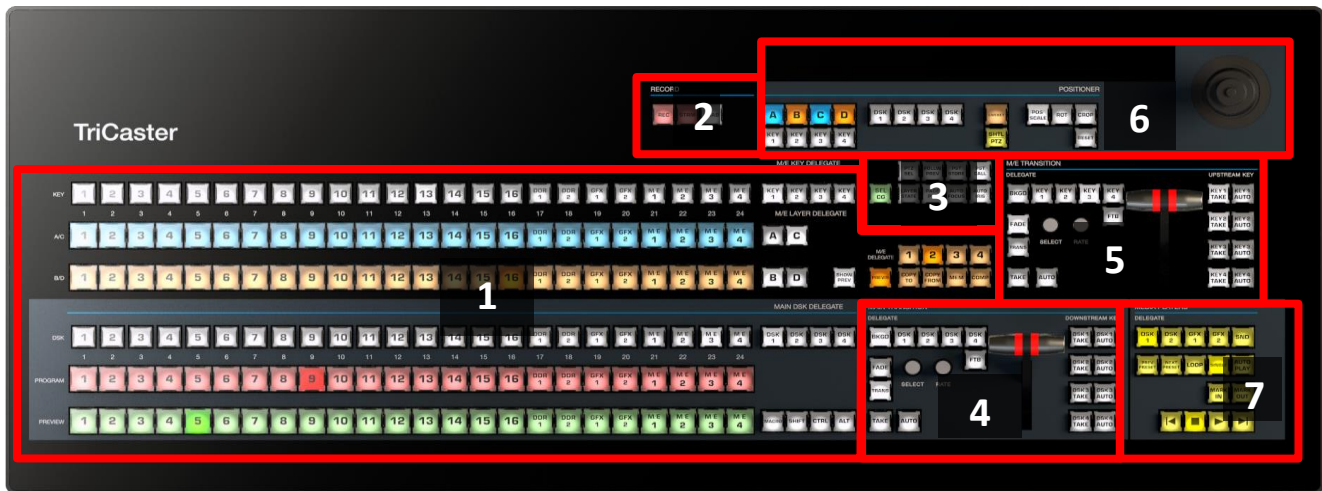


FIGURE 21-5

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 21-6

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 21-6), the row of 24 white buttons at left above can be assigned to control selections for any of the 4 *DSKs*.

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 21-7).

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



FIGURE 21-7

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



FIGURE 21-8

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.

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 *COMP*s 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*.

21.1.5 CAPTURE GROUP



FIGURE 21-9

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 not stop recording. Instead, the *SHIFT* button flashes to remind 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 21-10

PTZ CONTROL BUTTONS

- **PTZ SEL** – Hold this button down and press button 1-8 in the *KEY* row at left to designate which of up to eight connected PTZ cameras to control.
- **FOLLOW PREV** – Toggle: When this button is lit, PTZ selection will automatically track 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.

TITLE CONTROL

- **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** – reserved
- **PAGE PST** – Hold this button down and press button 1-16 in the KEY row at left to select and activate a title page 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 21-11

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 21-12

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 21-13

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.

FIGURE 21-14

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

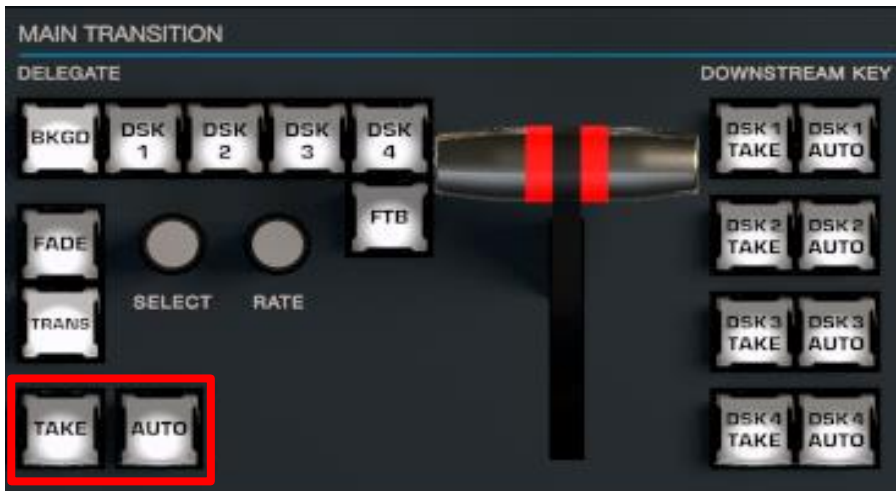


FIGURE 21-15

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. TC1 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 in 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*.



FIGURE 21-16

- The specific target of *Joystick* operations at any moment is primarily determined by a set of *Joystick delegate* buttons, outlined in red in Figure 21-16.
- The operation performed on the delegated target is determined by a set of *Control Mode* buttons at right, outlined in green in Figure 21-16.

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 (see Section 0). 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 21-17

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 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*).

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).



FIGURE 21-18

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.

- ◀ (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 TC1SP

This more compact ‘two-stripe’ unit is designed to provide convenience for smaller productions, and those which benefit from a smaller equipment ‘footprint’.

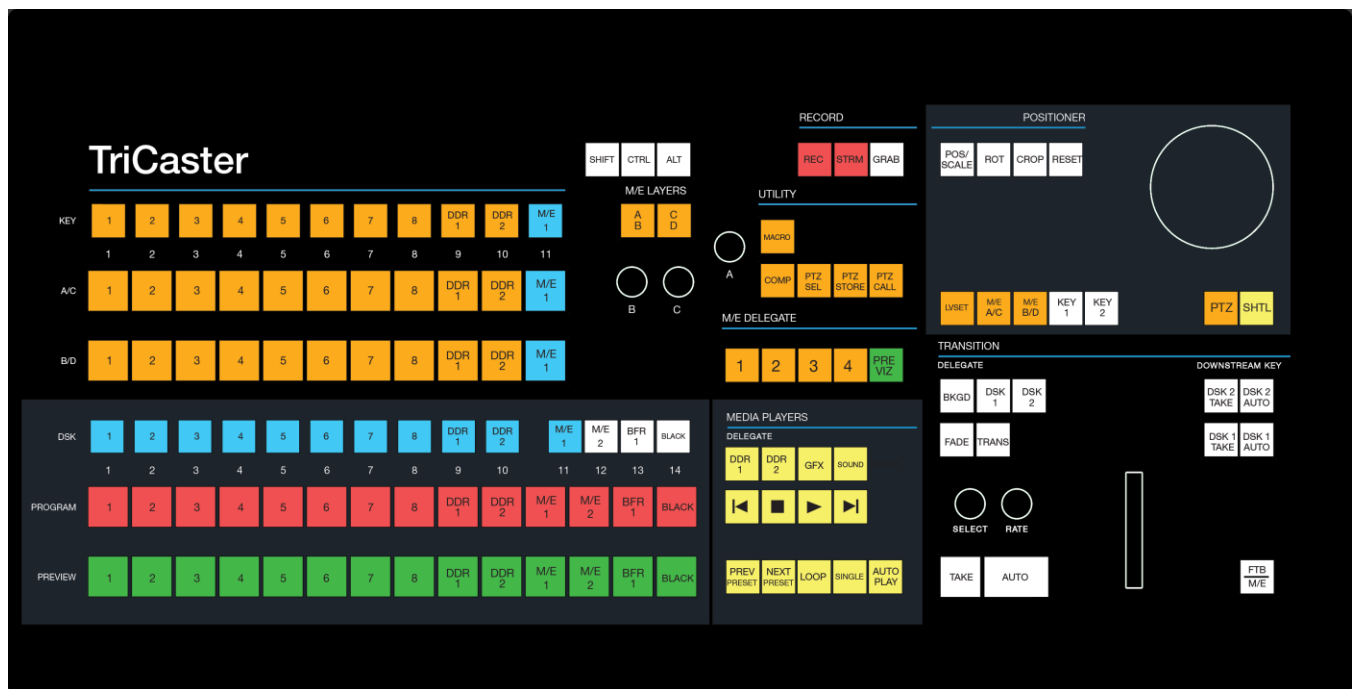


FIGURE 21-19

21.2.1 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 their USB cable. Connecting the unit using a USB cable longer 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).

21.2.2 CONTROL LAYOUT

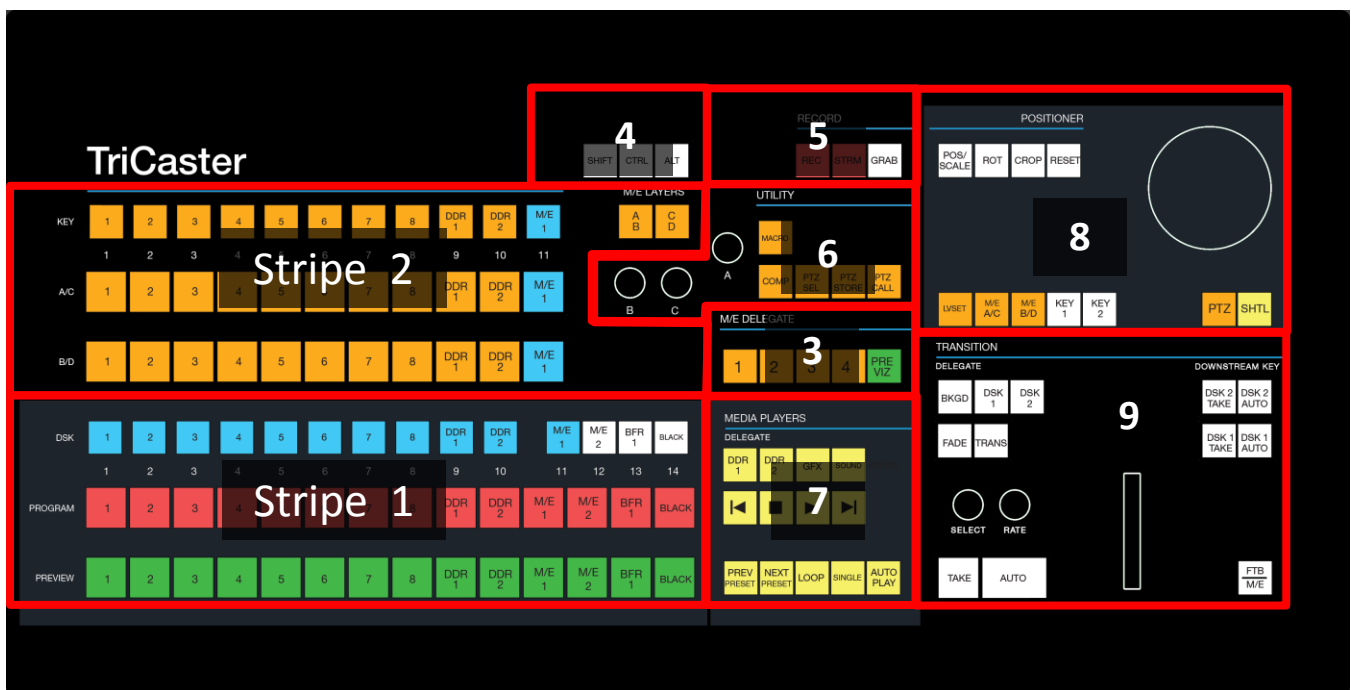


FIGURE 21-20

The various control groups are organized into groups as shown in Figure 21-20.

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.

21.2.3 STRIPE 1 & 2



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 Bank 2.

FIGURE 21-21

M/E AND LAYER DELEGATES



FIGURE 21-22

The second stripe is similar, but includes *M/E LAYERS* and *M/E DELEGATE* control groups (Figure 21-22).

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*.

21.2.4 QUALIFIERS

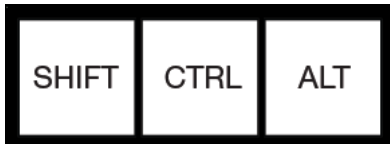


FIGURE 21-23

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.

21.2.5 CAPTURE

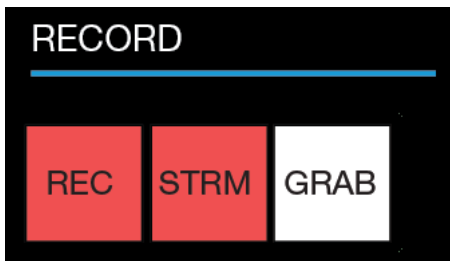


FIGURE 21-24

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 not stop recording. Instead, the *SHIFT* button flashes to remind 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.

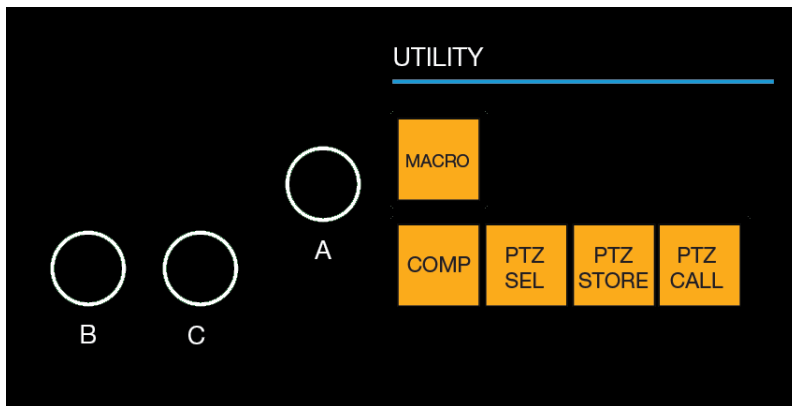


FIGURE 21-25

MACRO

The last button we will discuss in this group offers spectacular convenience. TriCaster's powerful macro system is fully addressable from TC1SP. 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** – Hold this button down and press button 1-8 in the *KEY* row at left to designate which of up to eight connected PTZ cameras to control.
- **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* or *PTZ Sel* button pressed down, twist *knob A* to:
 - Pop up either the *Comp bin* or *PTZ preset bin*, respectively, for the current *M/E* or *PTZ* delegate (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/PTZ Preset* 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*.

21.2.7 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).

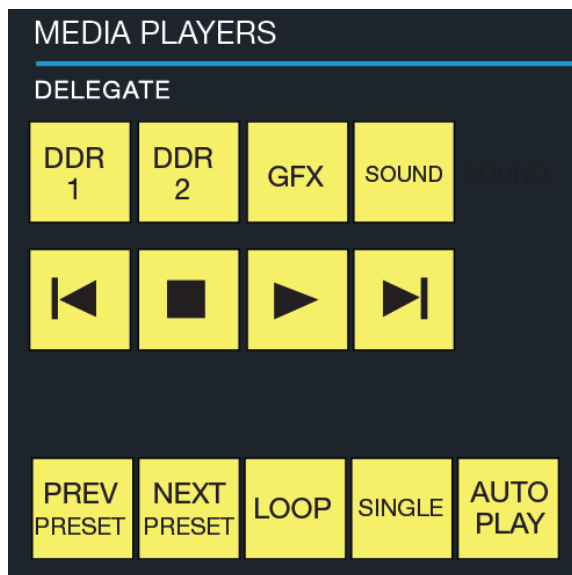


FIGURE 21-26

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.

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.)

21.2.8 POSITIONER

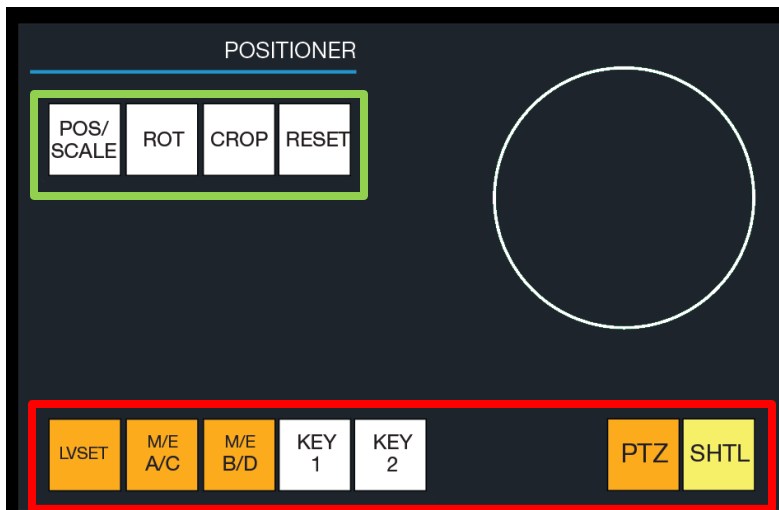


FIGURE 21-27

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 21-27. The operation performed on the delegated target is determined by a set of *Control Mode* buttons at right, outlined in green in Figure 21-27.

DELEGATES

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 21.2.3).
- **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 21.2.3).
- **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 21.2.6).

Hint: With PTZ delegated, press SHIFT and rotate the joystick to adjust focus.

- **SHTL** – Press this button to assign the joystick to control the *Media Player* camera that is currently delegated (see Section 21.2.7). 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.

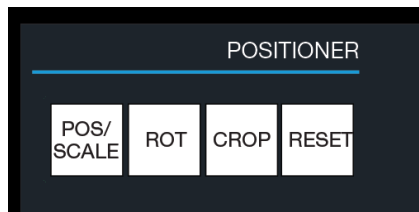


FIGURE 21-28

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 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).

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.

21.2.9 LAYERS & EFFECTS:

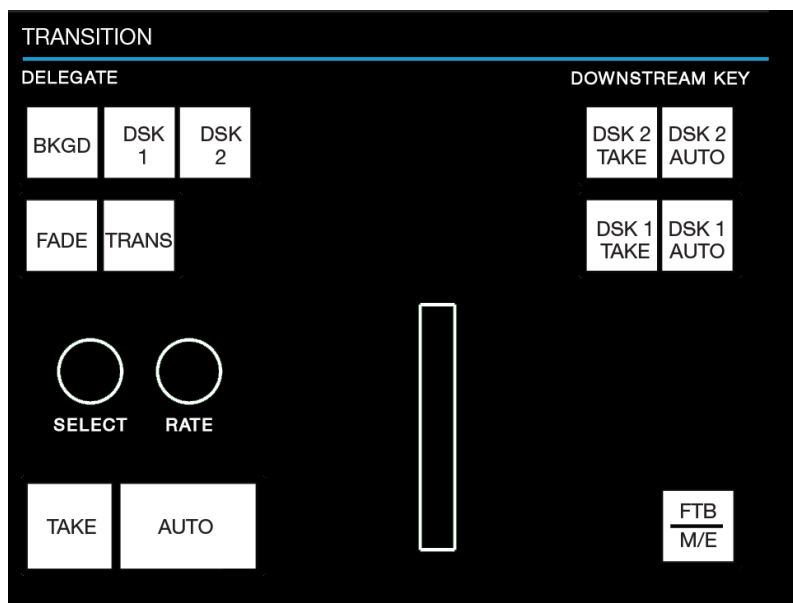


FIGURE 21-29

The controls in this group (Figure 21-29) 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



FIGURE 21-30

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.

PART III (APPENDICES)

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

A HOW DO I ... (?)



In this section, we'll consider the most common questions TC1™ operators 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.

If you've largely mastered your TC1™ but have a specific question, this may be the best place to look first. The headings that follow list related questions and answers together, along with cross-references and other helpful remarks.

Hint: The NewTek website includes a comprehensive FAQ database containing a wealth of useful information on all of its products – please see <http://www.newtek.com/faq/>

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A.1 CONNECTIONS

A.1.1 CONNECT CAMERAS?

1. Connect local SDI video sources to the appropriately labeled BNC input connectors on TC1's backplate.
2. Or, connect NDI video sources across the network. For example, multiple SDI cameras connected to NC1 IN units (each of which can convert four a'/v sources of many different kinds, including SDI, to NDI) can be connected in this fashion.
3. Open a TC1 session (or create a new one) from the *Home Page* of the *Startup Screen*.
4. Click the *Live* button on the *Session Page* of the *Startup Screen*, and press *Enter* (or click the *Start Live Production* link).
5. Roll the mouse pointer over the monitor for the camera you want to set up, and click the *Configure* (gear) button that appears in its titlebar.
6. Choose the sources for each *Switcher* input in the *Input Settings* tab of the *Input* configuration panel.

A.1.2 CONNECT KEY AND FILL SOURCES?

1. Convert '*Key and Fill*' source pairs to an NDI-enabled supporting output with embedded alpha channel. (You can use a NC1 IN system to do this, or NewTek's NDI Connect Pro application and supported hardware).
2. Connect the network carrying the output of the NDI system to TC1.
3. Open a TC1 *session* (or create a new one) from the *Home Page* of the *Startup Screen*.
4. Click the *Live* button on the *Session Page* of the *Startup Screen*, and press *Enter* (or click the *Start Live Production* link).
5. Roll the mouse pointer over the monitor for the source you want to connect, and click the *Configure* (gear) button that appears in its titlebar.
6. Choose the desired NDI source with embedded alpha.

A.1.3 COLOR CORRECT MISMATCHED CAMERAS?

TC1 permits the use of sources that do not match the current session format. You might connect an SD camera during an HD session, for example. The broadcast standard for SD video is *Rec. 601*, but HD video conforms to *Rec. 709*. TC1's output color space is governed by the session format.

When the natural color space for a connected source does not match TC1's current output specification (in this example, Rec. 709), the system automatically attempts to compensate – but, as always, it's good to refer to the scopes for critical accuracy. As required, TC1's *Waveform* and *Vectorscope* displays can be used to monitor corrections made using the *Proc Amp* tools. (Scope calibration automatically conforms to the broadcast color specification for the current session – HD or SD, and is appropriately labeled as a reminder.)

A.1.4 CONNECT MONITORS?

COMPUTER MONITOR

With the power off, connect an external computer monitor to an HDMI connector on TC1's backplate, using an adapter if necessary.

MULTIVIEW MONITOR (OR PROJECTOR)

TC1 support as many as three more *Multiview* outputs in addition to the one integrated into the *Live Desktop*.

1. Connect the external device to an unused HDMI port on the backplate.
2. Open a session (or create a new one) from the *Home Page* of the *Startup Screen*, click the *Live* button on the *Session Page* of the *Startup Screen*, and press *Enter* (or click the *Start Live Production* link).
3. Click *Workspace* in the *Dashboard* at the top of the *Live Desktop*.
4. Select the *Display Settings* menu point to assign a suitable *Resolution* for the monitor you selected.
5. Continue to choose a preset icon in the *Workspace* menu above, and choose the multiview layout you want using the *Load Default* menu point.
6. If you wish, customize the layout by moving the mouse to the new *Multiview* display and using the right-click menu options for individual viewports.

SUPPLEMENTARY QUESTION:

Q: After reconnecting monitors, my Multiview and Interface monitor configuration is messed up. What can I do?

A: If you disconnect (or power down) and reconnect monitors while on the *Live Desktop*, the operating system can have difficulty with monitor recognition and configuration. To avoid problems, naturally it's best to leave display devices alone while live. In the case of an accidental disconnection, avoid reconnecting both monitors at the same time. Rather, allow the display on the first monitor connected to stabilize before connecting the second.

A.1.5 CONNECT AN EXTERNAL CONTROL SURFACE?

Please refer to 21.1.1.

A.1.6 CONNECT AN EXTERNAL HARD DRIVE?

Connect a suitable USB cable from the external hard drive to one of TC1's USB ports. Note that the hard drive should probably be formatted using the NTFS file system (the FAT file system chokes on exported files exceeding 4 Gigabytes, as will often be the case).

For faster transfers, use one of the (blue) USB3 ports, along with a suitable cable and hardware. You should note that USB2 is not fast enough to support capture from TC1.

A.1.7 EJECT A HARD DRIVE?

1. Click the *Open* button on the *Home Page* of the *Startup Screen*
2. Click the *Eject* gadget at upper right on the screen, and select the hard drive you wish to safely disconnect

or...
3. Open the *File* menu on TC1's *Live Desktop*, select *Eject* and select the desired drive (see Section 7.1).

A.1.8 CONNECT TALLY LIGHTS?

External tally light devices and their connections vary widely. Please refer to Section 3.7 for details on TC1's tally light jack implementation.

A.1.9 CONNECT TO A NETWORK?

Please refer to Section 3.13.

A.2 SESSIONS

SUPPLEMENTARY QUESTION:

Q: *What is a session?*

A: Sessions can be thought of as 'top-level presets'. They store all of the settings, playlists, device configurations, and so on for a given live production. See Section 5.1.

A.2.1 START A SESSION?

1. Connect your local hardware sources to input connectors (see Section 3.4).
2. Select the *New* button in the *Home Page* of the *Startup Screen*.
3. Click the *Enter Session Name* link (under *Session Name* at right) and supply a name for the new session.

4. Select a *Volume* (hard drive) for the new session.
5. Choose a *Resolution* for the session, and click the *Start Session* link (lower-right).

(See also Section 3.8 and Section 5.1.)

SUPPLEMENTARY QUESTION:

Q: *What is the best session format for streaming?*

A: We strongly recommend that you use a progressive video format for sessions you intend primarily for streaming.

Doing so eliminates fielding artifacts that might otherwise occur due to converting fielded video to progressive video for streaming. This will generally result in noticeably better quality.

A.2.2 WORK ON A STORED SESSION?

1. Click the *Open* button in the *Home Page* of the *Startup Screen*.
2. Click the name of the session you want to re-open.

A.2.3 BACKUP A SESSION?

1. *Open* the session you wish to backup, then click the *Manage* button in the *Startup Screen's Session page*.
2. Click the *Backup Session* button (below the *Browse* list). If the session has external files in its playlists, choose one of the options from the dialog that opens next.
3. Use the system file explorer that opens next to select the location for the backup file, and click *OK*. This process can take considerable time if the session has a lot of content; in such cases, it's best not to commence unless time (before a production) permits. (See Section 5.3 for additional details.)

A.2.4 RESTORE A SESSION?

1. Click the *Open* button the *Home Page* of the *Startup Screen*
2. Click the *Restore Session Backup* link at the bottom of the *Sessions list* as right.
3. Navigate to and select the previously stored session backup file, and click *Open*.

A.2.5 DELETE A SESSION (AND ITS CONTENT)?

1. Right-click the name of the session in *Home Page* of the *Startup Screen*.
2. Select *Delete* from the menu.

This will delete the session, and any content that is local to the session, including associated LiveText projects (external data that has not been imported will not be deleted).

A.2.6 MANAGE SELECTED CONTENT INSIDE A SESSION?

1. Click the name of the session containing the content you wish to delete in the *Home Page* of the *Startup Screen*.
2. Click the *Manage* button on the *Session Page*.
3. Under *Browse* at right, click the link for the type of content you wish to manage (see the sub-heading *Manage* in Section 5.3).

A.2.7 RENAME A SESSION?

1. Make sure all drives that have session data on them (such as captured clips) are inserted.
2. Right-click the name of the session you want to rename in the *Home Page* of the *Startup Screen*.
3. Choose *Rename* from the menu that appears.

A.2.8 DUPLICATE A SESSION?

It can be very useful to make a copy of a session. For example, it might often take less time to modify a copy of an existing session than to configure an entirely new one.

1. *Backup* a session.
2. *Rename* the current session.
3. *Restore* the backed up session.

A.3 LIVE PRODUCTION

A.3.1 MAKE CUSTOM TRANSITIONS AND LIVESETS?

The *Animation Store Creator* application is included with your TC1. Its documentation can be accessed from the *Help* menu on the *Home Page* in *Startup*.

As well, an optional, user-friendly, tool called Virtual Set Editor™ is available. This tool makes it easy to modify LiveSets to suit your specific needs.

A.3.2 RESTORE THE DEFAULT LIVESET?

1. Click the *label* button [...] above the current LiveSet name to open the *Media Browser*.
2. Click the *NewTek* heading beneath the *LiveSets* heading in the *locations list* at left.

3. Select *Default (2 Layer)* in the *Default* group in the *file pane* at right.

A.3.3 SET UP THE 'NIGHTLY SHOW A' LIVESSET?

As you may know, LiveSets for some TC1 support four primary video inputs, along with sources dedicated to Key channels. The 'Nightly Show A' LiveSet is special in that it *appears* to show many different video sources simultaneously (see Figure 21-31), even including a moving 'news ticker'.



FIGURE 21-31

This virtual multi-monitor effect depends on a single clip (played from a DDR) which is itself a montage composed of a number of different looping video clips composited into a single frame (e.g., Figure 21-32).



FIGURE 21-32

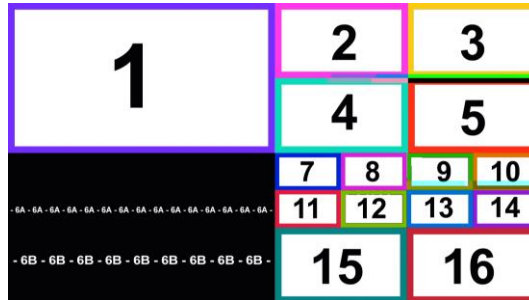


FIGURE 21-33

Hint: A template clip (Figure 21-33) is supplied in the Clips>NewTek folder (as are several looping sample clips). You can use the template as a guide to prepare similar clips with content positioned correctly for use with the Nightly Show set, using in the software of your choice.

To configure the effect:

1. Assign your talent shot to *Input A* in the *M/E* tab
 2. Put the looping montage clip you prepared in a *DDR*, and select that *DDR* as *Input B*.
- *Input C* targets the 'virtual ticker'. Knowing this, you might for example use *Input C's* positioner to compose a LiveText feed (from a *Network* input) to correspond to the lower right quadrant of the

template clip (as seen in Figure 21-33 above). This would then be mapped to the ticker, allowing you to update the virtual ticker remotely.

- *Input D* is mapped to the virtual ‘control room monitor displays’. Position another source to conform to any of the numbered input areas of the template clip to replace the corresponding ‘screen’ in the virtual control room. This allows you, for example, to send live video switched in another M/E to one of these monitors.

Hint: To use the set as originally designed, simply assign one looping ‘montage clip’ (like the provided samples) to all of inputs B, C and D.

A.3.4 SET UP THE ‘NIGHT BEAT 3D’ LIVESET?

One of the sample LiveSets provided uses supplies camera angles intended for use with the 3D Anaglyph effect. Here’s how to set up the *Night Beat 3D LiveSet* for this purpose:

1. Select an unused M/E, and assign a keyed talent shot to *Input A*.
2. Assign another source, perhaps a full frame graphic, to *Input B*.
3. Click the button labeled *Effect* above the central *Effect* thumbnail.
4. Click the + sign that appears when you move the mouse over the label below the effect thumbnail to open a *Media Browser*.
5. Click the NewTek label under the LiveSet heading in the *Media Browser*, and choose “3D Center L.LiveSet” from the “Night Beat” folder in the file pane at right.

This M/E provides the left angle for the center desk shot of the ultimate 3D result.

6. Choose another free M/E, and set it up exactly as described above – but this time choose “3D Center R.LiveSet” from the “Night Beat” folder.

This second M/E provides the right angle for the 3D effect.

7. Set a third M/E pane to *Effect* mode, and assign “3D Anaglyph (Red, Cyan).LiveSet” from the “3D” folder to it.
8. In this third M/E pane, assign the left angle M/E prepared earlier to *Input A*, and the M/E you configured as the right angle to *Input B*.
9. Select this third M/E on the main Switcher’s *Program* row, and view the result through red/cyan 3D glasses. (Note that the anaglyph effect is maintained even through a LiveSet zoom.)

Hint: If you assign suitable left and right images to the Input B rows of the respective left and right M/Es, the desk front monitor imagery will also be shown in 3D.

A.3.5 SET UP THE 'METROPOLIS A' LIVESET?

Metropolis is a 'million dollar set', and provides endless opportunities for creative use. There are actually two versions of this set, labeled A and B, with multiple shots in each group. The second of these groups ('B') employs tighter camera shots with less video sources visible at one time, and requires no special care to configure.

Metropolis A, however, is a complex set, with three different primary talent positions as well as numerous secondary displays. When viewed in its widest zoom angle, it can require as many as 8 different sources to supply all of these – not counting the Key (overlay) layers.



FIGURE 21-34

Since a single M/E accommodates four independent sources (*Inputs A-D*) at most, it requires two M/Es to take full advantage of Metropolis A. Here's how to set up the most complex shot in this network-class virtual set group:

1. Select an unused M/E – let's use M/E 1 for our example.
2. Click the button labeled *Effect* above the *Effect* thumbnail in the M/E pane.
3. Click the + sign that appears when you move the mouse over the label below the thumbnail to open a *Media Browser*.
4. Click the NewTek label under the LiveSet heading in the *Media Browser*, and choose "Metropolis A Wide" from the "Metropolis A" folder in the file pane at right.
5. Assign keyed talent sources to *Inputs A, B and C*.
6. Assign another M/E (we'll use M/E 2) to *Input D*.

This last source – Input D – will provides the imagery for the live 'news tickers' in the scene, as well as the three large monitors behind the keyed talent sources.

7. Select the tab for the second M/E –M/E 2 in our example, and set it to *effect mode* as well.

8. Click the + sign that appears when you move the mouse over the label below the effect thumbnail to open a *Media Browser*.
9. Click the NewTek label under the LiveSet heading in the *Media Browser*, and choose “Metropolis A Quad Split” from the “Metropolis A” folder in the file pane at right.
10. Assign video or graphics sources to *Inputs A-C*. These inputs supply the three monitors behind your talent shots.
11. Input D is meant to feed animated text (whether from a *DDR*, or perhaps a *Network Input* source such as *LiveText*) to the various news tickers in the scene.

Your animated text should be centered vertically in the frame, and presented over either a transparent or black background. The font size need not be overly large, but you can use the *Position* tools for the *Input D* layer to scale and reposition it as necessary.

Hint: If you temporarily select M/E 2 on Program output, you'll see how this quad source is arranged (prior to being fed to Input D of M/E 1).

A.3.6 INITIATE STREAMING?

1. Connect TC1 to the Internet (see Section 3.13).
2. *Open* (or create) a session (see Section 3.8).
3. Click the *Configure* (gear) button in the Dashboard's *Stream* control area.
4. Supply *Connection* parameters in this panel as required (passwords, username, etc).
5. Close the panel, and – when ready – click the *Stream* button.

(See Chapter 17 for full details.)

A.3.7 FIND MY CAPTURED STREAM FILE?

1. Go to *Locate the Home Page of the Startup Screen* and click *Open*.
2. Click the name of the session you streamed at right.
3. Click the *Manage* button on the *Session Page*.
4. Under *Browse* at right, click the *Clips* link. A system file explorer will open.
5. Open the *Saved Streams* folder in the file explorer.

A.3.8 RECORD MY PROGRAM?

1. *Open* (or create) a session (see Section 3.8).

2. Click the *Configure* (gear) button in the Dashboard's *Record* control.
3. Choose your recording options (see Chapter 19, Record and Grab) and enter a *Base Name* for the file(s).
4. Close the panel, and – when ready – click the *Record* button.

A.3.9 FIND MY RECORDED PROGRAM FILE?

1. Got to Locate the *Home Page* of the *Startup Screen* and click *Open*.
2. Click the name of the session you streamed at right.
3. Click the *Manage* button on the *Session Page*.
4. Under *Browse* at right, click the *Clips* link. A system file explorer will open.
5. Open the *Capture* folder in the file explorer.

A.3.10 CHANGE PLAYBACK SPEED FOR CLIPS IN THE DDR (MEDIA PLAYER)?

The DDR's *Speed* control adjusts playback speed between 25-400%. Simply adjust the slider knob to suit the need.

(Note that 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.) See Section 11.2.8 for more.

A.3.11 DEAL WITH DDR (MEDIA PLAYER) CLIPS THAT SEEM BLURRY?

When paused or stopped, *DDRs* perform motion removal (to avoid unwanted flicker). This can make the image seem slightly blurred when paused, but it should look perfect during playback. (Recorded static title pages look their best when captured using the *Grab* function with *De-Interlace* turned off.)

A.3.12 GET STUBBORN CLIPS TO PLAY IN THE DDR?

First, note that TC1 has a two minute warm-up period during which system software initializes. During this period, frames may be dropped during playback.

QUICKTIME®

At the time of writing, a 64bit version of Quicktime for Microsoft Windows® is not available. TC1 provides internal support for many QuickTime file formats, but not all of them. If a QuickTime file fails to play smoothly (or at all) in the DDR, converting it to a friendlier format can help.

For external systems, we recommend downloading and installing the NewTek Codec Pack (Mac) from the downloads page on the NewTek website. This will permit you to select from several NewTek SpeedHQ

codecs (including 32bit formats with embedded alpha channel) from applications that render to Quicktime® formats. Alternatively, Final Cut® users might consider M-JPEG, MPEG2, DVCPRO HD, or the DV Quicktime codec (for SD clips only, of course) as intermediate formats.

AVI

AVI codecs are plentiful. Most are suitable for DDR playback, but a few are not. For a given clip to play in the DDR, a corresponding 64bit codec needs to be available. However, we strongly discourage installing ‘foreign’ codecs, codec packs and the like downloaded from Internet sites, etc. For the sake of stability, if an AVI clip does not play well in the DDR, *please* consider converting it to a ‘friendlier’ format. We can recommend NewTek’s own SpeedHQ, or perhaps DV (for Standard Definition clips), M2T or MPG – please continue reading for more information on file conversion.

REMUXING CLIPS

Even when a specific AVI exists and can generally be considered ‘friendly’, the manner in which audio and video data is multiplexed (or ‘muxed’, in the jargon) by some few applications can cause playback issues that are only evident under stress. That is, a clip that plays back adequately in a typical player or NLE application may not do as well when played in a DDR at times when many other concurrent operations are occurring simultaneously.

In general, *remuxing* such files is all that is needed to obtain good performance. One approach is to use any of a number of freely obtainable remuxing utilities. A quick Internet search for “remux avi” turns up several applications you could use, some free. Installed on an external system, these will remux AVI files losslessly, resolving the issue.

You may prefer one of several simpler approaches that can be performed right on your TC1. For example, if the clip will play properly in a *DDR* when the system is not heavily loaded with other tasks, you could simply put the *DDR* on *Program* output, play the clip, and record it. With a little trimming of the recorded clip you’ll have a very usable file.

FLASH (F4V)

F4V format files written by Adobe® Flash Media Encoder are incompatible with most video playback applications (even those from Adobe). The developer has explained the situation as follows:

“Adobe Flash Media Server version 3.5 and later and Adobe Flash Media Live Encoder 3 can record content in MPEG-4 (F4V) format using an industry-standard recording technology known as “fragments” or “moof atoms.” Some MPEG-4 compatible tools and players do not support moof atoms, and therefore cannot recognize files recorded by Flash Media Server. The F4V Post Processor tool aggregates the information from all the moof atoms into a single moov atom and outputs a new file”

Unconverted F4V files imported will not play in a DDR either. Conveniently, the system automates the conversion for you to a degree. If you locate the folder named Media\Clips*sessionname*\SavedStreams on your primary session drive, you will see the “raw” (unprocessed) streaming file(s) and a batch file (.bat) that can be used to convert all files in that folder.

Simply double-click the .bat file to initiate processing. (Note that processing can take some time, so don’t do this just before a production.) Output files will be placed in the same folder after conversion.

Hint: The .bat file supports several additional features if employed with command line switches. A readme file located in the same folder provides details of these alternatives.

If you prefer to perform this post-processing on another computer, you can transfer the raw files to it and use the Adobe F4V Post Processor tool, available from the URL below (requires an account to login):

<https://www.adobe.com/cfusion/entitlement/index.cfm?event=custom&sku=FS0000522&e=fms35>

A.3.13 CHANGE COLORS FOR AN ENTIRE TITLE PLAYLIST AT ONCE?

You can quickly alter the default colors for a complete playlist of *Title Pages* in a *Media Player* (such as *Titles*).

1. Select the button for the player containing the titles on the *Preview* row of the *Switcher*.
2. Click the *Configuration* (gear) button for the player's onscreen monitor to access the *Proc Amp*.
3. Click and drag the *Hue* slider left or right, swinging colors through the spectrum.

Observe that black and white graphics and titles are unaffected by the hue shift. In many cases, this allows you to modify background imagery without any effect on text objects (which are often white).

A.3.14 GET LIVE TITLE PAGES (.CGXML) TO RESPECT ALL LIVETEXT FONT ATTRIBUTES?

NewTek's *Title Page* file format (.cgxml) presently supports *almost* every attribute that LiveText offers – but there are a few exceptions. For example, multiple font styles on one text line are not supported, which means that different words on a single line cannot be different colors, or use different typefaces. (Of course you can achieve the same effect by using additional text objects as necessary.) For similar reasons, text entered as paragraphs is automatically split into multiple lines in .cgxml *Title Page* files.

A.3.15 PREPARE A MATCHED GROUP OF M/ES?

Suppose you want to assign matching shots from one theme group of *LiveSets* to different M/Es (or MEM slot).

1. Prepare the first *M/E* – click its tab, use the controls to select a *LiveSet*, assign and position a *Key* source, and select a *shot* (position/zoom preset).
2. Move the mouse pointer to the extreme left of the screen, right-click on the *Preset* button in the flyout preset bin, and select *Export*.
3. Supply a filename for the *Preset*.
4. Click the second *M/E* tab.
5. Right-click on a blank *Preset*, and select *Import* from the menu.
6. Select the file you exported above, and click *Open*.

The *second M/E* will adopt the exact same settings as the first. Now all you need to do is replace the currently assigned *LiveSet* with a matching one by clicking *Add* at upper-right in the tab, choosing the *LiveSet* you want, and clicking *OK*.

A.4 FILES

A.4.1 MANAGE FILES?

Please refer to the item (How do I) Manage Selected Content inside a Session? (Section A.2.6).

A.4.2 IMPORT MEDIA FILES?

Importing files implies copying them into the session folders, making them *local* (rather than *external*). At times, imported files are also automatically transcoded to ‘friendly’ formats for realtime playback. To import media files:

1. Launch a session.
2. Click the *File* menu in the Live Desktop’s *Dashboard*.
3. Click the *Import Media* item.
4. Use the *Import Media* module that opens to create a list of files you wish to import into the current session, and click the *Import* button.

Hint: You may know that external files can be used in a session without being imported, by adding them to Media Player playlists using the “Add Media Location” feature. However, such external files used in a session will not be included in session backups (unless they are deliberately imported during the backup process), nor are they deleted when sessions are deleted. Also, the transfer speed of many external devices is too slow for reliable playback of large clips, making it wise to use Import instead whenever possible.

A.4.3 AVOID DELAYS WHEN SESSION MEDIA IS OFFLINE?

Launching a session when content in *Media Player* playlists that is served across a network is offline or missing can result in lengthy delays, even making it seem as if TC1 has ‘hung’. Normally (i.e., when dealing with local content) the operating quickly reports file status to the system, and missing media is ghosted in the playlist bin. This process is more complicated when dealing with networked media.

For example, if a volume is missing the operating system will automatically scan the network in an attempt to resolve the path. After some time, the operating system gives up, and the file is marked as inaccessible. Unfortunately, though, this process now iterates for as many files as you have added to the playlist.

Fortunately, the potential delay involved during this process can be easily bypassed. By default, the system uses a full UNC (“Universal Naming Convention”) path for all network connected resources (e.g., “\\myserver\myfolder\myfile.mov”). Use the Windows “Map a Network Drive” feature to give the server (or folder) where your remote media is located a drive letter (e.g, “M:\”, or “M:\myfolder\”). This results in much quicker path resolution, and effectively eliminates the problem.

A.4.4 PREPARE CLIPS WITH EMBEDDED ALPHA CHANNEL?

Probably the best format to use for files with embedded alpha channel for use in TC1 are those encoded using NewTek's own SpeedHQ 4:2:2:4 codec. This format can serve for either SD or HD clips, and represents a high quality, moderately compressed alternative. You can download the NewTek Codec Pack for either Windows® or Mac® platforms from the Updates and Downloads page on the NewTek website.

Apple® computer users have several other options available which support an alpha channel, including the Animation and PNG Quicktime® movie codecs (select "Millions of Colors +" in the codec settings to include alpha in the file).

A.4.5 ADD AN EXTERNAL FILE LOCATION TO THE FILE BROWSER?

1. *Open* (or create) a session.
2. Click the *Add* button for a *Media Player* (*DDR*, *Still* or *Title*).
3. Click the *Add Media Location* button at bottom left in the *File Browser*.
4. Select the folder you wish to list as a location in TC1's *File Browser*, and click *OK*.

(See Add Media Location in Section 11.2.7)

A.4.6 REMOVE A LOCATION FROM THE FILE BROWSER?

1. Click the *Add* button for a *Media Player* (*DDR*, *Still* or *Title*)
2. Right-click the name of the location you wish to remove from the list, and select *Remove* in the menu that opens.

(See the sub-heading File Context Menu in Section 11.2.7)

A.4.7 EXPORT FILES TO AN EXTERNAL DRIVE?

There are several approaches to exporting media files from within TC1 sessions. By far the simplest is to use the *Export Media* feature – see the sub-heading by that title in Section 5.3.3.

A.4.8 IMPORT/EXPORT FILES LARGER THAN 4 GIGABYTES?

This question may arise if you are using external media, perhaps portable hard drives or USB 'thumb' drives. These are commonly prepared using the FAT32 file system, which does not support files larger than 4GB.

As video files will often exceed this size, FAT32 is not very suitable for use in that context. You should reformat these drives using the NTFS system to eliminate this limitation (or you might consider transferring larger files to the system over a network connection).

A.4.9 REPAIR DAMAGED RECORDINGS?

At times, a catastrophic event (such as a power outage) that interrupts recording will result in a damaged Quicktime® clip. Generally, such a clip can be repaired by simply adding it to a *DDR* playlist. (Note that this process depends on the clip being stored as-is within the NTFS file system at all times before repair.)

Operations like zipping the file, transferring it to a FAT32 drive and then back, etc., will make recovery impossible).

A.4.10 AVOID THE ERROR “...COPY THIS FILE WITHOUT ITS PROPERTIES?”

Windows® shows this error message when you export a media file to an external volume that does not use the NTFS file system. The warning is not really a concern (although we highly recommend using NTFS formatted storage, as noted in Section A.4.8). The files will copy just fine regardless.

TC1 generates metadata attributes for media files for internal use. This metadata is only retained when you export to storage formatted as NTFS. That being said, the metadata is automatically regenerated if you use the files again later, so its loss poses no issue.

A.4.11 FREE UP SPACE BY DELETING THE DEMO CLIPS?

1. Go to the *Startup Screen*.
2. Open a session (it doesn't matter which one).
3. Click *Manage* on the main menu, and click the *Clips* link at right.
4. Use the system *File Explorer* that opens to navigate up one level in the folder hierarchy, to D:\Media\Clips.
5. Selectively delete content from the sub-folders you find in this location.

A.5 SOFTWARE, MAINTENANCE AND UPDATES

A.5.1 IMPROVE PERFORMANCE?

1. Click the *Shut Down* button on the *Home Page* of the *Startup Screen*, and click the *Administrator Mode* link at right to exit the *Startup* environment.
2. In the *Administrator Mode* screen, click the *Defragment Hard Drive* link (under the *System Utilities* heading) and follow directions provided (see also the heading *System Utilities* in Section 5.2.3).

This process can take considerable time, so it's best not to commence unless time (before a production) permits.

A.5.2 RESOLVE SERIOUS INSTABILITY OR DROPPED FRAMES?

If the system becomes seriously unstable or is dropping frames with 'known compatible' video files (after the warm-up period), consider a full *System Restore* (see item A.5.6).

A.5.3 UPDATE SOFTWARE?

1. Connect the system to a valid Internet connection
2. Click the *Shut Down* button on the *Home Page* of the *Startup Screen*.
3. Click the *Administrator Mode* link at right to exit the *Startup* environment.

4. In the *Administrator Mode* screen, click *Update* under the *System Utilities* heading. This will open the Downloads and Updates page in your system web browser. The page lists update options appropriate for your system (see also the heading *System Utilities* in Section 5.2.3).

Note: Updates can involve changes to system configuration files. In such cases, the original (pre-update) files are automatically stored in a directory named "Configuration (Backup)" to avoid unintended loss of custom settings. At times you might decide to restore one of these in place of the newer configuration file, to retain use of certain settings (or perhaps, macros). An advanced user might opt to cut and paste relevant lines from the older file into the new one (we suggest backing up the newer file in this case, too).

SUPPLEMENTARY QUESTION:

Q: *Can I backup my configuration files before a software upgrade?*

A: Backups of configuration files are automatically stored when the software is updated. The backed up files can be located inside the folder at C:\ProgramData\NewTek\TC1\Configuration\Configuration (Backup).

A.5.4 INSTALL VIRUS PROTECTION?

Virus and malware protection applications can dramatically impact system performance. In general, once additional software or services are enabled, real-time performance cannot be guaranteed.

In a perfect world, we'd recommend not installing virus and/or malware protection software on your system. It's not a perfect world, though, so what to do? Certainly you should *always* take sensible precautions to avoid introducing infected files, by rigorously virus-checking media you plan to connect or import beforehand – ideally, do so on a laptop or other system *before* connecting.

Realistically though, in some settings the need for protection outweighs the risk. If you feel you *must* install virus protection, switch all of its 'active scanning' operations off so that nothing can occur in the background while the *Live Desktop* is running. Anything that provides full-time protection will dramatically reduce memory and disk speed on your system, so you should disable those features.

Then, only when you need to do so (perhaps on a daily or weekly schedule), perform a manual scan. Never let scanning continue into a live switching event, and do not assume that you can now omit pre-checking files and external media for nasty surprises.

Hint: In the unfortunate event that malware ever does evade your defensive measures, you can always use the Restore TC1 function to completely rehabilitate your system.)

A.5.5 INSTALL MY FAVORITE SOFTWARE (OR CODEC)?

TC1 is not a 'general purpose' computer. The installed software suite is finely tuned to provide reliable performance and features. Anything you install apart from official NewTek updates places these important goals at risk. Doing so is strongly discouraged.

Regarding codecs, NewTek supports the vast majority of popular image, audio and video formats. That said, hardly a day passes without another new one appearing on the scene. If a file you would like to use does not play back well (or at all), consider converting it to a friendlier format.

If you feel the format is so popular that we should support it, please submit the details as a feature request. (Please also see Section A.3.12 above.)

A.5.6 CREATE A 'USER BACKUP' DRIVE

The *Backup and Restore* system permits you to create a bootable clone of the system drive on another (same size) hard drive connected externally for this purpose.

The clone operation includes:

- The hidden, factory-prepared *Restore partition*
- The complete C partition (uncompressed)

Afterward, the backup drive can be disconnected and stored, to be used later if necessary to restore the internal drive, or in the case of a catastrophic drive failure, to be used internally to replace the original drive.

Note: Since opening the case is a breach of warranty, please call Customer Service to obtain direction before proceeding with an internal drive replacement.

The actual creation process for the backup is discussed in the next section.

A.5.7 RESTORE SOFTWARE

We firmly expect you will never need it, but isn't it good to know that comprehensive *Restore* features are available in the event of an unforeseen problem? You can use one of two methods to access the *Restore* features, depending on your situation.

To restore your system software *after the system launches normally*:

1. Click the *Shut Down* button on the *Home Page* of the *Startup Screen*.
2. Click the *Administrator Mode* link at right to exit the NewTek software environment.
3. In the *Administrator Mode* screen, select the link labeled *Backup or Restore System*.
4. Select the *Restore Factory Defaults bootup option*.

If the system ever fails to boot up properly, you may need to try a different approach to restore your software, as follows:

1. Select the menu item labeled *Restore Factory Defaults* from the black boot screen that appears shortly after powering up. (If this screen does not automatically appear, reboot and press F8 a few times in quick succession, say once per second, immediately after powering up.)

Either method described above will ultimately present you with powerful system backup and restore tools. The management screen initially presents you with 3 options as follows:

- *Restore System Partition to Factory Defaults*: overwrites the C partition (only) on the existing system drive from the disk image in its local Restore partition.

This procedure restores your system drive ("C:") to its 'as-shipped' state. The "D:" drive, which holds content and sessions won't be modified. However any NewTek software updates (possibly including

optional software) will be overwritten – so use this function only when necessary. When you do restore, remember to update the software and reinstall any optional additions afterward.

- *Create User Backup Drive*: create a bootable clone of the entire system drive (as it exists at the time) on either an external HDD or a drive mounted in a removable hard drive bay.

The clone operation includes:

- The existing (factory-prepared) Restore partition
- The complete C partition

In cases of catastrophic drive failure requiring drive replacement, a service technician can simply connect the *User Backup* ‘clone’ drive in place of the original internal system drive and you’ll be back in production (prudence would call for creating a new *User Backup* drive as the first order of business.

- *Restore System Partition from User Backup Drive*: overwrites the C partition (only) on the existing system drive with the C partition on the external user backup drive. This allows you to insert a *User Backup* drive into a removable drive bay (or otherwise connect it), and regain a functional system partition as stored on the clone drive.

Note: This feature is intended to allow a restore operation of the system drive that the clone was prepared on. It is not intended to allow restoration from a ‘foreign’ unit. Using the ‘Restore System Partition from User Backup Drive’ in the latter manner will almost certainly cause multiple problems. In a dire emergency, however (such as if a system drive fails when no User Backup from the same unit has been prepared) a User Backup created on a similar model system can be helpful, as follows:

- Install the ‘foreign’ User Backup drive to replace the defunct system drive.
- Power up, and – at the boot selection screen – select ‘Manage’.
- Choose ‘Restore System Partition to Factory Defaults’, and follow prompts.

It will be necessary to re-activate Windows, re-enter the registration unlock code, and possibly update the NewTek software after the restoration process in this case.

The approach above is not “encouraged”, since minor hardware differences between the two units involved may well result in issues in the resulting Windows installation. As well, the new system drive will no longer have a factory restore partition. Still, it might be better than nothing in a crisis.

A.6 REGISTRATION AND TECH SUPPORT

A.6.1 CONTACT CUSTOMER SUPPORT?

Visit the NewTek Website to find the latest support information for your NewTek products, including FAQs and documentation, along with the Customer Support Department’s hours of operation and contact details.

A.6.2 FIND HARDWARE/FIRMWARE REVISION NUMBERS?

Click the *Help* button in the Startup Screen's *Home Page*, and select *About*. This opens an information panel listing version numbers (at the bottom).

A.7 MISCELLANEOUS

A.7.1 ACCESS SYSTEM ADMINISTRATION FEATURES?

1. Exit the *Live Desktop*, and navigate to the *Home* page in *Startup*.
2. Click the *Shutdown* button, and then click the *Administrator Mode* link.

A.7.2 EXIT ADMINISTRATOR MODE

Click the *Return to TC1* link in the *Administrator Mode* screen to return to the *Startup Screen*.

A.8 MORE QUESTIONS AND ANSWERS

A.8.1 CAN I DO ANYTHING TO IMPROVE LATENCY/AUDIO SYNC?

Latency might be defined as the 'transit time' for I/v stream. Each device in the video chain introduces some limited (transmission) delay. TC1's latency is very minimal (as little as 1 frame), but you can take measures to keep it to a minimum – first and foremost, by genlocking your video devices – see Section 8.2.4. For genlocked sources, consider disabling *Frame Sync* – see Section 8.1.1.

In a *seemingly* related matter, note that audio and video passing through the system are always synchronized. However, aspects of the physical design for IMAG (video projection) installations can make mimic a sync issue for viewers at some locations in the auditorium. These issues are discussed in detail in Section B.2, IMAG and Latency.

SUPPLEMENTARY QUESTION:

Q: *Why does latency seem higher for certain video formats (i.e. 24p, 25p, or 30p)?*

A: The system passes frames through the switcher at the appropriate frame rate. When the session format calls for frames at 60Hz, displayed frames are refreshed much more often than (for example) a 24p format. Consequently, apparent latency will also be less than half what it would be at 24Hz.

In general, the lower the frame-rate of the session video format, the higher latency will seem to be.

A.8.2 WHY DO SOME THUMBNAIL ICONS LOOK WRONG?

Some file formats (notably AVI) do not provide embedded aspect ratio information. As a result, their thumbnail image in *Media Player* icons for may not be properly proportioned. Generally the problem does not extend to playback (the DDR will 'guess' the aspect ratio correctly).

B PERFORMANCE CONSIDERATIONS



In this section, we'll consider the most common questions TC1™ operators 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 – unless you happen to be very near the stage. For those in the front rows, a few extra frames of latency *may* be rather disconcerting. (It’s true that IMAG was conceived primarily for the benefit of those further back, but if the latency is too obvious for those nearest the front it can be disconcerting distraction.)

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

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.

TC1’s portion of the total latency sum is well within acceptable standards for devices of this sort – roughly between 1 and 2.5 frames (the actual amount can vary slightly within this range, depending on several factors).

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

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 3.5, Section 3.12 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).

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, TC1’s *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 part of your scene, and reading values from the scale alongside the *Waveform* scope.

Hint: TC1 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 21-35) can be likened to the familiar 'color wheel' (Figure 21-36) 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.

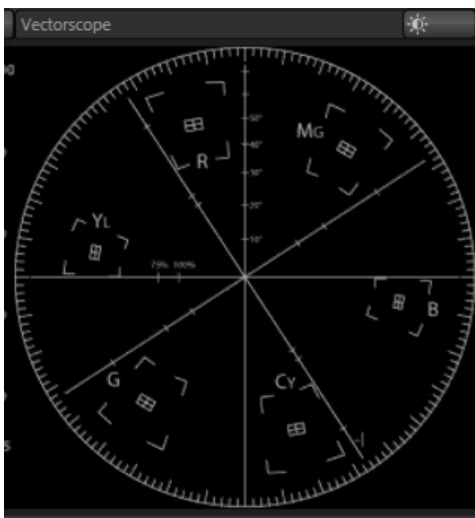


FIGURE 21-35

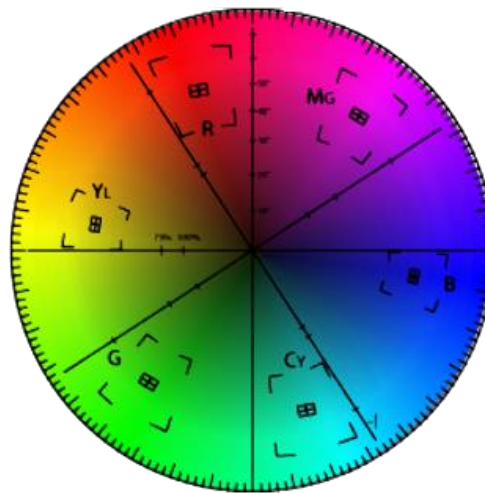


FIGURE 21-36

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.

C.2.3 COLOR METRICS

At this point, we've assured ourselves that the signal from the camera is neither too bright nor too dark, that its output falls within broadcast legal luminance limits, and that the black & white part of the signal does not have an unwanted color cast.

We haven't done anything yet, though, to assure our reds are red, not slightly brown, or that our blues are not slightly green or magenta, etc. The *Vectorscope* can provide much more specific information about your camera's 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 21-37 is an example of the color bars used in NTSC countries, while Figure 21-38 is a PAL example, common throughout European nations.



FIGURE 21-37 (NTSC)

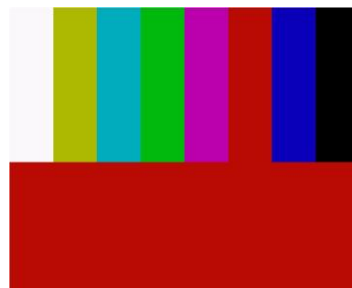


FIGURE 21-38 (PAL)

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 21-39).

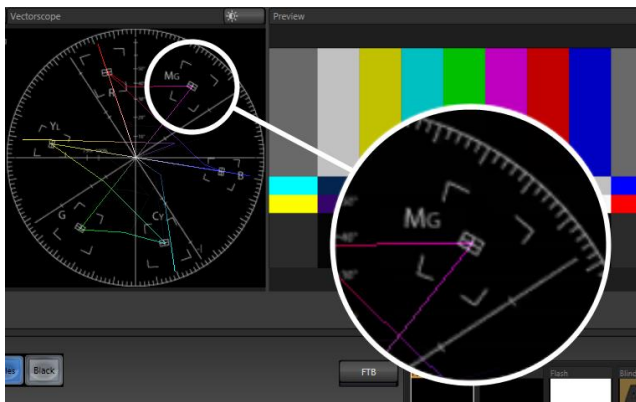


FIGURE 21-39

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 21-40).

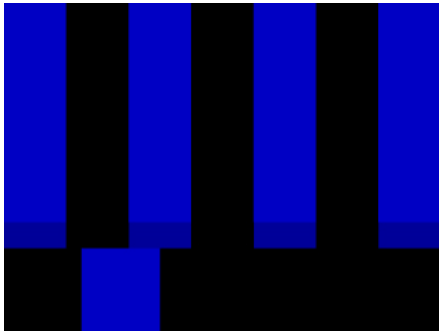


FIGURE 21-40

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.

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 GENERAL

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

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. For TC1, 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

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- LAME library <http://lame.sourceforge.net/>
- FFmpeg library <http://ffmpeg.org/>

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