NewTek TriCaster™

850 & 850 extreme™

450 & 450 extreme™

HD PORTABLE LIVE PRODUCTION

USER GUIDE

Revised – Dec. 20, 2011

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TriCaster™

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PART I (GETTING STARTED)

Introducing TriCaster™ – connections and registration, a top-level overview of primary features, and a hands-on tour to get you started.

1 ABOUT THIS MANUAL

Hate reading manuals? If so, you are part of the majority (estimates are that between 60 and 97% of the human race concur). Most prefer to jump right in, maybe asking a friend for occasional help (and who can blame them)?

This manual attempts to tell you what you need to know in a friendly, concise way, while also providing a deeper reference section you can turn to when you really need specifics.

Even if you hate reading, please take a moment to peruse at least this section, which explains the manual structure. You may find you can escape with a minimum of reading. (Or, if you are a devout reader, you can be the *hero* others turn to for expert advice.)

Part I – Getting Started: introduction to TriCaster; connecting devices (cameras, monitors, etc.) and registration, ending with the Live Production Walkthrough – a brisk jog through fundamentals, about 50 pages (if you're a quick study, this may provide all you need).

Part II – Reference: chapters in this section cover every arcane detail related to using TriCaster (for those who need it, and those who just like to know everything).

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. Part III is also home to a comprehensive keyword index.

TRICASTER EXTREME™ This User Guide discusses two TriCaster types. In most respects, operations and interface are very similar, and a single description will suffice. TriCaster EXTREME™ models provide additional and unique features, though. Wherever these are discussed in the text, they will be flagged in the same manner as this paragraph.

2 INTRODUCTION

Thank you for purchasing this NewTek™ product. Your TriCaster™ belongs to a large family of video systems and software with a remarkable heritage. A bona fide video pioneer, NewTek is justifiably proud of its record of innovation, ongoing commitment to design excellence, and superb product support.

This chapter provides a quick tour of the major components of your new TriCaster system.

2.1 OVERVIEW

Traditionally, producing live high definition television has been very costly, requiring very expensive equipment and a large crew. TriCaster™ changed all that. In one compact system, you can have a complete set of tools to create, broadcast, web stream and project your production. TriCaster even includes NewTek's revolutionary LiveSet™ system to provide you with network quality virtual sets for 'bigger than life' production capabilities.

TriCaster™ thus sets a new benchmark for "portable live production". Simply put, it is the most complete, reliable and efficient system available for live production and web streaming. Its capabilities are equally well suited to broadcast center control room installation or remote production location, and it requires just one person to operate. No matter what your live broadcast ambitions are, a TriCaster™ can help you fulfill them.

With TriCaster™ you can produce and distribute live video programs from diverse sources and materials in both Standard and High Definition. Use multiple cameras, recorded digital video, PowerPoint™ presentations on networked laptops, live web pages, digital photos and graphics, and much more.

TriCaster™ also supports Apple's AirPlay® protocol, allowing compatible off-the-shelf mobile video devices (such as iPhone™ and iPad™) to stream content wirelessly to TriCaster™. Your presentations can simultaneously be displayed by video projectors, television monitors, broadcast by traditional means, and streamed in high quality on the Internet.

2.2 STARTUP SCREEN

When you power up TriCaster™ the *Startup Screen* appears. This is your command center for initiating most other operations.

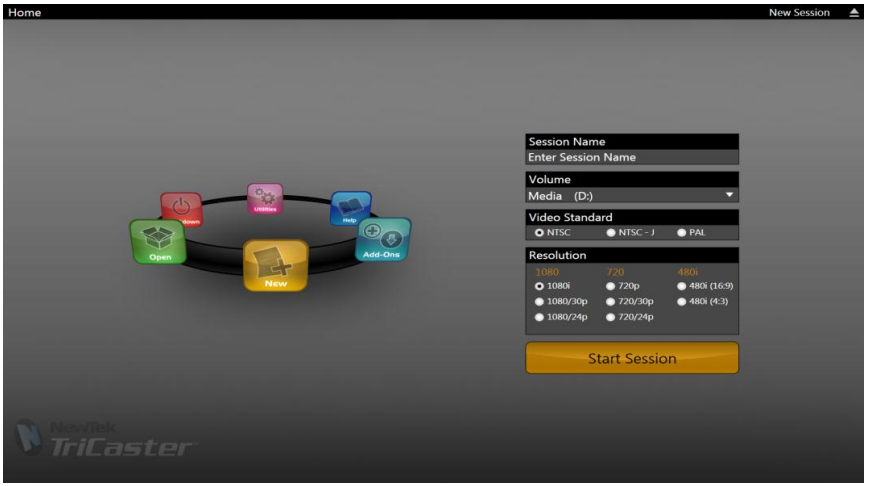


Figure 1

The *Home Page* of the *Startup Screen* allows you to define and open sessions, each of which can be customized for various productions or other purposes. Later, when you re-open a session, all of its assets and settings are remembered.

After creating a session (or opening an existing one), you are taken to the *Session Page*. Here you can launch the *Live Desktop* (for live production), or perhaps choose to *Edit*, prepare *Graphics* (title pages), *Manage* content, or even create custom transitions.

2.3 LIVE DESKTOP

TriCaster's live production features are all available from its unique *Live Desktop*, which in many ways mimics familiar production equipment. However, the Live Desktop provides far more functionality than that of similar single-purpose devices, all in one place.

The various features, controls and modules comprising TriCaster's *Live Desktop* are arranged in three horizontal bands, as seen in Figure 2.

Figure 2

The uppermost area is devoted to monitoring. The *Switcher* section is centrally located, and is also home to the *Transition* and *Overlay* controls. The bottom-most section of the *Live Desktop* holds side-by-side tabbed panels featuring media players (*DDR, Still* and *Title*), *Virtual Input* setup, and the *Audio Mixer*.

2.4 FEATURES

Here's a brief overview of just *some* of TriCaster's key features:

2.4.1 PHYSICAL

TRICASTER™ 450 & TRICASTER™ 450 EXTREME™

- Rugged 2U rack-mount case ensures robust, reliable and quiet performance in fixed or mobile installations.

- Massive storage capacity – the internal drive holds approximately 20 hours of 1080i, and the removable drive bay can be used to add to this capacity (TriCaster™ 450 EXTREME™ ships with an extra 1TB drive for this purpose).
- All audio and video, monitoring and network connectors are easily accessible from the rear for convenient installation in industry standard 19" rack-mount configurations.
- Audio and video connectors are industry standard (XLR, ¼" phono or BNC as appropriate), ensuring broad compatibility and secure, locked connections. Headphone output uses a standard 1/4" stereo phone jack, and an HDMI port supplies an added *Program* output.

TRICASTER™ 850 & TRICASTER™ 850 EXTREME™

- Rugged 4U rack-mount case with redundant power supplies ensures robust, reliable and quiet performance in fixed or mobile installations.
- Massive storage capacity – the internal drive holds approximately 50 hours of 1080i, and the removable drive bay can be used to add to this capacity (TriCaster™ 850 EXTREME™ ships with an extra 2TB drive for this purpose).
- All audio and video, monitoring and network connectors are easily accessible from the rear for convenient installation in industry standard 19" rack-mount configurations.
- Audio and video connectors are industry standard (XLR, ¼" phono or BNC as appropriate), ensuring broad compatibility and secure, locked connections. Headphone output uses a standard 1/4" stereo phone jack, and the HDMI port supplies an added *Program* output.

2.4.2 (MULTI-TIER FAILSAFE)

- Multiple software failsafe systems continually monitor and safeguard the live performance. Any recoverable software error conditions are quickly and unobtrusively dealt with.

TRICASTER EXTREME™

TriCaster™ EXTREME's 'Always on Air' features provide multi-tiered redundant failsafe mechanisms in both hardware and software. To name just a few:

- Failsafe software monitors live performance and automatically re-starts modules if any unexpected error condition calls for it.
- 'Always on Air' video pass-through ensures that as long there is AC power, in a case of catastrophic software condition, audio and video from the last input are routed to Program output.
- Streaming output and recording also continue in such cases.

2.4.3 A/V INPUT AND OUTPUT

- Live switch between up to four SDI and analog HD (or SD) cameras.
- Professional BNC video connectors provide increased durability and reliability for camera connections.
- Input and mix 16:9 and 4:3 formats.
- Freely mix SD and HD sources in both HD and SD sessions.
- Output HD sessions as SD (4:3 or 16:9) and HD simultaneously from HD sessions.
- Multiple *Media Player* modules allow you to insert pre-recorded video, music, sounds and imagery into your live presentations.
- Select Microsoft Windows™ or Apple Macintosh™ computers on the same network ™ as Switcher inputs for your live productions using NewTek's iVGA client.
- Assign one or both *Network* inputs on the *Switcher* to receive AirPlay® streams and switch live or recorded content directly from your compatible Apple mobile device or computer.
- Mix internal and external audio sources.
- Supply external audio via analog or SDI Embedded audio.
- Send *Aux* (Auxiliary) video output to a projection system or secondary monitor at resolutions up to 1920x1080.
- Send either *Aux* or *Master* audio to the *Aux* audio outputs.
- Take advantage of an additional *Program* output via an HDMI connector.
- Broadcast your *Program* to the Internet.

2.4.4 TIMECODE

- TriCaster™ generates and displays 'local timecode' based on the system clock.
- MPEG-2 recordings include full 'per frame' time-code.

TRICASTER EXTREME™

- TriCaster™ EXTREME ™ models support industry standard (LTC) external timecode.
- With IsoCorder™, recorded clips from multiple sources are easily aligned for synchronized post show editing using the embedded timecode.

2.4.5 ALPHA CHANNEL I/O

- TriCaster™ allows alternate video inputs to be configured as alpha channel inputs for the TriCaster™ *Switcher*.

TRICASTER EXTREME™

- TriCaster EXTREME™ adds alpha channel output supports using its *Aux* video output channel.

2.4.6 MONITORING

Figure 3

TriCaster's *Live Desktop* includes large *Program* output and *Look Ahead Preview* monitors with associated controls. Also, freely toggle between viewing:

- *All Monitors* - onscreen monitors for all sources (Figure 3).
- *External Monitors* – Live video sources supplied to TriCaster's video inputs.
- *Internal Monitors* – all internal sources, including *Media Players* and *Network* sources.
- *Scopes* – *Waveform* and *Vectorscope* monitors and full color source monitor.
- Secondary *Multiview* monitor output options including:
    - All sources plus *Preview*, *Program* and clock

- *Waveform, Vectorscope* and video monitor
- More …

2.4.7 VIDEO PROCESSING

- *Proc Amps* for every source preserve pristine image and color fidelity through the entire pipeline to final output.
- Separate control over the *Brightness*, *Contrast*, *Hue* and *Saturation* for every video source, along with *White Balance* and *U* and *V Offset*.
- Individual *Proc Amp* controls for *Program* and *Multiview* outputs.
- Input *Proc Amps* retain independent settings for different *Connection Types*.

2.4.8 THE SWITCHER

TriCaster's *Switcher* layout is consistent for all models, but the number of inputs available varies. TriCaster™ 450 & TriCaster™ 450 EXTREME™ provide a 14-channel switcher, while TriCaster™ 850 & TriCaster™ 850 EXTREME™ both offer 24-channels.

Figure 4 – TriCaster 450 & 450 EXTREME

Figure 5 – TriCaster 850 & 850 EXTREME

The three-row (*Utility*, *Program*, and *Preview*) *Switcher* allows you to freely *hot-punch* between external sources (*Cameras* or *Network 1 or 2*), internal sources (*Media Players*) and *Virtual Inputs*, or *Take/Transition* between *Preview* and *Program* sources.

Use *Utility row* selections to delegate video and graphics sources to various internal video busses, including the two primary *DSK* (Overlay) channels, *AUX OUT*, or to the *FX bus* (used as a secondary source for virtual sets or for other purposes).

Figure 6

2.4.9 VIDEO LAYERS AND TRANSITIONS

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

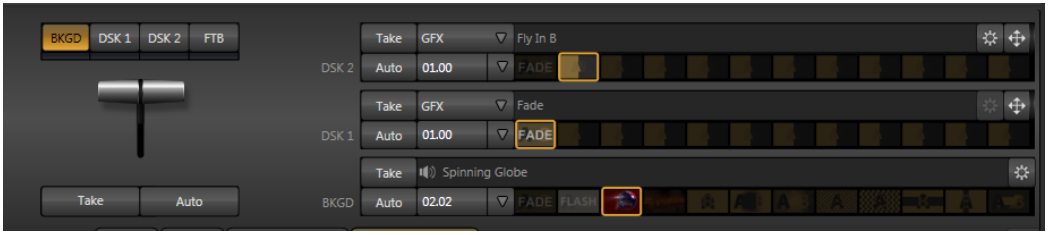


Figure 7

- Display of one or more user-delegated video layers, including *FTB* (Fade to Black) is controlled by the main T-bar, supplemented by one-click Take or Auto buttons.

- Local Transition controls for *BKGD* (Background) and *DSK* layers provide flexible and independent configuration and control of these layers and their transitions.

  Select different transition effects for each layer, and adjust *Transition Speed* (variable and presets), *Reverse* and *Ping Pong* options.

TRICASTER EXTREME™ TriCaster EXTREME™ boasts powerful and great looking *Animation Store Transitions* that support full-color embedded overlays and separate in/out sounds.

DSK CHANNELS

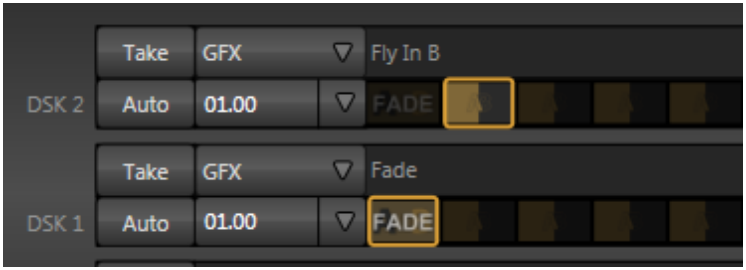


Figure 8

TriCaster's *DSK* layers support dual-channel downstream keyed (or alpha) overlays. Assign any *Switcher* source or a dedicated *Frame Buffer* to either channel. *DSK* channels can be displayed in tandem or independently, or swapped – again, with independent custom transitions.

You might use the *Graphics* or *DDR* modules to overlay title pages, including scrolls, crawls and lower-thirds – or delegate a *Camera* input or *Network* source as an overlay (using the Switcher's *Utility row*). Alternatively, use the *Frame Buffer* feature to assign a specific title or image to any overlay channel, and even update it in realtime over a network using external graphics or titling software.

Independent *Crop*, *Position, 3D Rotation*, and *Scale* controls for each *DSK* channel permit you (for example) to configure two live sources as 'Picture in Picture' elements using the *DSK* channels, freely switching them on and off (with or without individual custom effects), with or *without* changing the *BKGD* (Background) video layer using the *Program* and *Preview* rows on the *Switcher*.

2.4.10 RECORD AND STREAM

- Record your live-switched production at full resolution to a multi-platform compatible format.
- Recorded MPEG-2 files have embedded timecode.
- Choose how far below 0dB FS (the maximum digital level) to set nominal level; record files with headroom levels of up to 20dB.
- Store approximately 20 hours of 1080i video (or 155 hours of SD).

- Simultaneous output for broadcast, projector and live web stream to in-house and remote audiences.
- Use either Windows Media™ or Flash Media™ streaming.
- Archive your Internet stream.
- Connecting to multiple content delivery networks is a snap using the *Configure Stream Connection* panel.

TRICASTER EXTREME™

- IsoCorder™ technology lets you record up to four a/v sources at once, including all camera inputs, or a custom set of sources chosen from *Program*, *Aux* and camera sources.
- Multiple encoding formats, including MPEG-2, AVI, Quicktime™ and H.264 (m4v).
- Capture MPEG-2 clips with embedded LTC (linear timecode).
- Use NewTek's TimeWarp™ instant replay control surface without interrupting full-time recording of your program (or other sources).

2.4.11 IMPORT AND EXPORT

IMPORT MEDIA

Clicking the *Import Media* link in *Startup* opens a dedicated *Import Media* module in *Startup*, providing a convenient one-stop approach to managing productions assets.

- Batch import media files for use in TriCaster's *Media Players.*
- Imported files are automatically categorized and sent to the correct locations, making them easy to find and use during live productions.
- Optionally transcode selected to high quality and TriCaster-friendly file formats, ensuring smooth playback.

EXPORTING CONTENT

The *Export Media* function allows you to create a batch list of files for export, and optionally select new file formats for the exported media.

2.4.12 AUDIO MIXER

TriCaster™ provides extensive multi-channel audio control and management in two dedicated tabbed panels.

- Adjust individual audio sources (internal and external) and introduce them into your program manually or automatically.
- Control output levels for program, headphones, auxiliary output and stream separately.
- Convenient mixer presets allow single-click access to prepared setups.
- Audio follow video options.

TRICASTER EXTREME™

- Advanced audio controls including:
  - Seven-band equalization along with compressor/limiter for each source and also every output.
  - Source grouping and multi-bus routing options.

Figure 9

2.4.13 INTEGRATED MEDIA PLAYERS

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

- Add a/v clips, sound files or still image files to *Media Player* playlists.
- Trim and re-order playlist entries.
- Store playlists as presets for easy recall.
- Flexible playback controls include variable *Speed* and *Loop* options.

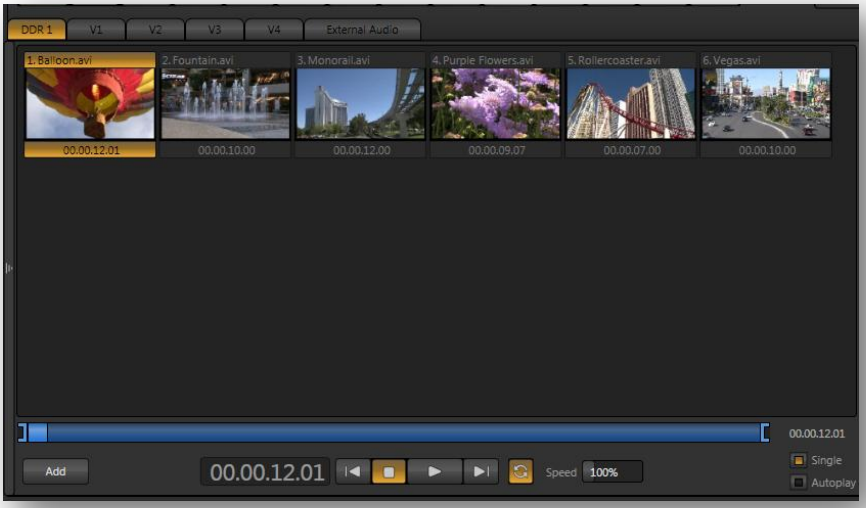


Figure 10

- *Media Players* have volume and more elaborate controls in the mixer, along with convenient per clip audio level adjustments right in the playlist.
- Start and stop playback manually or automatically based on *Switcher* activity.
- Use two *Media Players* to create automated 'slide-shows', complete with transitions.
- Assign titles, graphics or a/v clips to multiple *DSK* or *Overlay* channels.
- Edit titles live, even while 'on air'.

2.4.14 KEYING, VIRTUAL SETS AND VIRTUAL INPUTS

- Use *LiveMatte*™ realtime keying technology for green/blue screen effects.
- Apply independent *LiveMatte* settings to all video sources.
- *Virtual Inputs* (Figure 11) permit M/E (Mix/Effect) style compositions of two primary switcher sources, with convenient *Scale*, *Position*, *Crop* and *Rotation* controls.

Figure 11

- Achieve the look of a sophisticated studio setting in a very small space with NewTek's astonishing *LiveSet*™ virtual set technology.
- *Zoom* in/out on *LiveSets* during your live productions right from the *Live Desktop*.
- *Virtual Inputs* also sport an integrated overlay channel (selected from any *Switcher* source or an assigned *Frame Buffer* graphic) with its own position controls.
- Convenient *presets* allow single-click access to pre-configured *Virtual Input* setups.

2.4.15 GRAPHICS

Also part of TriCaster's integrated software suite is LiveText™, NewTek's professional titling and graphics application. LiveText allows you to create your own custom title pages and motion graphics, including scrolls and crawls.

2.4.16 EDIT

The full version of NewTek's popular and versatile non-linear video editing program SpeedEDIT™ is included as well. SpeedEDIT provides powerful, professional tools to let you prepare movies for insertion into your live productions, or perform broadcast quality post production work on recorded programs.

- Edit, import and export in full HD resolution.
- Realtime external hardware project preview in HD or SD.
- Import and export file format support includes MPEG2 and QuickTime for versatility in program delivery.

In summary, TriCaster™ gives you the combined power of both a network control room and a complete post-production facility in one simple to use broadcast appliance. Let's jump in now. First, we'll get you connected. Following that, we'll begin to explore TriCaster's most important features.

2.4.17 OPTIONAL CONTROL SURFACES

Figure 12

Several models of optional TriCaster™ control surface are offered, including models designed for primary control and others for specific purposes such as instant replay. Control surfaces make many operations even more convenient. Once you get your hands on one you'll never want to let go, and there's sure to be one or more that would be an ideal companion to your system.

3 SETTING UP

This chapter explains how to properly connect power, external control devices, monitors and audio visual sources to your NewTek TriCaster™ system.

It also reviews registration for warranty purposes and technical support. After completing this short section, you'll be all set to continue into the Walkthrough chapter that follows it.

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

- NewTek TriCaster™
- TRICASTER 850 EXTREME™ Package of three (3) 2TB hard drives
- TRICASTER 450 EXTREME™ One 1TB hard drive for the removable drive bay
- Keys to front panel of case
- Four attachable rubber feet (for desktop use)
- A/C power cable(s)
- BNC removal tool (to assist with cable connection and removal)
- DVI to VGA adapter
- NewTek mouse and keyboard
- Quick Start Guide
- NewTek 3PLAY™ brochure
- Getting Started Training DVD
- NewTek iVGA™ CD
- NewTek TriCaster™ registration reminder card
- New product letter

3.1 COMMAND AND CONTROL

1. Connect an external computer monitor to the (uncapped) DVI port on the backplate (labeled *Interface* on TriCaster™ 850). For TriCaster™ 850, use the DVI connector nearest to the *Video In* group for the interface monitor connection. (DVI connectors located at left below the power supply are normally capped and should not be used.)

   Note: TriCaster's user interface requires a minimum screen resolution of 1440x900.

2. Connect the *mouse* and *keyboard* to USB ports on TriCaster™.

3. Connect the *A/C power cord(s)* from the three-prong connections on TriCaster's backplate to an external power receptacle (see *Hint* below).
4. Turn on the computer monitor.
5. Press the *Power* switch located on TriCaster's faceplate.

At this point, the blue *Power LED* will illuminate, and the adjacent hard drive *activity light* should flicker as the device boots up. (If this does not happen, check your connections and retry).

Though not a requirement, we do strongly recommend that you connect TriCaster™ using 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'.

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.

Surge protection is especially important in some locales. Power conditioners can reduce wear on TriCaster's power supplies and other electronics, and provide a further measure of protection from surges, spikes, lightning and high voltage.

3.2 ACTIVATING & AUTHORIZING WINDOWS™

(Your dealer may have performed this operation for you as part of his pre-delivery service.) When you see the *Welcome to Windows* screen:

1. Click *Next* at lower right.
2. Choose your time zone.
3. Accept the license agreement.
4. Enter your 25-digit key (on some models, the sticker is on the *bottom* of the case).
5. Decline automatic updates (by clicking "not right now").
6. Give TriCaster™ a distinct computer name for networking.

You can authorize your Windows installation by network or by telephone. Assuming you have an Internet connection available, and have connected TriCaster™ to it with an Ethernet cable, the Internet is the fastest method of activation. (See Section 3.16 and Chapter 14 for more on network connections.)

1. Click 'Obtain IP and DNS automatically'.
2. Agree to activate Windows. This activation is permanent, and you won't see these screens again. (Registration with Microsoft is optional).
3. Assign a name to the *administrator* account. You may type your name, company, or perhaps simply "TriCaster".
4. Click *Finish*, and TriCaster™ will re-start.

After restarting and accepting NewTek's *User Agreement*, the interface will load automatically.

3.3 TRICASTER™ LICENSE AND REGISTRATION

On launch, TriCaster™ presents an *End User License Agreement* dialog. After you accept this, the *Registration* dialog shown in Figure 13 is presented.

If necessary, enter the unique TriCaster™ *Serial Number* and *Product ID* for your system. TriCaster's video output will show a watermark until the system is registered and unlocked (by entering the *registration code*).

Figure 13

Hint: If the Serial number doesn't appear automatically, and can't find it on your unit, you can obtain it from the registration webpage mentioned in the next section, or by calling Customer Support Desk (open seven days a week).

You can register and obtain your registration code either by telephone, or online (directly from TriCaster™ or from another system connected to the Internet) as described next.

3.3.1 ONLINE REGISTRATION

If you have connected your TriCaster™ to the Internet, simply click the button under *Step 2* in the registration dialog. This will take you to the *Registration* page (http://register.newtek.com) in the *Customer Care* section of NewTek's website where you will find further directions.

Hint: More information on connecting TriCaster™ to a network can be found in Section 3.16 and Chapter 14.

Otherwise, you can visit the registration webpage from another system with Internet access. In either case, after registering on the website, enter the resulting *registration code* into the field provided at *Step 4* of the dialog.

Hint: It's a very good idea to record the login name and password you choose when creating your website profile and keep them in a safe place. Jot down registration code too; it could come in very handy if you ever need to restore the TriCaster™ software to its as-shipped state when you don't have access to the Internet.

Check your personal area of the site from time to time afterward; among other things, you'll be able to download any free software updates that are made available going forward.

3.3.2 REGISTERING BY TELEPHONE

NewTek's Customer Care center can also handle registration requests by telephone, if that is more convenient (when opportunity permits, you should still visit the website as discussed above to gain access to software updates). Please have your *Product ID* (from the Registration dialog mentioned earlier) handy when you call. The phone numbers for Customer Service follow:

Telephone: (US) 1-800-862-7837
(Outside US) +1-210-370-8000
Fax: 210-370-8001

Note: For Technical Support contact information, please see Section A.6.2.

3.4 INPUT CONNECTIONS

3.4.1 CONNECT A/V SOURCES

External audio and video sources are connected to the appropriate inputs on TriCaster's backplate.

Figure 14 – TriCaster™ 450 and TriCaster™ 450 EXTREME™

Figure 15 – TriCaster™ 850 and TriCaster™ 850 EXTREME™

1. Connect *video* sources to the appropriate connectors in the *VIDEO IN* section, whether *SDI*, *Component*, *Y/C* (S-Video) or *Composite* (may require RCA to BNC adapter).

    a. *SDI* – Attach SDI source connectors to upper row of BNC connectors in the *Video In* group (marked *SDI*).

Hint: If your equipment supports SDI, this is your best quality I/O option.

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

c. *Y/C* – If your S-Video equipment and cabling has the usual 4-pin mini-DIN connectors, you will need an *S-Video to dual BNC* adapter. To connect Y/C sources, attach the *Y* (luma) connector of your source to the second analog BNC connector (labeled *Pb*). Attach the source's *C* (chroma) connector to the *bottom* connector (labeled *Pr*).

d. *Composite* – Attach the composite source's connector (may require an RCA to BNC adapter) to the *second* connector (labeled *Y*).

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

2. To input *analog* audio along with the video, connect the external audio sources to the XLR or ¼" connectors in the *Audio In* group box. Two connectors, labeled "a" and "b", are provided for each input group. We'll discuss audio *Connection Type* options a bit later, in Section 3.14.

Note: SDI video sources with embedded audio do not need a separate analog audio connection.

3.5 GENLOCK CONNECTION

The *Genlock* input on TriCaster'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 usually found on professional gear. If your equipment allows you to do so, you *should* genlock all cameras supplying TriCaster™, *and* TriCaster™ itself.

To genlock TriCaster™, supply the reference signal from the 'house sync generator' to TriCaster's *Genlock In* connector.

3.6 TIMECODE CONNECTION

TRICASTER EXTREME™

TriCaster EXTREME™ supports external linear timecode (LTC). Connect the cable from your timecode generator to one of the connectors in Audio Input 7 for TriCaster™ 850 EXTREME™; TriCaster™ 450 EXTREME™ uses Audio Input 3. External timecode is enabled and configured in the *Live Desktop* (see Sections 3.16 and 7.3).

3.7 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 some aspects are best considered before even beginning a TriCaster™ session.

3.7.1 A/V OUTPUT

TriCaster™ provides separate 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:

- Simultaneously send output to standard and/or high definition devices from HD sessions.
- Simultaneously send program output to both analog and digital devices.
- Send program output or other layouts to a secondary monitor or projector using Multiview.
- Stream program output to the Internet via a suitable network connection.

3.7.2 HD AND SD

As mentioned earlier, for HD sessions TriCaster™ supports *simultaneous* output of both SD (Standard Definition) and HD (High Definition) video.

The *Video Output* section on TriCaster's backplate provides vertical columns of four BNC connectors, offering the following connection possibilities for live production:

- *Row 1* video output format 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.

- *Row 2* outputs are user-configurable, and can be set up in the *Live Desktop* (*Output Configuration* panel).

  - For TriCaster™ 850 and TriCaster™ 850 EXTREME™, Row 2 outputs a secondary, configurable copy of the main *Program* video stream.

  - TriCaster™ 450 and TriCaster™ 450 EXTREME™ employ *Row 2* to supply the *AUX* video output, which has even more options.

- TriCaster™ 850 and TriCaster™ 850 EXTREME™ (only) provide a third video output row, and use it to present *AUX* output.

Figure 16

1. Connect downstream video devices to the appropriate output connectors in the *VIDEO OUT* section, whether *SDI*, *Component*, *Y/C* (BNC) or *Composite*. Please note that the latter two formats may require RCA (cinch plug) or S-video (4 pin mini-DIN) to BNC adapters, and also that both of these connection options support output at SD resolution only.

   a. *SDI* – Attach SDI connectors to the uppermost row of BNC connectors in the VIDEO OUT group, labeled 1, 2 and AUX.

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

   b. *Component* – Attach your device to the *second, third and fourth* BNC connectors (Y, Pb and Pr).

   c. *Y/C* – If your S-Video equipment and cabling has the usual 4-pin mini-DIN connectors, you will need an 'S-Video to dual BNC' adapter. Attach the *Y* (luma) connector of your device to the *second* analog BNC connector row (labeled Pb at far left in the VIDEO IN group). Attach the *C* (chroma) connector to the *third* analog connector (labeled Pr).

d. *Composite* – Attach the device's connector to the *first* (top) analog connector, labeled Y.

2. Connect TriCaster's audio outputs:

   a. *Analog audio* – Connect external audio devices to the connectors in the *AUDIO OUT* section. Note that there are two pairs of two connectors each; Connectors *1a and 1b* provide *Program* (Master) output, while *2a* and *2b* are designated *AUX* (Auxiliary Output). These two output sections are configured and controlled separately in the *Live Desktop*.

   b. *Digital audio* – A separate digital audio connection is not necessary for SDI output with embedded audio.

Hint: TriCaster's SDI and analog output sections can be used simultaneously. For example, you could use the Composite output to view your program on a local composite monitor at the same time as you use the SDI connection to supply broadcast equipment.

3.7.3 SUPPLEMENTAL VIDEO OUTPUTS

Additional dedicated video outputs make it possible to connect monitors or projection devices to TriCaster™ for a variety of purposes including program output for IMAG (Image Magnification) installations or flexible monitoring for the convenience of the operator.

1. An *HDMI* connector provides an additional primary *Program* output. Simply connect a suitable external monitor or device to the HDMI connector on the backplane

2. TriCaster's *Multiview* output may be supplied by a DVI connector (TriCaster™ 850) or an HDMI connector found beside the main *Interface* DVI connector (TriCaster™ 450). Again, connect a suitable external monitor or device. The new device should be recognized and enabled by the system automatically. This output offers a variety of optional monitoring layouts that can be selected at any time in TriCaster's *Live Desktop*.

Note: For best results, it is important to configure Multiview Output to the native resolution of the external display (monitor or projector) connected.

3.8 TALLY LIGHTS

TriCaster's *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.

3.8.1 EXTERNAL CONNECTIONS

Here is a pin-out listing for TriCaster's DB15 Tally connector:

- Pin1 – LED1
- Pin2 – LED2
- Pin3 – LED3
- Pin4 – LED4
- Pin5 – LED5 (850 only)
- Pin6 – LED6 (850 only)
- Pin7 – LED7 (850 only)
- Pin8 – LED8 (850 only)
- Pin9 – GND
- Pin10 – GND
- Pin11 – GPI1
- Pin12 – GPI2
- Pin13 – NC
- Pin14 – 3.3V (with 20 Ohms current limit)
- Pin15 – NC

ENGINEERING NOTES

- Pins 1-8 are 'hot' when the LED should be illuminated.
- Each LED pin (pins 1 - 8) has a 200 ohm current limiting resistor inside TriCaster™.
- With no load (open circuit) pins 1 - 8 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 support for GPI triggers has not been implemented in TriCaster™ at this time.)
- To prevent damage to TriCaster's components when making external connections to the tally light jacks, care should be taken that connection to Pins designated GND (Ground) are always at ground potential.

3.9 STARTING A SESSION

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

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

THE HOME PAGE

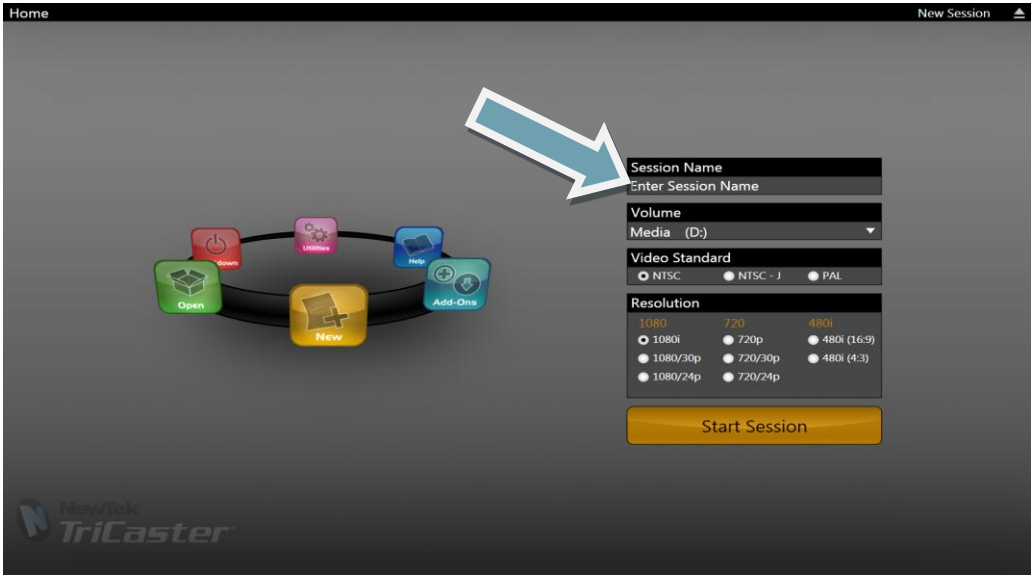


Figure 17

When no previously created sessions exist, the icon ring dominating the *Home Page* defaults to *New*, inviting you to create a new session. A link labeled *Enter Session Name* is shown at the top of the right-hand pane when New is selected on the icon ring. Click in this area to modify the name using the keyboard if you like. (The default name is the current date.)

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

SD options include both 4:3 and 16:9 (widescreen) image aspects. TriCaster™ Multi-standard models permit you to select from different video standards according to your locale, choosing between NSTC, NTSC-J (Japan) or PAL.

Continue with session creation by designating the *Video Standard* used in your locale (Multi-standard models only). For the moment, let's choose *1080i* for *Resolution* (even if the cameras you plan to connect are SD 4:3), then click the *Start Session* link below.

By default, new sessions are created on TriCaster's 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 TriCaster's *Live Desktop*), click *Live* on the icon ring.

Figure 18

Simply click the link labeled *Start Live Production* to launch the *Live Desktop*, which is likely where you will spend most of your time working with TriCaster™.

THE LIVE DESKTOP

Initially, as you have yet to configure input devices or add content, the *Live Desktop* will look a bit barren (Figure 19).

Figure 19

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, Live Production – coming up soon.)

3.10 CONFIGURE VIDEO OUTPUT

TriCaster™ provides complete video input monitoring right on the *Live Desktop*. This allows you to operate it without even connecting downstream video monitors or devices. You might do just that in the case of productions intended primarily for live streaming.

In other cases, however, you will likely connect external monitors to the *VIDEO OUT* connectors on TriCaster's backplate (see Section 3.6). High definition video monitors should be connected to either *SDI* or *Component* connections.

3.10.1 SD ANALOG CONFIGURATION

For standard definition monitoring, however, several types of analog connections are currently in popular use. These include *Composite*, *Y/C* (also known as S-Video) and – at the upper end of the analog quality range – *Component*. To connect an *analog* standard definition monitor for use in live production*, you must specify the connection type in the *Output Configuration* panel.

**Note: Analog connections for SpeedEDIT™ and LiveText™ output are pre-defined, and cannot be user-modified. Please see Chapter 17 for details.*

Figure 20

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

2. Click the *Configure button* (gear) that appears above its top-right corner (Figure 20) to open the *Output Configuration* panel.

The first tab in this panel is labeled *Output*. Optional settings for *SD Analog Connections* are located in the central part of the panel ().

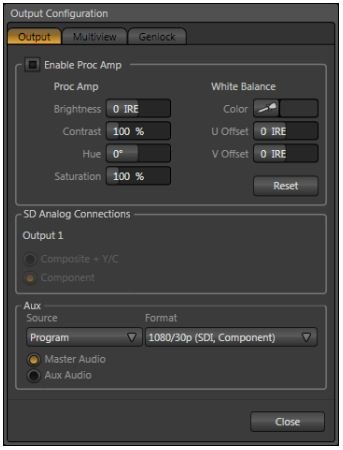


Figure 21

These settings provide optional configurations for the first output connection, designated as *Output 1* (a.k.a. *Program* out).

Note that the video format for *Row 1* output (and, for TriCaster™ 850 models, *Row 2*) invariably conforms to the format you chose for the session (e.g., 1080i). The only suitable analog connection type for HD is component, so the *SD Analog Connection* options are ghosted in HD sessions.

By contrast, SD sessions do support several optional connection types. Choose between *Component* connection or *Composite + Y/C* in this case.

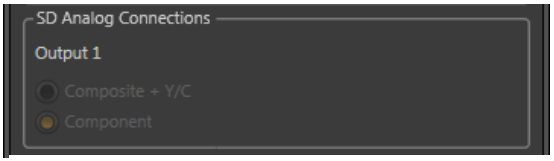


Figure 22

Selecting *Composite + Y/C* sends composite video output to the second BNC connector in an output row (*Y*), and Y/C to the third and fourth connectors (*Pb* and *Pr*, respectively).

3.11 CONFIGURE AUX VIDEO OUTPUT

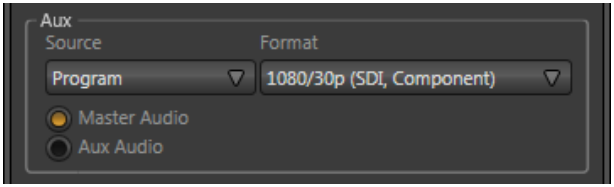


Figure 23

The *Aux* video output allows you to choose a different video source for output if you wish, using the *Source* menu.

You can also choose from a wide array of output formats, and opt to send either the *Master* or *Aux* audio mix to accompany it. Aux configuration and options are detailed later, in Section 7.1.4

3.12 CONFIGURE MULTIVIEW OUTPUT

The next tab in the *Output Configuration* panel is *Multiview.* Settings in this tab determine what is displayed on TriCaster's secondary DVI output, and the resolution of that display. You might use this output for subsidiary monitoring purposes, or perhaps to supply a projection system.

The *Screen Layout* drop-down menu provides numerous optional displays, including *Program*, *Preview* or *FX* monitors, an *All Sources* (monitors for all Switcher sources, plus a clock) option, and many more.

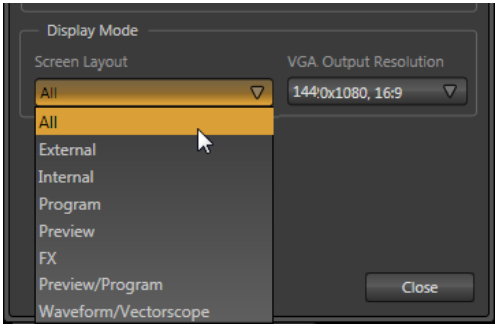


Figure 24

Set the *VGA Output Resolution* to the native resolution of the external device, and test the different display options to find a suitable setting.

3.13 CONFIGURE VIDEO INPUT

Let's continue by configuring the video sources you connected earlier (Section 3.4):

1. Click the *All Monitors* tab at upper-left on the *Live Desktop*.

2. Move your mouse back and forth over the input monitors. Notice that a *Configure button* (*gear* icon) appears above the top-right corner of each input monitors as you do so.

3. Click the *Configuration button* to open a tabbed settings panel for *Camera 1* (Figure 25).

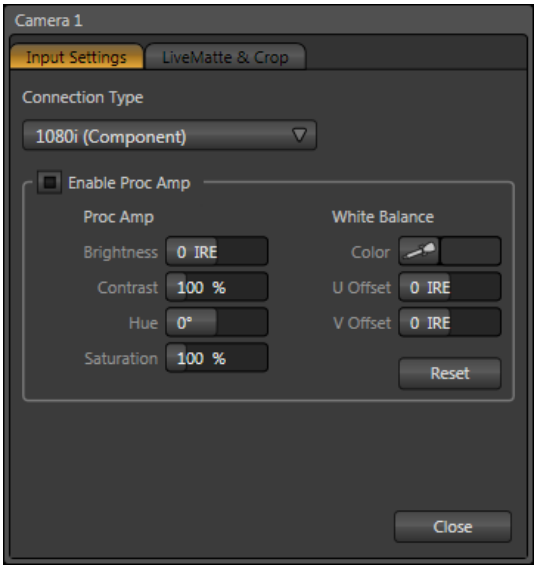


Figure 25

4. Click the *Connection Type* button to reveal a drop-down menu listing a variety of connection types. Select the correct format, such as *720p (Component)*, or *1080i (SDI)*, etc., for the video source you plan to connect to this input.

5. Close the *Configuration* panel for now (note that you can click the *Close* button or simply 'click outside' the panel to close it).

6. Continue to configure all connected external video sources in the same manner.

We'll look at the other options and settings in the *Configuration* panel later (see Section 7.2), but at this point you should be able to view the video inputs you have configured on their respective monitors.

3.14 CONFIGURE AUDIO

Click the *External Audio* tab in the lower-left quadrant of the *Live Desktop* to reveal set up and control features for external audio sources.

Figure 26

The tab houses individual control panels for each of the external audio inputs on TriCaster's backplate (*Inputs 1-4*).

Hint: Audio tab layouts for different TriCaster™ models vary. For example, TriCaster™ 850 has eight audio inputs rather than four, so Network source controls are located in the Internal Audio tab.

TriCaster™ 450 presents Network controls in External Audio (Figure 26). Beyond this, please note that TriCaster EXTREME™ systems have additional audio features and controls that do not appear in the audio tabs of standard models.

TRICASTER EXTREME™. The advanced audio features provided by TriCaster EXTREME™ are discussed in Chapter 13, Audio.

There is a source *Type* selector drop-down at the top of the control panels for each Input. Clicking it reveals the list of *Connection Types* (Figure 27).

Figure 27

Options include *Mic 1, 2* (with and without phantom power), *Line*, *SDI Embedded*, and in selected instances, *Line Quad*. (The latter option combines two neighboring input pairs as a one 4 channel source governed by a single *Gain* slider.)

After connecting audio sources to the input connectors (see also Section 3.4.1), the first thing to do is set the correct *Type* using the drop-down menu:

- Select *Mic 1, 2* for professional grade microphones or other low impedance connections (use the *Phantom* option for condenser microphones requiring supplementary power)
- Choose *Line* for higher impedance device connections (such as a CD player, computer audio output or VCR), or *Line Quad* where required.
- Select *SDI Embedded* to access digital audio from an SDI video source.

Note: Analog levels conform to SMPTE RP-155. The maximum input/output level is +24 dBu, nominal input level +4 dBu (-20dBFS), and the sample rate is 96 kHz.

The *Gain* sliders (next to the *VU meters*) default to their lowest settings on first launch. After adding audio sources, slowly bring these sliders up to pass their signals through the system.

Hint: Most numeric controls in TriCaster™ can be reset to their defaults using Shift + double-click on the control knob. The default value for Gain sliders is 0dB.

Some variation exists as respects signal levels from individual sources, even within the same type. For *Mic* (and *Mic + Phantom*) connections, the *Trim* controls provide a preliminary adjustment allowing you to fine tune the input level. Use *Trim* to bring the levels for microphone and similar sources into a useful range on the VU meter.

Figure 28

Note: In digital audio systems, signal levels exceeding allowable values are 'clipped' (uniformly assigned the maximum level value), inevitably entailing audible issues that cannot be corrected later. The Audio Headroom setting In Record Configuration allows you to offset input signal levels to provide a safety margin (see the heading Audio Headroom in Section 16.1.1). This can greatly reduce the possibility of clipping in captured files. Beyond this, use Trim and Gain controls judiciously to avoid over-modulation.

TRICASTER EXTREME™ *Compressor/Limiters* in TriCaster™ EXTREME's *Audio Mixer* tabs provide another powerful tool to prevent clipping problems – see Section 13.4.

3.15 CONFIGURE GENLOCK

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

2. Access the *Output Configuration* panel by clicking the *Configure* button (gear icon) that appears at upper-right when you move the mouse over the main *Program Output* monitor on the *Live Desktop*.

3. Click the *Genlock* tab in the *Output Configuration* panel (Figure 29).

4. The default *Reference Type* in the Genlock settings 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)*.

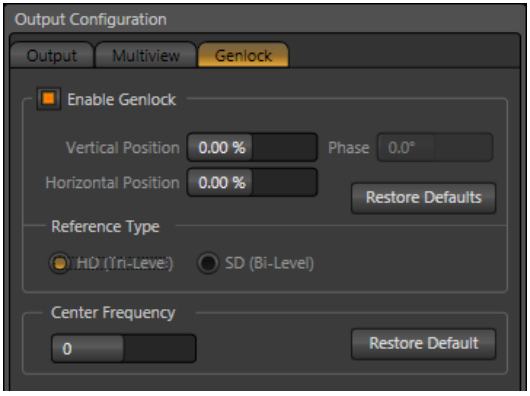


Figure 29

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

Ideally both the cameras and the TriCaster™ should be genlocked. If they are not genlocked to the same reference signal as the TriCaster™ output, a TBC (Time Base Correction) operation is automatically applied. Time Base Correction may drop or insert occasional frames as necessary to maintain sync, hence is a less desirable approach.

Note: For a deeper discussion of genlocking, please see Section 7.1.6.

3.16 CONFIGURE TIMECODE

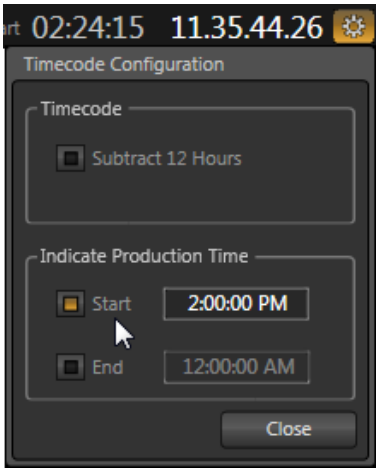


Figure 30

TriCaster™ uses the system clock to generate 'local timecode' for the time display shown in the *Live Desktop* and to be embedded in captured MPEG-2 video clips.

To configure timecode, click the configure button (gear) next to the timecode display in the Live Desktop titlebar. Please see section 7.3 for more detail.

TRICASTER EXTREME™ If you have an external linear timecode (LTC) source, you can use that timecode reference instead of relying on the local (system) time.

A switch is provided in the *Timecode Configuration* panel to enable this support - please see Section 13.4 for more detail.

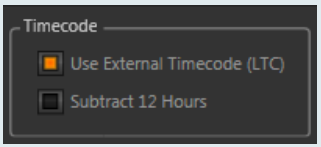


Figure 31

3.17 NETWORKING

TriCaster™ is capable of displaying screens from networked computers running NewTek's iVGA™ client software, output from other supported applications (such as NewTek's own LiveText™), or media streamed via from Apple AirPlay® to a connected network.

Connecting TriCaster™ to a *local area network* (LAN) may require additional steps beyond those mentioned back when we discussed Microsoft Windows ™ activation (Section 3.2). Here is the basic procedure involved in joining a *workgroup*:

1. Connect a suitable cable from the ETHERNET port on TriCaster's backplate to your external network.

2. (If necessary) – close the *Live Desktop*; click the *Back* arrow to return to the *Home Page*.

3. Click *Shutdown*, then select *Exit to Windows* at right to access the operating system's own desktop.

4. Right-click on the *My Computer* icon, and select *Properties.*

5. Scroll down in the right hand pane of the *System* panel that opens to find the *Computer name, domain and workgroups* settings area.

6. Click the *Change Settings* link at right.

7. Click the *Computer Name* tab of the *System Properties* panel that opens.

8. Click the *Change* button, and enter the name of your local *workgroup*, as provided by your system administrator.

9. Close the *OK* button.

10. Close the *System* control panel.

11. At this point, the network connection should be functional. If further help connecting is required, please consult your system administrator.

The next section (Chapter 4, Live Production Walkthrough) will guide you through your first experience using TriCaster™.

4 LIVE PRODUCTION WALKTHROUGH

This chapter provides a quick hands-on tour of the major components and functions of your NewTek TriCaster™. In a very short time, these basics will be second nature to you.

More detailed reference material on all aspects of TriCaster™ follows in Part II (Reference).

Having made the essential external connections in the previous section, let's start your first TriCaster™ session, and skim through some important fundamentals:

- Startup and Import
- Monitoring and related features.
- Audio mixing (and the Follow feature).
- Network sources.
- Switching between video sources, and using transitions.
- Program Output and Recording.
- Playing stored clips using the DDR ('Digital Disk Recorder').
- Adding (and editing) title pages and graphics.
- Using LiveMatte to create a simple chromakey effect.
- Virtual Inputs.
- Creating a LiveSet (virtual set) shot.
- Streaming to the Internet.

4.1 CREATING A SESSION

We ran through the basics of starting new *sessions* and configuring input and output devices in sections 3.9 through 3.15. If you need to review this information, go ahead and do so now. (We'll look at them individually again later in Part II (Reference), too.)

1. In the initial *Startup Screen*, create a new 1080i session - name it "*Practice Session*".

2. The *Session Page* will appear when you click *Start Session.*

3. Click *Manage* on the icon ring (Figure 32).

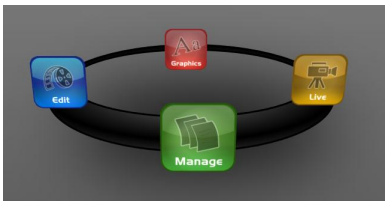
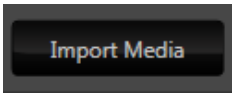


Figure 32

4.2 IMPORTING CONTENT

Let's import a few files that we'll use later in our walkthrough:

4. 

Click the *Import Media* button at lower-right.

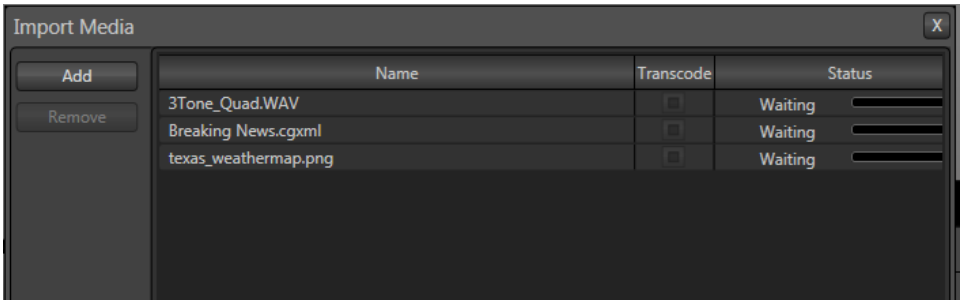


Figure 33

5. Click *Add* in the *Import Media* panel (Figure 33) to open a system *File Explorer*.

6. Navigate to C:\TriCaster\Documentation\Walkthrough Content.

7. Press *Ctrl + a* (to multi-select everything in the folder shown in the *File Explorer*) – then click *Open*, adding these items to the file pane of the *Import Media* panel (Figure 33).

8. Click *Import* (different media types are automatically sorted into their respective destination folders on import). We'll use these files later.

Hint: Although you might well never even notice, a two minute initialization period begins after you start (or re-start) TriCaster™. This 'warm-up' period allows the system to stabilize, ensuring consistent performance of various components (for example, video clips playing in the DDR before the end of initialization could skip some frames). See Section 6.5.1 for more information.

We are ready now to commence our tour of the *Live Desktop*, beginning with further consideration of monitoring features and options.

4.3 MONITORING

4.3.1 PROGRAM AND PREVIEW

Inevitably, you'll be paying a lot of attention to the main *Program and Preview* monitors (Figure 34), occupying the right half of the upper (monitoring) section in the *Live Desktop* by default.

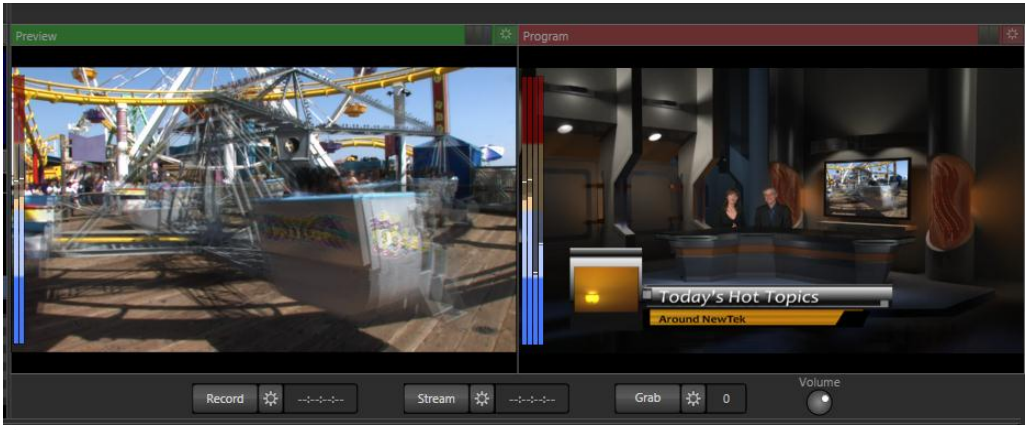


Figure 34

TriCaster's 'Look Ahead' *Preview monitor* reflects the outcome of the upcoming switching operation.

The *Program monitor* displays what you are sending to downstream devices and your audience.

Situated beneath these principal monitors are *Stream, Record and Grab* buttons, their respective *Configuration* buttons, and time/counter fields (we'll look at those features later). A convenient master volume knob appears here, too (notice the VU meter monitor overlays in Figure 34).

Hint: Move your mouse over Program Output, then click the Configure button (gear) that appears above it to open a tabbed panel containing Proc Amp, Multiview and Genlock settings.

4.3.2 ALL MONITORS

Click the *All Monitors* tab at upper left to view dedicated monitors for all camera inputs, along with an array of other sources. These include monitors showing the current playlist items in the two *DDRs*, *Graphics* module, and *Network* sources – such as an *iVGA* input from another computer on the network, a title overlay from a networked *LiveText™* workstation, or Apple AirPlay® stream.

Figure 35

Just as Audio tab layouts for different TriCaster™ models vary, so too do the monitoring tab layouts. For example, for TriCaster™ 850 the *All Monitors* tab shows eight camera monitors, while TriCaster™ 450 naturally has half that number. Otherwise, though, the various aspects of the interface are quite similar.

The header of the monitor for the video layer source currently selected on the *Program* row is highlighted in red.

Figure 36

The monitor titlebar for the *Preview* row selection has a green tint, while the titlebar for the *FX* source monitor is blue. Note that many of these onscreen monitors are *interactive*:

1. Click a (source) monitor once to select that source on the Switcher's *Preview* row.

2. Click the monitor with the green highlight again to perform a simple *Take,* swapping the *Program* and *Preview* row selections. Looked at another way, what you have done is swap the *BKGD* (Background) video layer sources – *without* changing the display status of any other video layers.

3. Double-click any source monitor to send it immediately to *Program* output.

And, as discussed back in Section 3.13, these monitors display a *Configuration button* allowing input type selection and more, including *Proc Amp* (see Section 7.2.3) and *LiveMatte* controls (see Section 4.9), and indicators depicting the on/off status of these features.

Further, some onscreen monitors provide other contextual controls and displays including things like *Play* or *Stop* (*Freeze*), current position (timecode) in a clip, and *Network* source selection (see Section 9.3.1).

4.3.3 EXTERNAL AND INTERNAL MONITORS

These two tabs offer other monitor layouts that you may find useful, especially when used in concert with complementary *Multiview* monitor layouts.

4.3.4 SCOPES

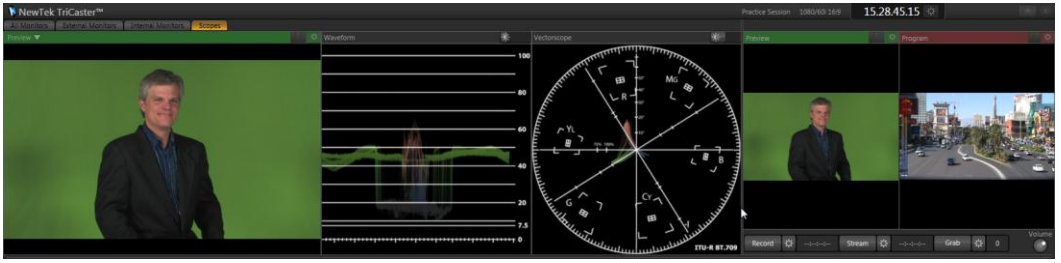


Figure 37

In this configuration, the tabbed monitoring area in the *Live Desktop* displays *Waveform* and *Vectorscope* displays (along with a full color source video pane), invaluable for calibrating your video sources.

1. Click the *Scopes* monitor tab.

2. Move your mouse pointer over the *vertical* divider separating the *Scopes* pane from the main *Preview* monitor at right – click and drag the divider as far as it will go to the right.

3. Drag the *horizontal* divider separating the monitoring section from the *Switcher* area below downward until you've got nice big scopes to work with (Figure 37).

4. Move the mouse onto the video monitor at left, and click the *Configure button* (gear) at right in its titlebar to display the *Configuration* panel for the video source.

A drop-down menu at upper-left lets you choose whether the current source for the scopes (and full-color monitor) is drawn from the *Preview* row selection, *Program* row, or the *FX* row.

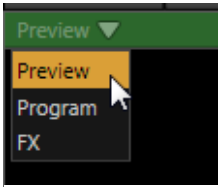


Figure 38

Feel free to experiment with the controls, but before leaving, restore the monitoring panes to their default size as follows:

5. Move the mouse above one of the *Desktop* dividers you previously dragged, and double-click it. Then repeat this process for the other divider, too.

4.4 AUDIO MIXER

Having previously connected and configured your audio inputs, let's explore a few of the standard features in TriCaster's two *Audio Mixer* tabs.

Hint: You will need to have speakers connected to (at least) the first two connectors (channel 1 and 2) in the PGM row of TriCaster's Audio Out section (even better, if you have them handy, connect a pair of stereo headphones and put them on).

4.4.1 MUTE, MONO AND BALANCE

1. Click the *Sound* tab (at right below the *Switcher* area of the *Live Desktop*).

2. Click the *Add* button in the *Sound* pane.

3. Click the *Practice Session* entry under the heading *Audio* in the *Location* list at left (this *Location* entry was created automatically when we imported files back in Section 4.2, Importing Content).

Figure 39

4. Find the icon named "3tone_quad.WAV" in the file pane. This is a four channel audio file, with a mid-range tone on channel 1, a higher tone on channel 2, while both channels 3 and 4 both carry a lower tone.

5. Select the icon for this file, and click *OK* to add this sound file to the *DDR 1* playlist.

6. Turn on both *Single* and *Loop* for the *DDR*, then turn *Follow off* for *DDR 1.*

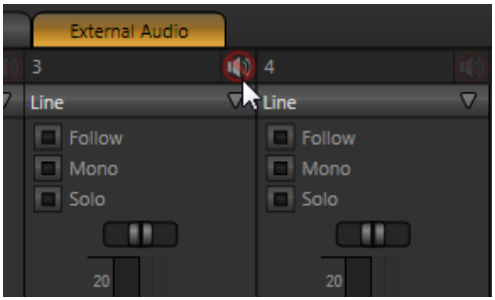


Figure 40

7. To avoid confusion later, click the *External Audio* tab and *Mute* any inputs that currently show live audio on their respective *VU meters* (by clicking the *speaker icons* in the titlebar of each control group so they show a red stroke through them) – see Figure 40.

8. Click the *Internal Audio* tab, and make sure audio for the *Sound* player is *not* muted.

9. Set the *Sound* player *Gain* slider to *0dB* (you can do this quickly by holding down the keyboard *Shift* key while *double-clicking* the *Gain* knob).

10. Click the *Sound* tab, and then click the sound player's *Play* button.

If you have stereo speakers or headphones connected, you should now hear two distinct tones – a mid-range tone from the left speaker (connected to Output *CH1*) and a higher pitched tone from the right speaker (connected to Output *CH2*).

Hint: If you happen to have a 'surround sound' speaker setup with front and rear speakers, you will also hear another even lower tone coming from the rear speakers.

11. The *VU meter* for *Sound* in the *Internal Audio* tab will show matching levels for all four input channels.

12. Next, drag the *Balance* slider all the way to the left. As you do so, observe that the level shown for *channel 2* and *channel 4* are gradually reduced. At the extreme left position, these two channels are completely silent. Only the mid-range tone (on channel 1) is heard (in a stereo environment), and only from the left speaker at that.

    Moving the slider to the right (of center) has the opposite effect, reducing channels 1 and 3 – doing so without any effect on the other 2 channels. At the extreme right position, only the mid-range tone from the DDR file is audible (and only from the right speaker).

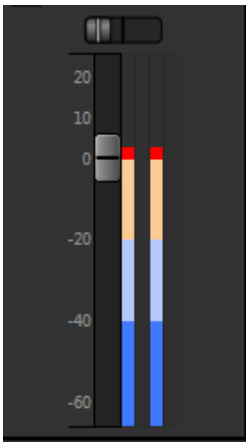


Figure 41

The lesson here is that (unlike either *Mono* or *Pan*, considered shortly) *Balance* does not 'move' audio from one channel to another. You *cannot* use *Balance* to 'blend' channel 1 with channel 2, for example. Rather, *Balance* regulates the levels for one pair of channels (1 and 3, or 2 and 4) at a time, and does not affect the other pair in doing so.

Let's consider the effect of the *Mono* switch next:

13. Center the *Balance* control once again, so that you hear the mid-tone exclusively from the left speaker, and higher tone from the right only.

14. Click the *Mono* switch. Notice that now *a blend of* the (channel 1) mid-range tone and (channel 2) higher tone issue from *both* speakers.

15. To confirm that for yourself, slide the *Balance* knob to the extreme left. Although sound is now issuing only from the left speaker, you can hear both tones.

16. Click *Stop* in the *Sound* player.

Note: the Mono switch has no effect on channels 3 and 4. These two channels are never blended with channels 1 and 2 on output.

4.4.2 PAN

The *Pan* control looks much like the *Balance* slider, but has special abilities. Like *Talk*, Pan is only available when the one of the two *Mic* input *Types* is chosen.

Figure 42

A *Pan* slider is provided for *both* channels of *External Audio* sources (when *Mic* is selected). Sliding the Pan knob left or right actually moves (or 'pans') the audio from its original channel onto its neighbor.

For example, when the Pan knob for *Mic 2* is at the extreme right, all of the sound from that source is sent to output channel 2. Moving the slider leftward places an increasing amount of the sound from Mic 2 on output channel 1.

When the slider reaches the extreme left position, the sound from Mic 2 is now entirely sent to output channel 1.

Hint: In their default center position, the two Pan controls have exactly the same effect as clicking Mono. Actually, this is why a Mono is not needed in this case.

Pan thus provides precise control over where the audio from either Mic input is heard – whether exclusively on output channel 1, 2, or whether differing levels from either source is sent to both outputs.

4.4.3 TALK

Talk is an abbreviation of "Talk Over". The *Talk* feature is only shown for inputs when they are set to Mic.

17. Start the *Sound* player playing the audio tone file again.

18. With *Input 1* set to *Mic 1, 2*, enable its *Talk* switch, watching the *Sound* player's *VU meter* as you do so.

Enabling it causes the level for all *other* audio sources to drop off by 20dB, allowing Mic 1 and 2 to dominate output. This is very useful for public address announcements, which is its principal purpose.

4.4.4 FOLLOW

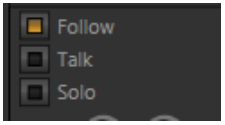


Figure 43

19. Connect cameras to both *Video In* rows 1 and 2.

20. Connect two (audibly different) active audio sources to *Audio In* rows 1 and 2.

21. Enable the *Follow* switch in the *Audio Mixer* for both *Input 1* and *Input 2*.

22. Select the button for video *Input 1* on the Switcher's *Program* row.

23. Select the button for video *Input 2* on the Switcher's *Preview* row.

24. Click the *Audio Mixer* tab.

25. Click the Switcher's *Take* button

Notice that when the video source assigned to *Input 1* is on output, you hear its associated audio input. When you perform a *Take* placing *Input 2* on output, the audio source connected to row 2 in the *Audio In* section is heard.

When *Follow* is enabled for an audio source, its sound is automatically sent to output whenever the associated video source is displayed on output. In this case, the levels shown in the *VU meter* for that audio source are drawn in color. When you switch away from that video source, the *VU meter* still shows its audio level, but the graph is drawn in grayscale (providing confirmation that audio is present, but indicating that it is not going live to *Program* out).

Hint: Follow even works when the associated video source is displayed on Output as an Overlay or Virtual Input source.

FOLLOW AND AUDIO GROUPING

TriCaster EXTREME™ Each audio control group for TriCaster EXTREME™ have an additional drop-down located just below the *Connection Type* menu. This is the *Group* control.

Grouping allows you to gang multiple audio sources together. When *Follow* is enabled for a group member, the sound from the entire audio group is heard whenever the corresponding video source is displayed.

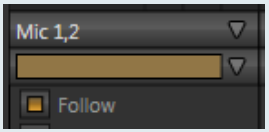


Figure 44

Let's test this:

1. Supply live sound to audio input 1 and 2, and set both inputs to a single group (color) using the drop-down *Group* menu.

2. Enable *Follow* for *Camera 1* and *Camera 3* (but not *Camera 2*).

3. Select *Camera 1* on the Switcher's *Program* row. The audio from *both* input 1 and 2 should be audible.

4. Switch to *Camera 3*. The audio from inputs 1 and 2 is muted on output. (If audio input 3 has sound, you will hear it instead.)

5. Switch to *Camera 2*. Even though *Follow* is not turned on for input 2, you will nevertheless hear sound from *both* input 1 and input 2 again. (This is because another input in the same group does have *Follow* enabled.)

4.5 NETWORK SOURCES

Perhaps you'd like to be able to add Microsoft *PowerPoint*® output, web pages, *Skype*™ video calls, application displays, titles and graphics from NewTek's *LiveText*™ or other exotic content to your productions. TriCaster™ supports all such displays from computers on the same network as *Network* (1 and 2) sources on the *Switcher*, via the supplied *iVGA™* client application (not required for *LiveText*).

4.5.1 IVGA CLIENTS

1. For a Microsoft Windows® client, copy the iVGA program from the *TriCaster iVGA* folder (inside C:\TriCaster) to the sending computer.

   For OS X client systems, copy the file *iVGA.dmg.zip* from the same folder to the Mac. Unzip it by double-clicking it; mount the disk image (.dmg file) in the same manner, then drag the iVGA program icon into Applications. (See Section 14.1 for more detail).

2. Connect TriCaster™ to the client computer via the local network.

3. Double-click the iVGA icon on the second computer.

After agreeing to the NewTek license (and a moment or two for the network connection to be established) the name of the remote computer is added (along with "Black" and any other networked systems with iVGA running on them) to the iVGA client list.

Note: Gigabit networking is highly recommended, and should be considered mandatory for HD sessions in particular.

Figure 45

When TriCaster™ recognizes qualified network sources, it adds them to a drop-down menu for quick selection (Figure 45).

4. Move your mouse pointer over a *Network* monitor in the *All Monitors* tabbed view.
5. Click the triangular menu button above the monitor to select a networked source (or change the current selection) from the menu that appears.

Hint: iVGA places a red-green-blue status icon on the client system. For a Windows-based system, the icon is in the task tray; on Macintosh systems, it is shown in the dock. This indicates this computer's display is ready to send to TriCaster™. The icon is animated when the iVGA source is selected as the active Network source in TriCaster™.

4.5.2 APPLE AIRPLAY

See Section 14.2 for details on using devices and applications supporting Apple AirPlay® as network sources for TriCaster™.

4.5.3 LIVETEXT™

NewTek's (optional) standalone LiveText™ application offers features that are very similar to TriCaster's integrated *LiveText* (see Chapter 17), but installs separately on a compatible Microsoft Windows® computer.

A (networked) *LiveText* workstation effectively constitutes a dedicated CG and title solution for TriCaster™ presentations. (This is a wonderful addition for those times when you could really use another pair of hands.) When running on the network connected computer, *LiveText* is listed in the *Network* selection drop-down menus (just as an *iVGA* source would be).

When you select *LiveText* (and click the *Live* button in LiveText), the current title page is available via the *Network* buttons on TriCaster's *Switcher* or in its *DSK* channels. For more information on installing and using this great tool, please refer to the Chapter 17.

4.6 LIVE SWITCHING

Back in Section 3.4, you connected cameras to inputs on TriCaster's backplate and configured them. If you haven't already done so, let's explore basic *Switcher* operations.

4.6.1 SWITCHER ROWS

The *Switcher* features 3 rows of labeled buttons. From top to bottom, the three rows are labeled *Utility*, *Program* and *Preview*. Each button on a *Switcher* row represents one of the many and varied video sources available. The first button group at left on any row represents *Cameras*, while others represent other special sources (discussed soon).

Figure 46 – TriCaster 450 & 450 EXTREME

Figure 47 – TriCaster 850 & 850 EXTREME

Clicking a button in any row selects the active source for that row. *Utility* row selections serve various special purposes that we'll come to a bit later. Your *Program* and *Preview* row selections determine the content of the *BKGD* (Background) video layer.

VIDEO LAYERS

TriCaster™ video output often consists of multiple sources of imagery, added together layer on layer to form a composite. The *Switcher* and *Transition* controls allow you to manage these video layers to show the viewer just what you want him to see.

Three of the four primary video layers – BKGD, DSK 1, and DSK 2.

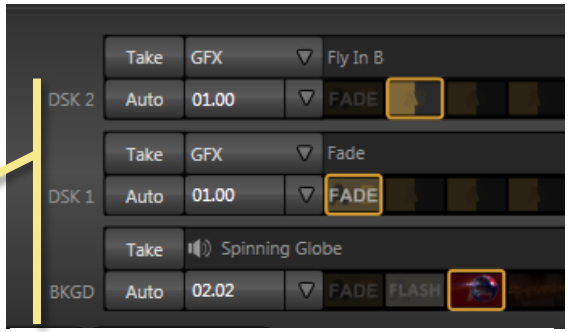


Figure 48

The *BKGD* (Background) *video layer* constitutes the base of the video composition ultimately sent to *Program Output*. Based on your *Switcher* operations, as many as three other primary *video layers* may be superimposed above the *BKGD* layer on output:

- The *DSK 1* and *DSK 2* video layers are most commonly used to apply graphics or titles to the *BKGD* layer (*DSK* stands for 'Down Stream Keyer').

- *FTB* (Fade to Black) constitutes a final video layer prior to output – one that can obscure all others when called upon to do so. (*FTB* is less commonly used, and unlike the other primary video layers, has no *local* transition controls - Figure 48).

As stated in the previous section, the *Program* and *Preview* row selections determine the content of the *BKGD* (Background) video layer. The *Preview* row selection is normally cued up for the next *Take* (cut) or *Transition* operation. Either operation, once completed, results in the original *Program* and *Preview* row selections exchanging places. (Of course during a transition, portions of both the *Program* and *Preview* row selections can be seen in varying amounts.)

The *BKGD* layer composition can include other content as well, as we'll see later in Sections 4.9 (LiveMatte) and 4.10 (Virtual Inputs).

Hint: By default, selecting a tabbed module (DDR1, Still, etc.) on the Preview row automatically shows the corresponding control panel in the tabbed panes below. Click the Desktop Options button (gear), at extreme right just above the tabbed panes, to enable or disable this behavior.

CONFIGURING CAMERAS

Let's try out some of these concepts, shall we? (If you previously configured some cameras, feel free to skip ahead to the next sub-heading – The Utility Row).

1. First, confirm that the *Connection Type* selected for your video sources is correct.
    a. Move your mouse over an *Input* monitor (*All Monitors* view).
    b. Open the *Configuration* panel for that video source by clicking the *Configure button* (gear) that appears in the monitor's titlebar.
    c. Choose a *Connection Type* setting that is appropriate for the camera.
    d. Close the *Configuration* panel.

2. Repeat the steps above for all connected cameras.

3. Click the *Switcher* button labeled '1' on the *Program* row to send *Camera 1* to TriCaster's *BKGD* layer (the button turns red, denoting its selected state).

   (For experimental purposes, feel free to use internal sources such as *Media Players* rather than live cameras if you like – see Section 4.8).

4. Click to select *Camera 2* on the *Preview* row (the button will light up in green).

5. Note that the titlebars of the corresponding source monitors (*All Monitor* view) are now also tinted red and green, respectively.

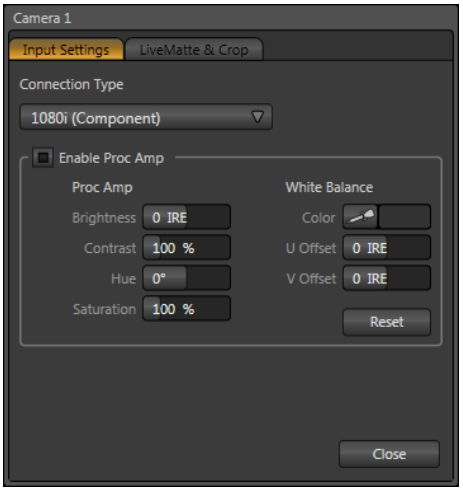


Figure 49

THE UTILITY ROW

Let's take a moment to discuss the *Utility* row now. The steps we take here will come into play a bit further on in our exploration.

Figure 50

Notice that a group of controls labeled *Utility Delegate* is provided to the right of the *Utility* row, as shown in Figure 50). The group contains buttons labeled *FX*, *AUX OUT*, *DSK 1* and *DSK 2*. The selection you make here govern the *Utility row* buttons.

1. Click the tab for the *Graphics* tab (TriCaster™ 850 models have a dedicated *Title* module you can use instead), and *Add* a title to the playlist; choose one that does not cover the entire screen.

2. Add a different title to the playlist for *DDR 2* (or *Still*, for a TriCaster™ 850).

3. Click the button labeled *DSK 1* in the *Utility Delegate* group; this delegates the *Utility* row to control the *DSK 1* source.

4. Click the *Graphics* (or *Title*) button in the *Utility* row – note that the label above the *DSK 1* delegate button updates when you do so.

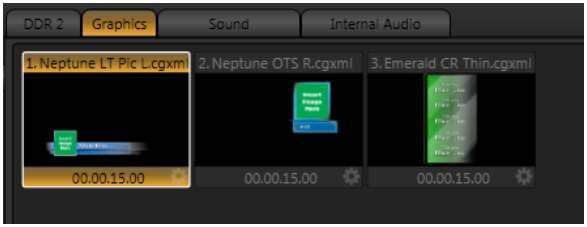


Figure 51

5. Click the *DSK 2* button in the *Utility Delegate* group, and use the *Utility* row to assign *DDR 2* as the current source for *DSK 2*.

4.6.2 TRANSITIONS

Now we're ready now to try out the features in the *Transition* section, to the right of the *Switcher* rows.

Main Layer Controls	Local Layer Controls

Figure 52

As shown in Figure 52, the *Transition* section is organized into two groups – the *main* layer controls at left, with *local* layer controls at right. The latter group is divided vertically into individual sections for the *BKGD*, *DSK 1* and *DSK 2* video layers.

Controls for each layer are stacked in order of their appearance from 'bottom to top' on *Program* output – first *BKGD*, then the other two layers in order. (*FTB*, the final video layer, has no optional settings; thus it does not appear in this area.)

LOCAL CONTROLS

Let's begin our exploration of switching with local controls and the *BKGD* (Background) layer.

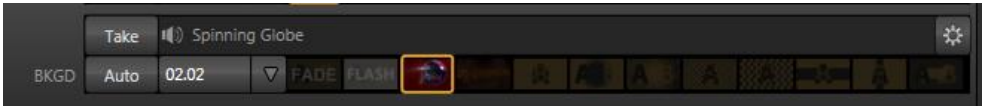


Figure 53

1. Select *Camera 1* on the Switcher's *Program* row.

2. Select *Camera 2* on the *Preview* row.

3. Click the *All Monitors* tab, and notice that the red and green highlighted titlebars conform to the selections you just made.

4. Click the local *Take* button for the *BKGD* layer (Figure 53).
    a. *Camera 1* is removed from *Program Out*.
    b. *Camera 2* (previously the *Preview* row selection) moves to *Program* output.
    c. The *Camera 2* button is now lit up on the *Program* row.
    d. The *Camera 1* button is lit up on the *Preview* row.
    e. The red and green monitor titlebars have been swapped.

5. Now click the local *Auto* button for the *BKGD* layer. The *Program* and *Preview* row selections swap again, but this time, rather than a simple (and instant) *Cut*, the change employs the currently selected transition – by default, a *Fade*.

6. The icon for the current *Transition* for the *BKGD* layer has a gold border in the *Transition Bin* at right. Click a different icon to select a different transition, and click *Auto* again.

7. To replace the current transition in the *Transition Bin* with a different one, follow these steps:
    a. Click a transition 'slot' other than Fade (the left-mot icon), and then click the configuration (gear) button at extreme right.
    b. Click the drop-down menu in the configuration panel, select *Browse*, and choose a new transition from the many supplied with TriCaster™ (Figure 54).

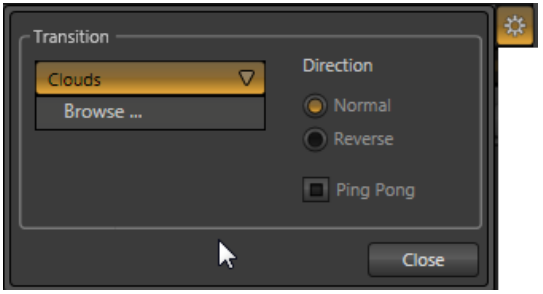


Figure 54

8. To change the duration of the transition, click the drop-down menu next to the local *Auto* button. (The time for the transition is shown as seconds and frames.)

9. Now click the local *Auto* button for the *DSK 1* layer. Since *Graphics* is assigned to *DSK 1*, the currently selected item in that *Media Player* transitions in to appear *above* the *BKGD* layer.

MAIN CONTROLS

Having seen how *local Transition* controls work, let's move on to their main counterparts.

Figure 55

10. In the *main Transition* control group (Figure 55), click the *BKGD* button above the *T-Bar*. This delegates the controls below to affect the *Background* video layer – only.

11. Click the button labeled *Auto* below the *T-Bar* (again, the *main* Auto button, not to be confused with the *local* Auto buttons at right).

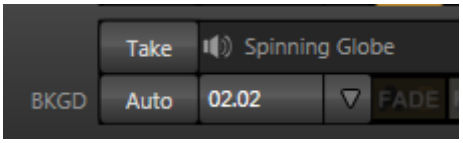


Figure 56

12. Click a *different* transition icon in the *BKGD Transition Bin*, and click the *Auto* button again. (TriCaster™ supplies a wealth of transitions to suit every need).

13. Select a slower transition speed for the *BKGD* layer using the drop-down as before, and click *Auto* again to test the new transition rate.

Note that *local* configuration settings for the *BKGD* layer do affect transitions performed using the *main* controls:

Hint: Manually control the progress of a transition by grabbing the T-bar with the left mouse button and dragging it downward.

14. Earlier, we displayed *DSK 1*, using its local *Take* button. The *BKGD* transitions we've made did not affect it, so it should still be displayed (if you removed it from view while experimenting, please restore it before continuing).

Figure 57

15. With the *BKGD* delegate button lit up, press *Ctrl* on your keyboard, and keep it pressed while you click the buttons for both *DSK* 1 *and DSK 2* – then release it.

Your *Transition Delegate* buttons should resemble Figure 57, with three delegates multi-selected. Note also that the *Take* button for *DSK 1* is illuminated in Figure 57, and the progress gauge beneath the *Delegate* button likewise shows that DSK 1 is fully displayed.

LOOK AHEAD PREVIEW

Back in Section 4.3.4 we promised to spend some time on the *Look Ahead Preview* monitor, and the time has finally arrived for us to do so together.

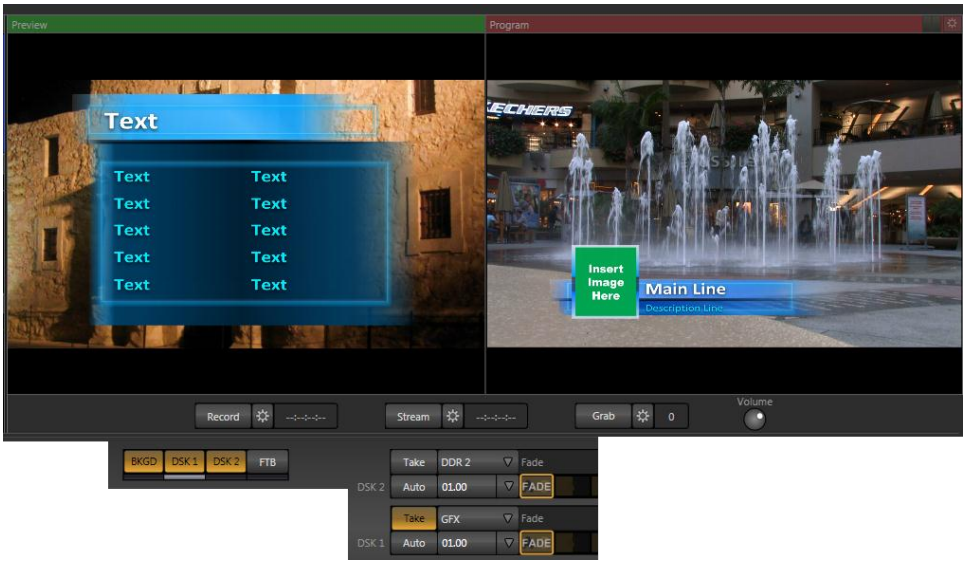


Figure 58

1. Cast your eyes over the *Preview* and *Program* monitors; consider what you see there, and how it relates to the *Transition Delegate* controls:

    a. The *Program monitor* shows *DSK 1,* currently assigned to *Graphics (or Title),* over the current *BKGD* layer. The latter, at the moment, is the *Program row* selection.

b. The *Preview monitor* shows *DSK 2,* assigned to *Still* (or *DDR 2*) overlaid on the current *Preview row* selection.

The *Look Ahead Preview* monitor (or simply, *Preview*) is showing us the composition that will result if a *Take* or *Transition* operation is performed – a look into the future, if you will.

2. Hold down *Ctrl* on the keyboard again, and click the *BKGD Delegate* button (de-selecting it).

Note that, after de-selecting the *BKGD* delegate button, the *Preview monitor* no longer shows the Switcher's *Preview row* selection. Why is that? At this moment, only the *DSK 1* and *DSK 2* buttons remain lit – thus only those two video layers will be affected by a main *Take* or *Auto* operation. The result will be as follows:

- *DSK 1*, currently seen on *Program* out, will be removed from view
- *DSK 2* will be overlaid above *Program* instead.
- The *BKGD* layer will not change in this case. Hence *Preview* correctly *depicts* the outcome of a Take or Auto, just as we've mentioned.

The *Look Ahead Preview* allows you to switch with real confidence; the *Transition Delegate* features provide flexible and convenient video layer management, and thus enhanced control over your ultimate *Program* output composition.

4.7 RECORD AND GRAB

Figure 59

Located immediately beneath the *Program* monitor are *Record*, *Stream* and *Grab* buttons (along with their respective *Configure* buttons). We'll discuss streaming further on, but let's consider *Record* and *Grab* here.

4.7.1 RECORD

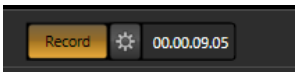


Figure 60

1. Click the *Configuration button* (gear) next to *Record* (Figure 60).

2. The *Record Configuration* panel opens (Figure 61).

3. Click in the *Base Name* field, and enter a unique name for the captured file(s).

Hint: TriCaster™ stores recordings at (drivename):\Media\Clips\sessionname\Capture (where "drivename" and "sessionname" are appropriate entries for your system and session).

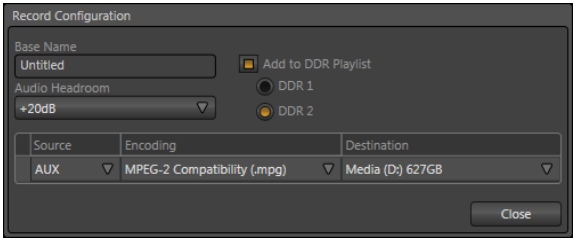


Figure 61

The default *Encoding* options and *Destination* will work just fine for our current purposes, so let's continue:

4. If necessary, select PGM as the Source to be recorded.

5. You could optionally enable the *Add to DDR Playlist* switch to automatically add newly recorded clips to the (currently designated DDR) playlist – but let's not do that yet.

TRICASTER EXTREME™ With IsoCorder™ technology, TriCaster EXTREME™ models can capture multiple a/v sources simultaneously. The first of these sources is the *Primary* source, and defaults to *PGM* (Program output). Additional sources in many combinations can be added in a *Secondary* recording group shown below. The options are discussed in more depth in Chapter 16, entitled Record and Grab.

6. Click *Close*.

7. Make sure you have an active source playing on *Program* output.

8. Press the *Record* button (Figure 60) – it will illuminate, and the neighboring timecode field will begin keeping track of the duration of your recording.

9. After a little while, press *Record* again to stop recording.

This configuration will record everything that is displayed on *Program Output* in this manner, letting you capture your entire live production for posterity if you like; it also provides a way for you to capture clips for playback (from TriCaster's DDRs) *during* your live events.

4.7.2 GRAB

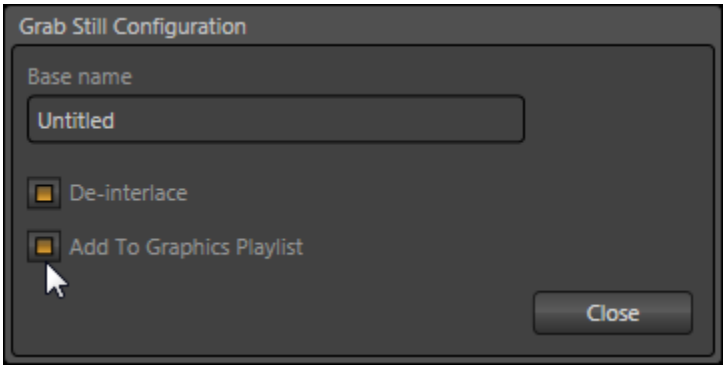


Figure 62

The *Grab* feature is similar to *Record*, just described - except of course that it grabs a fresh still image from *Program Output* each time you click the Grab button.

Also, in place of an option to add the captured file(s) to a *DDR*, you may enable an *Add to Still Playlist* switch, with the result that every time you click *Grab* a new image is added to the *Still* Media Player.

4.8 MEDIA PLAYERS

4.8.1 DDR 1 AND 2

TriCaster's two *DDRs* (Digital Disk Recorders) are powerful media players, and can greatly enhance your live productions. DDRs have three siblings that we'll discuss later – the *Still* and *Title* players, and the *Sound* player.)

1. Show *DDR 1* by clicking its tab beneath the *Switcher*.

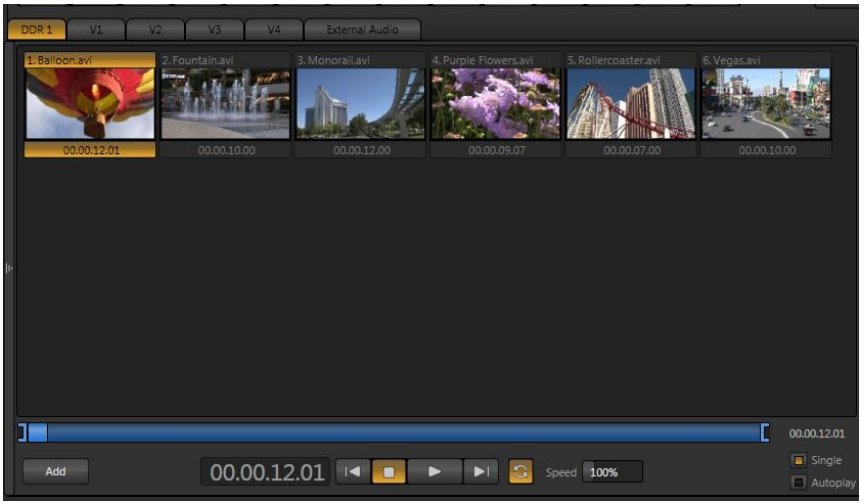


Figure 63

ADDING FILES

Figure 64

2. Click the *Add* button in the *DDR 1* pane (Figure 64) to open a *Media Browser*.

3. Click the name for your current TriCaster™ session (*Practice Session*, if you've been following along) beneath the *Clips* header in the left-hand column of the *Media Browser*.

4. The file pane at right displays icons for recordings made in the session. It should list the file you recorded earlier (in Section 4.7.1) under a group header labeled *Capture* – click the icon to select it, and then click *OK*.

5. You may wish to add several more files to experiment with (*DDR 1* and *2* also support most popular audio file formats).

Hint: See also the sub-heading entitled Section 10.2.1 regarding per clip audio levels.

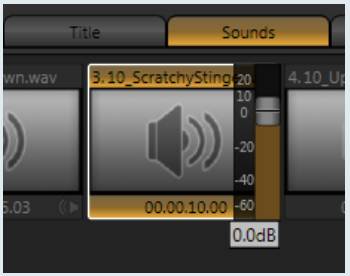


Figure 171

TRICASTER EXTREME™ In TriCaster EXTREME™ (only), the playlist of the two *DDRs* as well as *Sounds* have an additional audio feature. The icons of files with audio will display a small configure (gear) icon at lower right. Click this icon to pop up a small level slider (Figure 172).

Note: When playing files located in TriCaster's 'capture folders', DDRs automatically adjust the audio level according to the current Audio Headroom setting in the Record Configuration panel. This results in an improved match between the default playback level for captured audio and imported sounds or music (for which nominal levels are unknown).

TRANSPORT CONTROLS

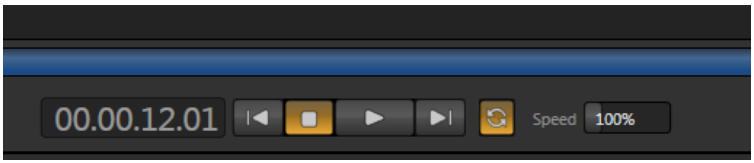


Figure 65

6. Click the newly added icon in the *playlist*, and press the *Play* button in the player's footer (Figure 65).

    a. The video clip you recorded should play on the DDR onscreen monitor (*All Monitors* view).
    b. Click *DDR 1* on the Switcher's *Program* row, it will appear on *Program Output*.

7. Click the *Stop* button.

Notice that if you move the mouse pointer over the *Speed* slider, it changes to a double-headed arrow, indicating you can *drag* the slider to a new value if you wish.

8. Instead, try this: simply *click* inside the *Speed* slider (engaging direct edit mode), type "50" and press Enter to change the Speed to *50%*.

9. Click *Play* again, and observe that playback is now in slow motion.

10. Adjust *Speed* again – notice that you can even modify Speed *during* playback.

11. Click *Stop*.

TRIMMING AND SCRUBBING

Let's spend a moment learning how to trim a clip in the *DDR*. To do this you will use tools in the *Scrub Bar* immediately beneath the playlist pane (Figure 66).

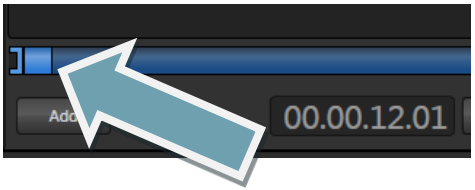


Figure 66

Drag the *Scrub Bar's* square blue knob left or right to change the current play position. Trimming is accomplished by dragging the *start* and *end* points for the clip using the blue] and [bracket controls at either end. (The mouse pointer changes to a double-headed arrow when you move it over a trim control.)

12. Click the first (top-left) clip in the *playlist*, highlighting it.

13. Drag the trim controls to shorten the clip's runtime to 10 seconds (watching the *Duration* display to the right of the *Scrub Bar* helps when trimming).

14. *Record* a few more clips, if you haven't already done so, and add several to the playlist (either automatically or by using the *Add* button).

SINGLE AND AUTOPLAY

15. Click the *Single* switch (Figure 67).

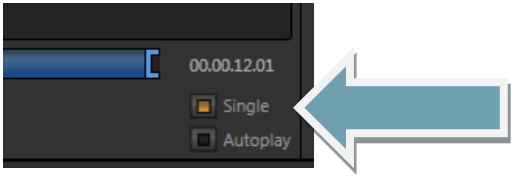


Figure 67

16. Double-click the first clip in the *DDR* playlist to play it (double-clicking is another way to engage *Play*). With *Single* mode engaged, playback automatically stops at the end of the current clip.

17. Select *Camera 1* on the Switcher's *Preview* row *(DDR 1* is already selected on the *Program* row).

18. Enable the *Autoplay* switch for *DDR 1*.

19. Play the first clip in the playlist again. This time, just as the clip approaches its end, the *Switcher automatically* performs a transition (the sources on *Program* and *Preview* are automatically swapped), leaving *Camera 1* on *Program* output.

20. After a few moments, click either *Take* or *Transition* in the Switcher's *Transition* section.

Notice that a transition is performed (returning *DDR 1* from *Preview* to *Program*) and, more importantly, the next item in the playlist begins to play automatically -- right on time. When it ends, another automatic transition occurs, restoring *Camera 1* to *Program* output.

Let's try *Autoplay* without *Single* mode:

21. Click *Stop* (if necessary).

22. *Uncheck Single*, leaving *Autoplay* engaged.

23. With *DDR 1* on *Program,* and *Camera 1* on *Preview*, highlight a fairly long clip (say, a minute or more).

24. Click *Play.*

25. After a few seconds, perform a *Take* and watch what happens:
    a. Naturally, *DDR 1* and *Camera 1* are swapped on the *Switcher*.
    b. *DDR* playback is stopped at the current frame of the current clip.

26. Perform another *Take*
    a. As expected, *DDR 1* is restored to *Program* output.
    b. Playback re-commences at the next frame of the *current* clip; The DDR did not automatically jump ahead to the next clip this time.

You may find *Single* mode your usual choice, but it can be useful to turn it off (as just described) at other times. Perhaps a live speaker is presenting a long clip, but wants to be free to interrupt

it with live commentary at any time. Turning *Single* off (with *Autoplay* on) works perfectly in this scenario. The TriCaster™ operator can click *Take* or *Transition* freely, confident that DDR playback will resume at precisely the right frame when he does so again.

PRESETS

Figure 68

Let's consider one more powerful feature common to TriCaster's media players – the *Presets Bin*. These bins run vertically down the outer edges of all *Media Player* (and *Audio Mixer*) modules, providing instant access to custom playlists and configurations.

Normally hidden, the preset bins fly out when you move the mouse pointer to the edge of the screen.

Presets store other information about the current state of the module, too, including playback position, selection status, and so on. In many ways, presets act like tabs that reveal even more media players.

27. Click a different preset icon, and use the *Add* button to populate it.

28. Switch back and forth between presets, noting as you do how various attributes are retained.

29. Try copying and pasting playlist icons between two presets (right-click on an icon to access the context menu containing *Cut*, *Copy* and *Paste*).

30. Notice that if a clip is playing, a *Stop* action occurs when you change presets.

4.8.2 GRAPHICS, STILL & TITLE

TriCaster™ 850 and 850 EXTREME™ provide dedicated players for *Still* and *Title*, while TriCaster™ 450 models offer a combined *Graphics* player. In either case, all of these are actually essentially the same, identified by name mostly for convenience in use. All are similar to *DDR*s, just discussed, but for the fact that they do not offer clip playback.

Whether your TriCaster™ has a combined *Graphics* player, or individual *Still* and *Title* players, the type of media files they support remains largely the same. Each of these players, regardless of title, can display TriCaster™ *title pages and* popular still image file formats.

Hint: The DDRs can play all of the above media types as well as video clips and sound files.

EXPLORING AUTOPLAY AND SINGLE

The controls of the graphics players are identical to those of the *DDR* apart from the omission of a playback *Speed* control (which would be superfluous and possibly confusing). Rather than cover these again, let's have a little fun:

1. Click both *DDR 1* and the *Graphics* (or *Still*) tabs, so you can see both players. (TriCaster™ 850 owners can use *Still* and *Title* instead).

2. Click any icon in the *DDR 1* playlist, and press *CTRL + a* on the keyboard, to select all of the playlist entries.

3. Press *Delete* on your keyboard, clearing out the entire playlist (this is a non-destructive deletion, never fear).

4. Repeat the two steps above for *Graphics* (*Still*).

5. *Add* some image files (a dozen or more) to *DDR 1* (you can use some of the images from the *NewTek Content* group under the *Still* location heading for this example).

6. Click on one the icons about *halfway* through the playlist, highlighting it.

7. Hold down the *Shift* key, and click the last icon in the playlist. This will *multi-select* all of the files from the first one you clicked to the last one (the icons are given a lighter outline to show their selection status).

8. Right-click anywhere in the *playlist*, and select *Cut* from the *context menu*.

9. Right-click in the playlist area of the second *Media Player*, and select *Paste*.

Let's pause to review. To this point, we've prepared two *Media Players* with similar *playlists* consisting of a series of still images.

Hint: Still image files default to a fifteen second duration when added to a playlist.

Fine, but 'what about the aforementioned fun', you ask? Indeed, let us press on:

10. Turn *Single* and *Autoplay* on, and make sure *Loop* is off for both *Media Players*.

11. Select *DDR 1* on the Switcher's *Program* row.

12. Select *Graphics* (*Still*) on the Switcher's *Preview* row.

13. Click the first entry in both playlists (to set the current position).

14. Press *DDR 1*'s *Play* button, and watch the 'hands-free' slideshow.

Let's consider what is happening:

- When playback of the first *DDR* playlist entry reaches its end:
    - The DDR's *Autoplay* setting invokes an automatic *BKGD* layer transition to *Still*
    - And stops *DDR 1* playback
    - Then, unseen on *Program* output, cues up its next playlist item.

- Simultaneously, the *Graphics* (*Still*) player's *Autoplay* setting initiates playback of *its* first playlist entry.

- When playback of *that* item is reached:
    - The *Graphics* (*Still*) player's *Autoplay* function performs another transition, returning *DDR 1* to the *Program* row
    - And stops *Graphics* (*Still*) playback
    - Then, unseen on *Program* output, the *Graphics* (*Still*) player cues up its next playlist entry.

- Next, *DDR 1*'s *Autoplay* setting automatically starts playing *its* next playlist item. The cycle repeats until all items play through or is interrupted by user actions.

TITLE

TriCaster™ *title pages* can actually be added to any of the *Media Players* (apart from the *Sounds* player). The *Media Players* can also display bitmap files exported from third-party graphics applications (or overlay them using the DSKs when the files are either keyed or have an embedded alpha channel) – all of which is quite handy. However, TriCaster's native title pages have some distinct advantages over a common still image. Let's try them out:

1. Click *Add*, and use the *Media Browser* to select a few of the prepared title pages from the *NewTek* location listed under *Titles* in the *Location* List at left.

2. Click an icon to highlight it in the *Media Player* playlist.

3. Display the title page on *Program Output* by selecting *the correct Media Player* on the Switcher's *Program* row.

4. Move the mouse over a *different* title page icon, and click the *Configure* button (gear) that appears in its lower-right corner.

5. The *Title Page Editor* shown in Figure 69 will appear.

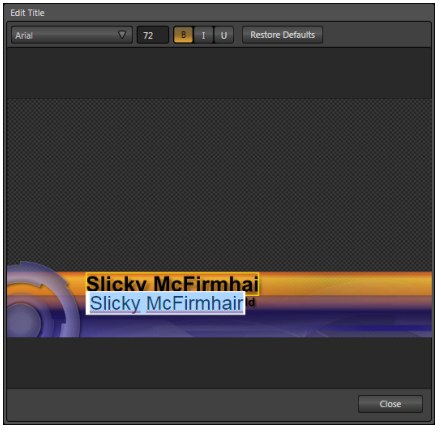


Figure 69

6. Move the mouse over the default text shown in the *Title Page Editor*'s preview pane, and notice that a white bounding-box appears as you locate editable items.

7. Double-click inside the bounding-box for a line of text to open a text entry field; type something different, then press *Enter* on the keyboard to accept the changes.

8. Notice that you were able to edit a page without disturbing the title already displayed on *Program Output* - Click the *Close* button.

9. Repeat your text edit operation, but this time modify the title that is displayed on *Program Output* – notice this time that the display updates immediately.

Figure 70

10. Try changing the *Font*, *Size* and other *attributes* for a line of text, using the tools in the Title Page Editor's titlebar (Figure 70).

11. Click the *Close* button.

4.9 LIVEMATTE

Let's try something different now – using *LiveMatte* to create a typical 'weather report' shot.

(We'll use a pre-recorded sample clip for this task, but of course if you happen to have a greenscreen studio ready to use, just skip the first three steps below, and select the appropriate *Input* button on the Switcher's *Program* row - instead of the *DDR*).

Figure 71

1. Change the Switcher's *Program* row selection to *V1*, and enable the *BKGD* delegate button in the *Transition* section of the *Switcher*.

2. Remove any extraneous *DSK*s left from earlier operations from view, using the local *Take* buttons in the *Transition* section of the *Switcher*.

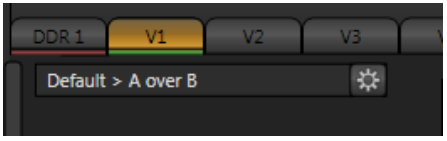


Figure 72

3. Click the tab labeled *V1* (Figure 72) below the *Switcher* to reveal the panel for *Virtual Input 1*.

4. Make sure the current *LiveSet* selection (shown at upper-left just below the tab, is *Default > A over B* (Figure 72).

Figure 73

5. Notice that the lower portion of the *Virtual Input* panel contains two source button rows labeled *Input A* and *Input B* (Figure 73).
    a. Select *DDR 1* in the button row labeled *Input A*.
    b. Select the *Graphics* (or *Still*) button in the *Input B* row.

6. Click the *DDR 1* tab, and *Add* the video clip named *Kiki 1 Center.mpg* from the *Green Screen* group inside the *Clips>NewTek* location.

7. Click the *Graphics* (or *Still*) tab, and add the image named *texas_weathermap.png (*from *Practice Session,* under *Still* in the *Location* list).

8. If you are not already viewing *All Monitors*, click that tab at the top of TriCaster's *Live Desktop*.

9. Move your mouse pointer over the *DDR 1 monitor*, and click the *Configure* button (gear) that pops up at right in the titlebar above the monitor.

10. Click the *LiveMatte* tab in the *Configuration* panel that opens.

Figure 74

11. Click on the *Color* button in the *Matte* section of the panel, and *keep the mouse button depressed*.

12. Drag the *eye-dropper* pointer over the green background in the DDR's monitor, and then release it (Figure 74). This establishes the primary key *Color*.

13. The default *LiveMatte* settings (*Tolerance* and *Smoothness)* are close enough for this little demonstration, so you can close the *Configuration* panel now.

We'll look at the details of *LiveMatte* in more depth in Part II (the Reference section), but already your result (as viewed on *Program* output) should look very similar to Figure 71. TriCaster™ doesn't stop here, though. Let's look a little more closely at TriCaster's powerful *Virtual Inputs*.

4.10 VIRTUAL INPUTS

Virtual Input buttons sit innocuously on TriCaster's *Switcher* rows just like other video inputs, but in fact they possess very powerful features. They can be likened to the M/E (Mix/Effect) rows of a traditional video switcher, in that they permit a composition to be prepared from multiple sources. In addition to the two sources just considered (*Inputs A* and *B*), *Virtual Inputs* provide an integrated *Overlay* channel, as well.

4.10.1 COMPOSING INPUTS A AND B

When we ended the previous section, the simple 'weather map' setup (Figure 71) we created was on *Program Out*. Again, remember that *LiveMatte* is *already enabled* for the greenscreen shot from our previous exercise.

We can use a few of the unique features of *Virtual Inputs* to dress up our production. For example, we might want to transpose the greenscreen talent shot to one side, placing it off-center in the result.

Figure 75

1. Click the *Position* button just to the right of the *Input A* row to open the *Position* panel (Figure 75) for Input A.

There are three sets of numeric sliders in the Position group in this panel: one with a four-pointed arrow button above, a *rotation* group, and another identified by a magnifying glass button. Experiment with these controls a bit to see how they work.

Hint: Shift + double-click a control to reset it to defaults.

You can drag the mouse over the top buttons in each group to freely adjust *Position, Rotation* or *Size* on multiple axes at once, or use the numeric sliders below to adjust just one property. As currently configured, *Program* output displays the result of changes you make; of course, during a live production you'd likely use *Preview* to set this up, instead.

Hint: When the Lock (padlock) button for the Size controls is lit, vertical and horizontal adjustments are locked together – adjusting one affects both. When unlocked, the vertical and horizontal scaling factors are independent.

Drag vertically over the 'magnifying glass' button to modify vertical scale, or drag laterally to adjust the horizontal scale. Another way to constrain the action to one axis is to hold down the Ctrl key before dragging.

2. Click *Reset Positioning* to restore default *Position*, *Rotation* and *Size*.

3. Drag the horizontal (upper) *Position* mini-slider to the right, locating the foreground (talent) shot as seen in Figure 76.

Figure 76

Without having moved the physical camera, we have changed the apparent position of our talent relative to the virtual backdrop.

4.10.2 ADDING AN UPSTREAM OVERLAY

Figure 77

Just above the *Input A* row, you'll see a control area labeled *Overlay*, with its own source row along with other controls.

The *Overlay* feature in *Virtual Input* works very much like the two downstream *DSK* video layers we used back in Sections 4.6.1 and 4.6.2, but is *upstream* of the *Switcher*. Thus content in this overlay channel thus appears beneath anything you display in those two video layers on *Program Output*.

4. Access the *Graphics* or *Title* player, and click the "*Breaking News.CGXML*" icon (imported back in Section 4.2) from the *Practice Sessions* folder.

5. Edit the top line in the title to say "5 Day Forecast", as shown in Figure 78.

6. Select *Graphics* (*Title*) in the *V1* tab's *Overlay* row, and display the *Virtual Input*'s overlay channel by clicking the *Auto* button in the *Overlay Transition* area of the VI tab).

Figure 78

As you can see, we have replicated on our earlier composition (which relied on the FX channel), with additional benefits:

- The *title page* can be displayed automatically or independently when you select V1 on the *Switcher,* and both of the primary DSK video layers are left free for other uses.

- *Virtual Inputs* allow you to offset (and even scale) the primary video source – of course this works every bit as well with live camera streams.

As well, since the entire composition is now represented by a single button on the *Switcher*, it is very easy to *Take* or *Transition* directly to it with a single click – and it is just as easy to transition from one *Virtual Input* to another.

Of course, this is just one way to use the basic *Virtual Input* features. The creative possibilities are endless. For example, Figure 79 shows *Input A* (with *LiveMatte* enabled) keyed over *Input B*, with the Virtual Input's integrated *Overlay* channel use to add a PiP (Picture in Picture) effect.

Figure 79

Again, note that this setup leaves *both* primary *DSK* channels available for other purposes, such as adding two more live PiPs, graphics or a title composition.

4.10.3 LIVESET™

We've saved the best for last in connection with *Virtual Inputs*, however. This is also where we gain access to TriCaster's virtual set technology called *LiveSet*.

Hint: Actually, if you've been following along, you have already used a LiveSet – a very simple composition named "A over B" (Figure 80), the default.

Figure 80

As its name implies, *A over B* simply produces a composite of the video source you select as *Input A* displayed on top of *Input B*. In cases where *LiveMatte* is active for *Input A*, or if *Input A* has an alpha channel (as might be the case, for example, for a 32bit image file), or for that matter, if Input A is scaled down or repositioned – *Input B* will automatically show through transparent areas in the composition (we can see that result in Figure 79).

The name of the current *LiveSet* is shown above the *Zoom Preset* thumbnail icons at the top of the *Virtual Input* tab – in this case, we see "NewTek > Default > A over B", identifying the specific *LiveSet*, a member of the "Default" group in the "NewTek" folder - Figure 80.

Let's try something more sophisticated now:

1. Click *Take* (or de-select the *BKGD* delegate) in the *Transitions* section of the *Switcher*, to place *V1* on *Preview*.

2. Add the file *TriCaster Spin Logo (Long).avi* from the NewTek > Logos group to *DDR 2*. Enable the *Single*, and *Autoplay* switches for both *DDR 1* and *DDR 2*.

3. Click the *Configure* (gear) button beside the current *LiveSet* name in the *V1* tab to display a *Media Browser*.

4. Select *NewTek* in the left-hand column under the heading *LiveSets.*

5. In the file pane at right, click the thumbnail icon named *Center* in the *World Update* group, and then click *OK* at the bottom of the *Media Browser*.

6. Select *DDR 2* as the source for *Input B*.

The *Zoom Preset* icons in the *Virtual Input* tab and the name above will update, showing that the current *LiveSet* is now *NewTek > World Update > Center*.

Figure 81

Assuming that you still have *LiveMatte* enabled for the *DDR*, V1's *Input A* selector set to *DDR* and *Input B* set to *Still,* a little adjustment in the *Positioner* for Input A is all that it should take to produce a result similar to Figure 81 on *Preview*.

Input A is the primary input for the LiveSet, while *Input B* serves as a secondary source – in this case assigned to the virtual desk-front monitor.

7. Enable the *BKGD* delegate in the Switcher's *Transition* control group, and click the *main Auto* button. Both DDRs will begin running their currently selected clips simultaneously thanks to *Autoplay* (of course normally your foreground shot would be supplied by a camera).

Figure 82

8. Now, click the second *Zoom Preset* icon (Figure 82).

Observe that the view on *Program* output (Figure 83) has now zoomed in by 33% - the value shown in the adjustable zoom slider above *Zoom Preset 2*.

Figure 83

9. Enable the *Animate Zoom* switch, and click *Zoom Preset 4*.

The zoom gradually changes from the starting position to the level assigned to Preset 4 (100%). The timing for the change is controlled by the nearby duration time controls.

Using the other *Virtual Inputs* along with convenient presets, you can easily mimic a very large studio complex from a much smaller location.

4.11 FRAME BUFFERS

To this point, we have used photos, graphics and titles from TriCaster's *Media Players* as sources for several different exercises. Of course, for *Overlay* and *DSK* purposes, this requires you to be sure that that the *current* playlist entry in the respective *Media Player* is the *right* one for the moment.

TriCaster's *Frame Buffers* provide an alternative workflow that not only prevents selection 'accidents', but also offers other benefits.

1. *Add* the image file named *TriCaster Logo w. Bkgnd.png* from Still > NewTek > Logos to the playlist of a *Media Player*.

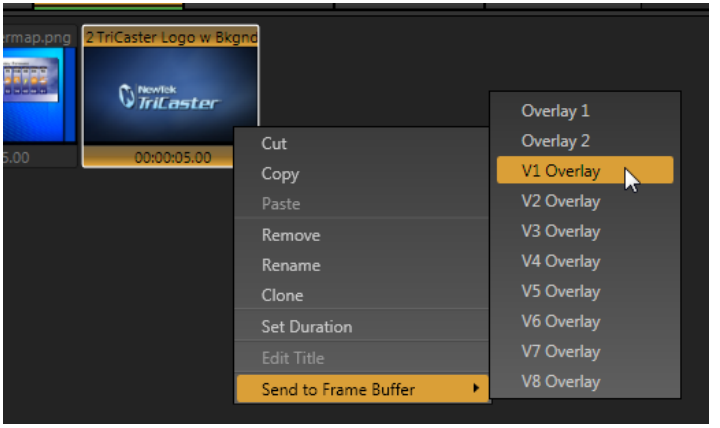


Figure 84

2. Right-click on the new icon in the playlist, and slide the mouse pointer down to the item *Send to Frame Buffer*. Select *V1 BFR* from the sub-menu that appears.

3. Select the button labeled *VI BFR* as the *Input B* source in the *V1* tab.

Figure 85

4. Note that the image you sent to the V1 *Frame Buffer* now appears on the virtual monitor in the *LiveSet*.

5. Now, right-click the original *TriCaster Logo w. Bkgnd.png* icon in the *Media Player*, and select *Remove*.

Observe that the correct image continues to appear when the *LiveSet* is displayed, even though the original image file no longer exists in the playlist.

Actually, the *Send to Frame Buffer* function copied the source file and placed it in a special folder (C:\TriCaster\Effects\Frame Buffer*session_name*\). It remains available there – even when the original file is not only unavailable from the playlist, but has actually been deleted from the hard drive.

TriCaster™ provides separate *Frame Buffers* for each *Virtual Input*, which can be selected as *Input A*, *Input B* or *Overlay* source (for their respective Virtual Inputs), and another for the main *Switcher*.

Important Hint: Frame Buffer files can be updated across a network using any suitable application (including Adobe Photoshop™) when "Share Frame Buffer on Network" is enabled (in the Live Desktop Options menu, opened by the gear button at right beneath the Transition section of the Switcher). See Section 10.3 for more information on Frame Buffers.

4.12 STREAMING

Sending your output to the world (or the office) can be nearly as easy as connecting TriCaster™ to the Internet (or intranet), and pressing the *Stream* button (located right below the *Program* output monitor).

Figure 86

Note: A few frames may be dropped on video output the first time you enable streaming for a session as the encoder launches. (If you test your stream first, you'll avoid this.)

4.12.1 STREAMING CONFIGURATION

Click the *Configure button* (gear) situated next to the *Stream* (on/off) button to open the *Configure Stream Connection* panel, which lets you view and modify settings related to streaming your production across a network connection (Figure 86).

4.12.2 SIMPLE PULL STREAMING

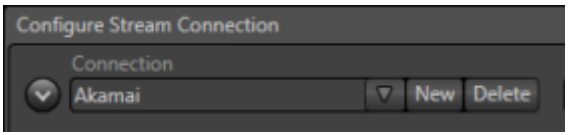


Figure 87

“Pull” streaming is arguably the simplest way to get your production online:

1. Click the *New* button.

The *Choose Connection Type* dialog switches allow you to select between *Browser Based*, *Windows Media Pull*, *Windows Media Push*, and *Adobe Flash* streaming protocols.

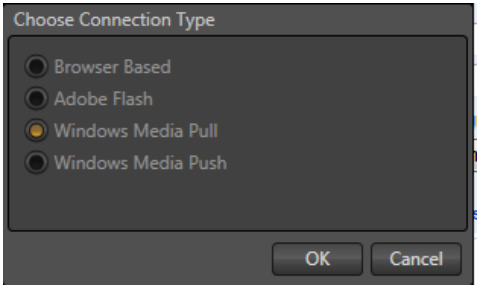


Figure 88

2. Select *Windows Media Pull*, click *OK*, and then supply a name for this *Connection* preset.

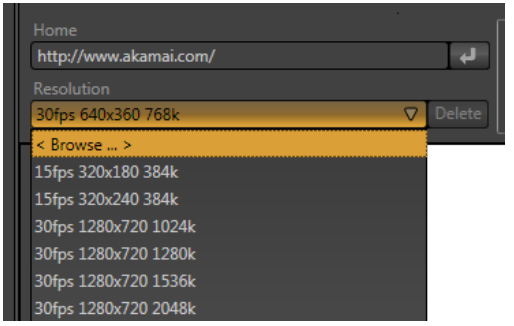


Figure 89

3. The next thing to do is pick a resolution (and bitrate) from the *Resolution* menu.

4. Click the *Test* button.

In a few moments, TriCaster™ provides you with the IP (Internet Protocol) address of your computer as viewed from the network. This information will be provided to you as a ‘punctuated’ numeric value in the *Location* display field.

Hint: If your TriCaster™ is connected to the network by a router or is behind a firewall, it may be necessary to take further steps to provide external access. See Chapter 15 for a more elaborate explanation.

5. Close the *Configure Stream Connection* panel now, and click the *Stream* button.

You're streaming! You can provide clients (or streaming providers supporting *Pull* streaming) the *Location* address. Entering this into the *File* menu of *Windows Media Player™* (using the Open URL window) will direct *WMP* to show the stream from your system on client computer system(s) connected to the Internet (or intranet).

4.12.3 PUSH AND FLASH STREAMING

Browser Based, Windows Media Push and *Adobe Flash* streaming are slightly more complex, largely because they depend on external resources to distribute your stream to a wider viewing audience. These may be provided in house by your organization, or you may take advantage of a commercial (or 'free', advertising -sponsored) Content Delivery Network.

(Arrangements and requirements of various external streaming hosts are diverse, but TriCaster's *Streaming Configuration* panel adapts to provide the necessary input and information fields for the various types.)

More detail on these matters, including connecting to a network and numerous useful tips on streaming strategies is found in Chapter 15.

4.12.4 CAPTURING THE STREAM

Whenever you are streaming your output, TriCaster™ archives the live stream as a file. Files are saved to D:\Media\Clips*sessionname*\SavedStreams.

This is a very useful feature. Among other things, it allows you to post the captured file to a website immediately after an event for 'video on demand' streaming purposes – for late arrivals or others who want to review the live event.

Note: Remember to turn off the Stream when your production concludes, or TriCaster™ will continue writing the stream capture file.

PART II (REFERENCE)

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

5 THE STARTUP SCREEN

TriCaster's Startup Screen is the gateway to a suite of applications as well as *session* and system maintenance and management features.

Icons in the left-hand pane of the Startup Screen provide access to numerous functions. 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 TriCaster™. From here, you create and launch sessions, then choose what sort of activity you wish to pursue by making a selection from the icon ring on the *Session Page*.

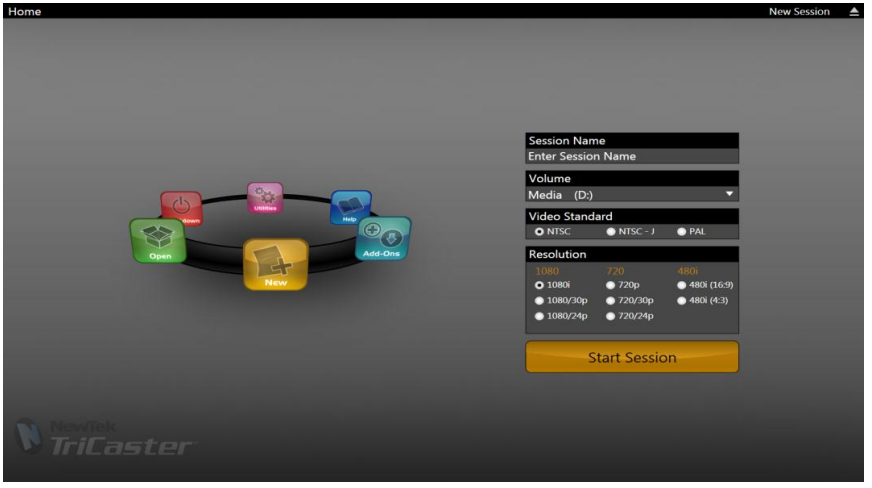


Figure 90

Your intention may be to begin a new live production, or to produce another episode of a live series. Perhaps you wish to do some video editing using SpeedEDIT™, to prepare some title pages for an upcoming event, or to 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?

5.1 INTRODUCTION TO SESSIONS

Whenever you work with TriCaster™, you provide certain information about the production environment:

- What broadcast standard is used in your locale? Is it *PAL*, common in Europe among other places, or perhaps *NTSC*, standard throughout North American regions?
- If your task includes cameras or other live sources, are they HD, SD or both?
- How are cameras connected (are you perhaps using component or SDI connections, or a mixture of several types)?

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

- You might calibrate your cameras individually using the *Proc Amp* settings in the *Input Configuration* panels.
- If your production plans include the use of greenscreen staging, you will adjust the *LiveMatte* settings for one or more cameras to provide optimal keying.
- Perhaps you will use the *output Proc Amps* to adjust the display sent to a projection system.
- What are your output device connection preferences? For example, will you send video to a local reference monitor using an S-Video or composite cable, etc. Do you intend to connect to 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 preset and playlists for clips in the *DDRs*.

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

- You could grab a series of still images from *Program Output*.
- 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. Assuming you do not deliberately delete the session, all of your session media and all of your session settings are ready for immediate recall.

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 more or less similar conditions, simply re-open your prior session and you are virtually ready to go. (Of course, it's the course of wisdom to *test* everything before actually beginning the event.)

Naturally, you can store multiple sessions and load any session freely. This greatly simplifies business models that involve regular trips to several locations, a number of unique episodic programs, or different users with their own specific needs.

5.2 THE HOME PAGE

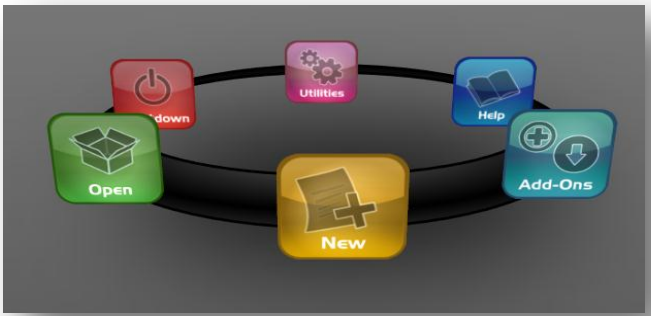


Figure 91

Having discussed sessions, let's go on to consider how you create sessions, and choose which one to work on. This and a few other top level functions are found in the TriCaster's *Home Page*.

This primary screen is the first thing you encounter on launching TriCaster™. It is dominated by the icon ring shown in Figure 91. When you click an icon on the ring (such as *New* or *Open*), that item advances to the front-most position.

Hint: Alternatively, you can use the keyboard's left and right arrow keys to cycle through the icons on the ring.

Also, when you choose an icon from the ring the right-hand pane of the *Home Page* updates to provide more options related to your choice.

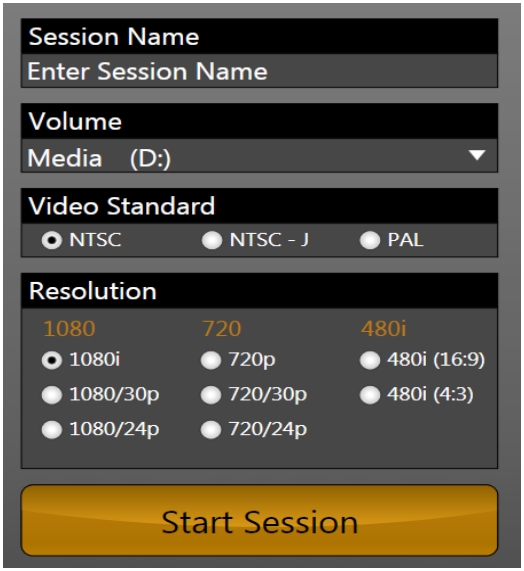


Figure 92

For example, the first thing you will likely do on launching a new TriCaster™ is create a session. In anticipation of that, the *New* icon is automatically pre-selected whenever no sessions already exist on TriCaster™. This results in the corresponding session options being displayed at right, as shown in Figure 92 (Multi-standard model options shown).

5.2.1 NEW (SESSION)

As just mentioned, clicking *New* on the icon ring populates the pane at right with related options. Principally, for each session you must designate (by selecting switches) your local video standard (Multi-standard model only – select NTSC, PAL or NTSC-J) and session format –1080i, 1080/24p, 1080/30p, 720p, 720/30p, 720/24p, 480/30i (16:9) or 480/30i (4:3). Multi-standard models offer PAL format equivalents.

SESSION NAME

You will see a suggested name for a new session listed above the options pane at right. You can click in this name field to modify the default name provided using your keyboard.

VOLUME

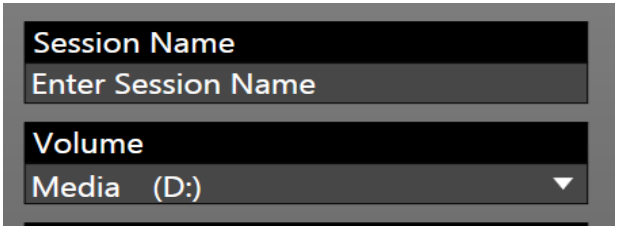


Figure 93

Beneath the *Session* name you will see a field labeled *Volume*. Here you can choose which hard drive the session (and its associated content) will be created and stored on.

Suitable hard drives added to one of TriCaster's removable drive bays are listed in a drop-down menu when you click on the field. You can select any drive shown.

Note: External drives are not recommended for active use as session drives. See Section A.1.7 for suggested hard drive specifications for use in TriCaster's removable drive bays.

FORMAT AND OUTPUT CONSIDERATIONS

Remember that for live production, TriCaster™ can supply SD output (for SD sessions), or both SD and HD (in the case of HD sessions). The format of video signal on *Program* and *Aux* outputs varies according to the session type:

- For all *HD* sessions, *Program (Row 1)* output is also HD
- For all *SD* sessions, *Program (Row 1)* output is likewise SD.
- For 16:9 sessions (*HD* or *SD 16:9*), *Program (Row 1)* output is consistently configured as 16:9 too, while for *SD 4:3* sessions output is of course formatted as 4:3.

Aux row video output is uniquely configurable, within certain limitations for different session formats. For example, during an HD session, you can output either HD or SD video from Row 3, and SD video output can be *either* a 16:9 widescreen format or one cropped for display on a 4:3 television (see Section 7.1).

The session setting has some other significant ramifications, too. For example, if your session format is SD 4:3, this is the file format captured by the Live Desktop's *Record* function when capturing *Program* output … even when the video cameras supplying your inputs are HD; the opposite is also true.

Note: See Section 7.1 for more information on Video Output configurations.

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

5.2.2 OPEN (SESSION)

If there are existing sessions on TriCaster™, the icon ring on the *Home Page* will default to *Open* (Figure 94).

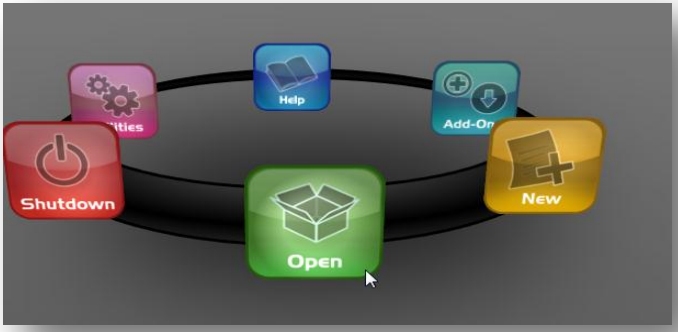


Figure 94

Selecting *Open* causes the *Sessions List* to appear at right. This pane lists all sessions stored on qualified media currently mounted on TriCaster™.

Sessions are listed separately under the name of the storage volume they are located on (Figure 95). The listing shows the *Session Name* and video *Format* for each one. Let's look at a few features of the *Sessions List* briefly before we open a session.

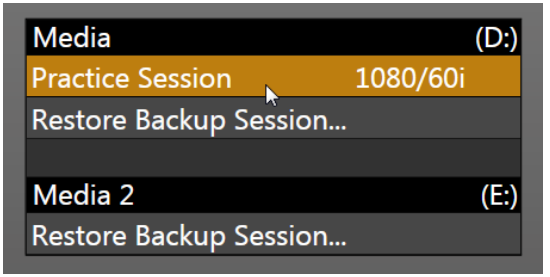


Figure 95

EJECT

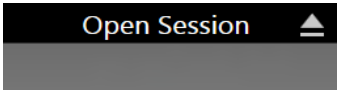


Figure 96

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* – see Section 6.5.2.)

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.

CONTEXT MENU

Right-click a session name to open a context menu with two items listed in it: *Rename* and *Delete*. 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 clips, images and titles, and *even title and edit project files* created within the session (unless you have deliberately saved the projects and all constituent 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 Session Backup* (Figure 97), and use the file explorer provided to select a *.SessionBackup* file.

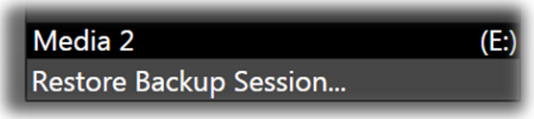


Figure 97

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

Just as you were able to select an icon on the ring using the left and right arrow keys, 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 away from the *Home Page* to the *Sessions Screen*.

5.2.3 SHUTDOWN

This selection provides *Restart TriCaster™, Shutdown TriCaster™,* and *Exit to Windows* links – click them to perform the named action in the usual manner. (In the case of the last-named function, you can return to the TriCaster™ environment by double-clicking the desktop *TriCaster* icon.)

5.2.4 UTILITIES

Figure 98

Selecting *Utilities* on the *Home Page* icon ring presents a list of functions at right that have to do with the TriCaster™ system.

REGISTER TRICASTER™

TriCaster™ 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 3.3, so we won't repeat them here.)

UPDATE TRICASTER™

Periodically, NewTek may provide software updates for your TriCaster™. Updates can enhance performance, security or even add useful new features.

If TriCaster™ is connected to the internet, clicking *Update TriCaster™* will automatically check for a more recent new software version and offer to install it. Alternatively, you can go to the NewTek web site, click *My Account*, and use the login details you provided when registering your

TriCaster™ to access your personal product page. Click the “my downloads” link at the top of the page, and check the list shown. If you find an update, you can install it manually as follows:

1. Click Update TriCaster
2. Login to the NewTek update webpage, locate the latest update and click on it.
3. At the dialog popup, choose *Run*.
4. Comply with any onscreen prompts that follow.

This way you can be sure the very latest version of the software for your TriCaster™ is installed.

Hint: If you wish, you can instead access the same webpage from a second computer connected to the internet, then transfer update files to TriCaster™ using a network connection or perhaps a USB thumb-drive.

DEFRAGMENT ALL DRIVES

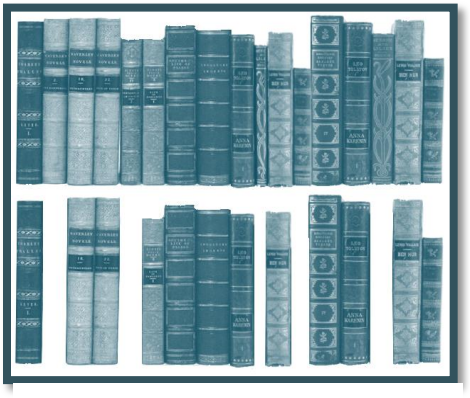


Figure 99

Over the course of lengthy use, the section of TriCaster’s internal storage devoted to audio and video storage can become fragmented. Eventually, this can degrade playback performance. Defragmenting corrects 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 large while others are small, just as TriCaster™ session content files may be larger or smaller.

To make room for new additions, you decide to remove books you have finished with from the shelf. You remove a book here, another there, opening up gaps between the remaining books. This makes some shelf space available, but also creates gaps separated by the remaining books. Sadly, when you obtain another large book, it may be too big to fit in any one of the gaps.

A foolish librarian might tear the new book into sections just big enough to fit into the open spaces on the shelf. This is would obviously be unwise. When you wish to refer to the book later

you will lose a lot of time locating and assembling its sections before you can read 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 it means literally shredding your 'book' (in reality large video files from your TriCaster™ 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 TriCaster™ 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.

RESTORE TO FACTORY DEFAULTS

A complete *System Restore* function is available in the event of an unforeseen problem. Please refer to Section A.5.7 in Appendix A for full details and usage notes.

5.2.5 HELP

Figure 100

Select the Help icon to reveal links to open TriCaster™ manuals, including the primary User Guide as well as documentation for other TriCaster™ features, such as the SpeedEDIT™ and LiveText™ manual. Documentation for optional *Control Surfaces* and *Add-ons* will appear here as well.

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

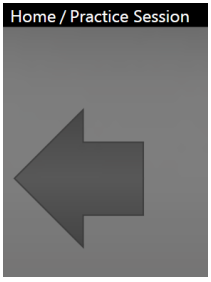
5.2.6 ADD-ONS

As time goes on, NewTek offers additional software to extend the power of your TriCaster™.

Figure 101

The icon labeled *Add-Ons* on the *Home Page* provides access to these tools. When you select it, links are displayed for installed software applications, allowing you to launch them. (For example, Figure 101 shows a link to the *Virtual Set Editor*™ demo, as well as the *Animation Store Creator* utility included with TriCaster EXTREME™ systems.)

5.3 THE SESSION PAGE



Opening a session from the *Home Page* (whether using *Open* or *New*) takes you to the *Session Page*, providing a new set of selections on the icon ring.

The name of the current session is shown in the top-left corner of the screen. 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 beneath the session name, or the word "Home" in the session name label.

Figure 102

Initially, the icon ring in the *Session Page* offers four selections. These are discussed next.

5.3.1 LIVE

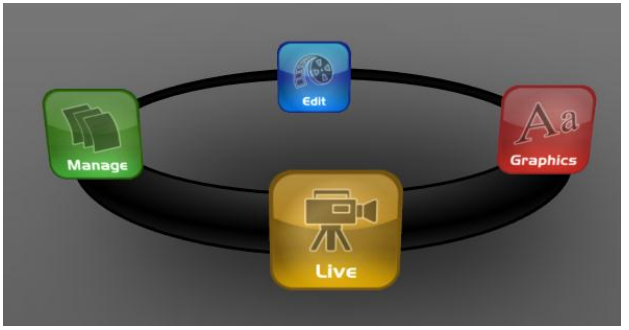


Figure 103

The icon labeled *Live* represents the *Live Desktop*, TriCaster's live production center. Selecting it (by clicking the icon or using the left/right arrow keys to bring it to the front), presents a *Start Live Production* link in the *Session Page's* right-hand pane – click it to launch the *Live Desktop*.

5.3.2 GRAPHICS

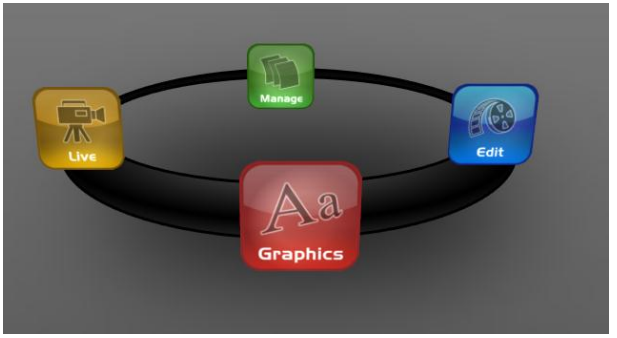


Figure 104

TriCaster™ includes an integrated version of LiveText™, NewTek's standalone titling and CG application. Selecting the *Graphics* icon displays a number of related items on the right-hand side of the *Session Page*.

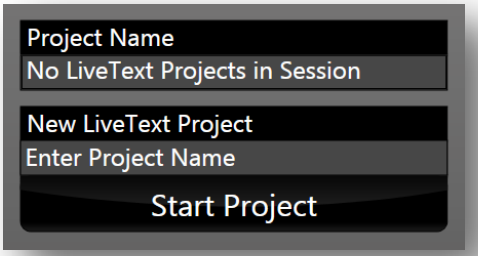


Figure 105

When you first enter a new session, no LiveText™ projects are listed in the area under *Project Name*. When you have created 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 that TriCaster™ stores new LiveText™ projects inside a folder named for the current session, as follows (for example): 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 screen. 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 (just above the *Start New Project* link) and modify it, then click *Start New Project*. When you are finished working in LiveText™, clicking the [x] button in its upper-right corner (or selecting *Exit* in the *File* menu) returns you to the *Session Page*.

5.3.3 EDIT

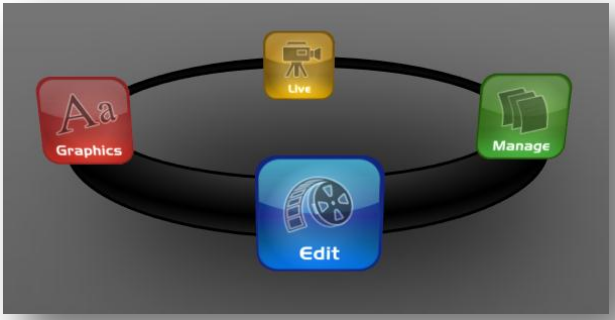


Figure 106

TriCaster™ includes an integrated version of SpeedEDIT™, NewTek's popular standalone non-linear video editor. Selecting the *Edit* icon displays a number of related items on the right-hand side of the *Sessions Screen*. When you first enter a new session, no SpeedEDIT™ projects are listed in the area under *Project Name*. When you have created one or more edit projects, the name(s) will appear here and, as you would expect, you can re-open the project by clicking its name.

Note that TriCaster™ stores new SpeedEDIT™ projects inside a folder named for the current session, as follows: D:\SPEEDEDIT PROJECTS\sessionname\projectname.vtp. SpeedEDIT's internal File menu Save and Save As functions default to the same location.

Just as for LiveText, it is possible to use *File>Save As* to store an edit 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 screen. To re-open them, you'll need to navigate to the project file using *File>Open* in SpeedEDIT™. As for LiveText™, external projects will not be backed up by the *Backup Session* function (or be deleted by the Delete Session function)

To create a new SpeedEDIT™ project, click in the default project name (just above the Start New Project link) and modify it, then click *Start New Project*. When you are finished working in SpeedEDIT™, clicking the [x] button in its upper-right corner (or selecting *Close* in the *File* menu) will bring you back to the *Session Page*.

5.3.4 MANAGE

Figure 107

Various TriCaster™ components provide filebins to permit you to manually administer files related to their projects, playlists, and so on. The *Manage* icon in the *Session Page* provides an alternative approach to file management. At times you may find it useful to be able to quickly access the various files associated with specific sessions. Selecting *Manage* refreshes the options pane on the right-hand side of the *Session Page* with a number of convenient items.

BROWSE

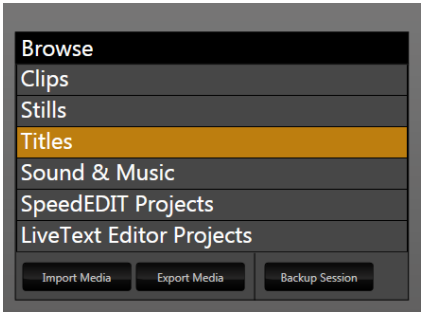


Figure 108

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.

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 for a different session.

Figure 109

Several other important features are found in *Manage*, including *Import Media, Export Media* and *Backup Session*.

IMPORT MEDIA

We discussed importing media for using in TriCaster™ productions back in Section 4.2, so we'll just review briefly here.

Clicking the *Import Media* link opens a custom import panel, offering batch import of files for use in TriCaster's *Media Players*.

It even allows you to transcode files to appropriate high quality TriCaster-friendly file formats at the same time if you wish.

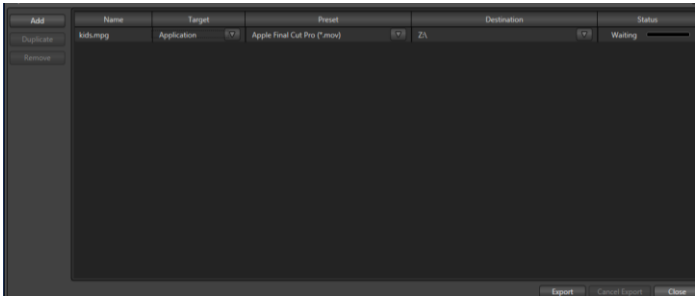


Figure 110

Import Media's quick processing makes this the fastest and most convenient way to pre-load a session with production assets.

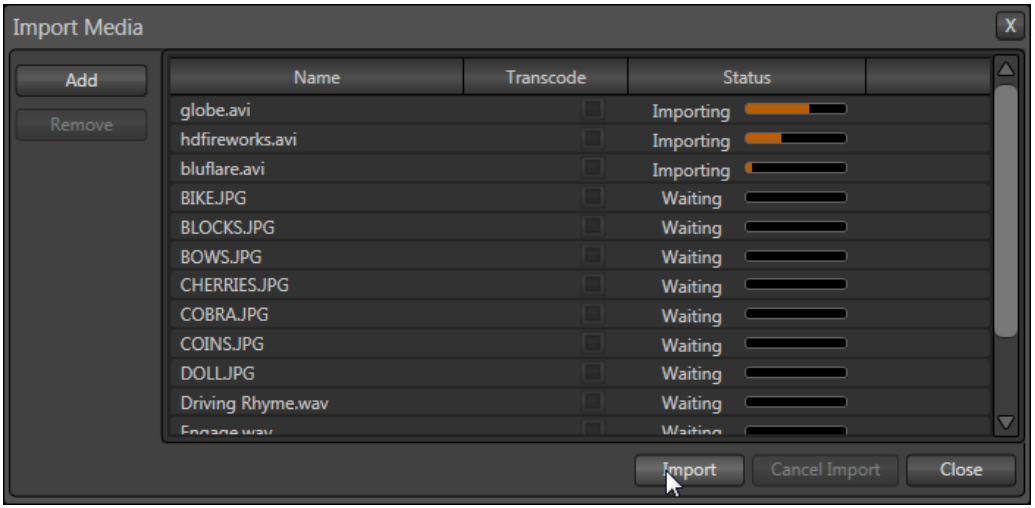


Figure 111

Click *Add* to open a standard system file window, and select (or multi-select) items to build a list in the *Import Media* file pane.

Some highly compressed video files may not be well suited to live playback. Enable switches in the *Transcode* column for files you wish to convert to a friendlier format on import. Files can be re-ordered by dragging their entries up or down with the mouse, or removed from the list by highlighting them and clicking *Remove*.

Once the batch import list is prepared, click *Import* to complete the operation. Files are processed quickly, and are automatically added to their proper locations (according to type) for easy access during live production.

Hint: Sections 4.2, 10.2.2, A.4.3 and A.4.5 discuss other aspects of importing media files.

EXPORT MEDIA

The *Export Media* function allows you to create a list of video files for export, selecting a new file format for these exports to be converted to (on a per file basis), and designate where to send them. Clicking the *Export Media* button opens a new pane.

Click the *Add* button at upper left to open a custom *Media Browser* (see Section 10.2.2 for browser details). Use this pane to locate and select (or multi-select) video clips for export.

Hint: The Export Media panel can be resized by dragging its edges or corners with the mouse.

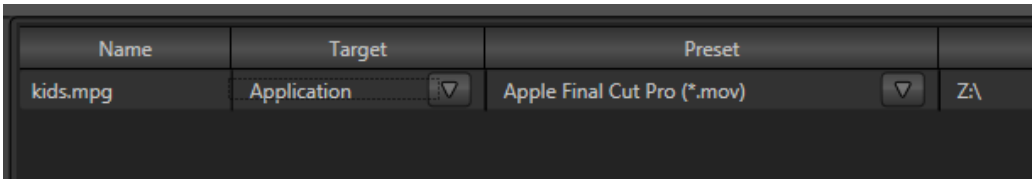
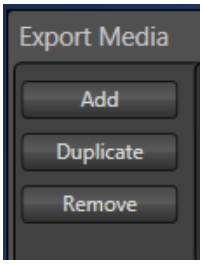


Figure 112

The file pane is much like a spreadsheet table, listing all files in the current export batch in its first column, then the current settings for each file in other columns. A *Status* column shows the current export status or progress for each file in the list.

TOOLS



The *Duplicate* feature is very useful for cases when you wish to export a file to multiple target file formats to be used for different purposes or in different applications.

Note that *Export Media*'s file list pane supports multi-selection. When a file (or group of files) is selected, you may use either the *Duplicate* and *Remove* buttons to clone or delete selected files from the list.

Figure 113

Hint: To multi-select files, you can use the familiar Shift-click or Ctrl-click techniques.

Figure 114

TARGET, PRESET & DESTINATION

Having prepared the file list, click the triangle button in the *Target* field to open a drop-down menu listing categories of device or application targets to choose from. Then select a specific encoding *Preset* in the next column. Export presets vary according to what is appropriate for a given session format.

Note: When presets that do not natively support HD are selected during an HD session, output is automatically scaled as required to fit the selected file format. This is a convenience, but be sure to select a Preset suitable for your ultimate needs.

A similar *Destination* button opens a system file browser to let you designate (or create) a location for file output. Each file to be exported can have its own *Target*, *Preset* and *Destination* settings.

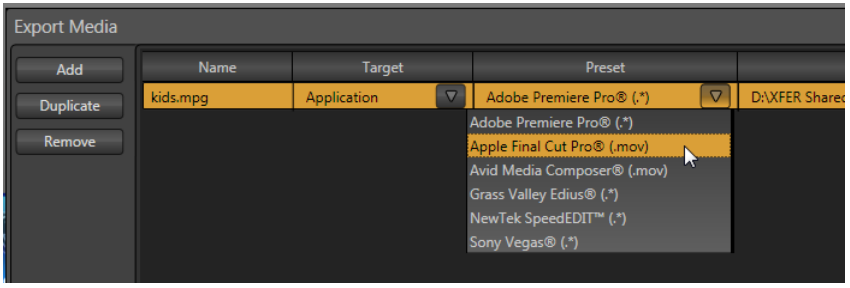


Figure 115

Hint: It is possible to selected mapped network locations (with a Drive letter assigned) as the Destination, saving time later.

Export file format options are updated from time to time (to include popular new formats). Here are some examples, as they appear for an HD session (note that the list is not comprehensive, as additions are made from time to time. *Target* categories are in bold text, while *Presets* are italicized):

- *Application*
  - *Adobe Premiere Pro®* - high quality MPEG-2 Program Stream, full raster, 4:2:2 sub-sampling, variable bitrate (100 Mbps nominal).

- *Apple Final Cut Pro® (.mov)* – very high quality M-JPEG encoding, full raster, 4:2:2 sub-sampling, high compatibility.

- *AVI*
  - *DV/ DVCPro (.avi)* – moderate quality, SD only (NTSC 720x480, PAL 720x576), 25Mbit/s, 4:1:1 (NTSC) or 4:1:0 (PAL) sub-sampling, very broad compatibility.
  - *MJPEG* (.avi) – moderate quality, SD or HD capable, 4:2:0 sub-sampling, broad compatibility.
- *DVD*
  - *(x) (*.mpg)* – SD-only MPEG 2, quality presets up to 9MB/sec bitrate (≈60 minutes) with 4:2:2 sub-sampling.
- *Flash/Flash 9*
  - A diverse collection of presets suitable for playback in newer or legacy Flash® players.
- *Mobile Devices*
  - Presets suitable for use with *iPad™*, *iPhone™* or *iPod Touch™*.
- *Quicktime*
  - *Renderless Conversion* – high quality 'wrapped' Quicktime file.
  - *DV/DVCPro (.mov)* – moderate quality, SD only (NTSC 720x480, PAL 720x576), 25Mbit/s, 4:1:1 (NTSC) or 4:1:0 (PAL) sub-sampling, very broad compatibility.
  - *h.264 Highest Quality (.mov)*
  - *h.264 Very Good (.mov)*
  - *MJPEG (.mov)*
- *Same as Source* – file copy (no re-rendering)
- *Video Server*
  - *Leightronix NEXUS\Ultra NEXUS* – SD (NTSC 720x480, PAL 720x576), high quality, MPEG2 Program Stream, 9Mb/s variable bitrate, 4:2:2.
  - *TelVUE Princeton* – SD (NTSC 720x480, PAL 720x576), high quality MPEG2 Program Stream, 9Mb/s variable bitrate, 4:2:2, NTSC 720x480 (PAL 720x576).

Next, use the *Destination* field drop-down to designate a target folder for exported files to be sent. A *progress gauge* is shown during file processing. Click the *Export* button at the bottom of the dialogue to begin batch export processing.

Hint: The time an export takes is affected by numerous factors – the number, duration and resolution of the selected files, the speed of the device selected as target for the files, the designated format, and so on. It is generally unwise to commence a file export shortly before a live event, since you cannot launch TriCaster's Live Desktop during export. If necessary, you can cancel the current export operation.

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. Backup operations can take some time, depending on the amount of content in the session. For obvious reasons, then, it would be wise not to begin a major backup operation shortly before a scheduled live production. 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 backup a different session, return to the *Home Page* and *Open* a different session.

The backup operation feature will determine whether all media used in the session is *local* (i.e., located in folders named for that session), or whether some content is *external* – stored in other places on your system, and included in the session using *Add Media Location*, or from folders belonging to other sessions. If all session media is local the backup proceeds without further interruption.

When external media is used in the session, a dialog is presented stating "The following files are external to the session. Would you like to import these files?" The optional actions in the dialog are:

- Backup without importing
- Import and Backup
- Cancel Backup

6 LIVE DESKTOP: OVERVIEW

TriCaster's Live Desktop is the control center for all your live production work. It provides control over switching, transitions and overlays, titles and graphics, audio mixing, playback of digitized content, and so on.

As well, streaming and recording features are located here, along with keying and virtual set tools. This chapter provides a top-level view, leading into the detailed information in subsequent chapters.

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

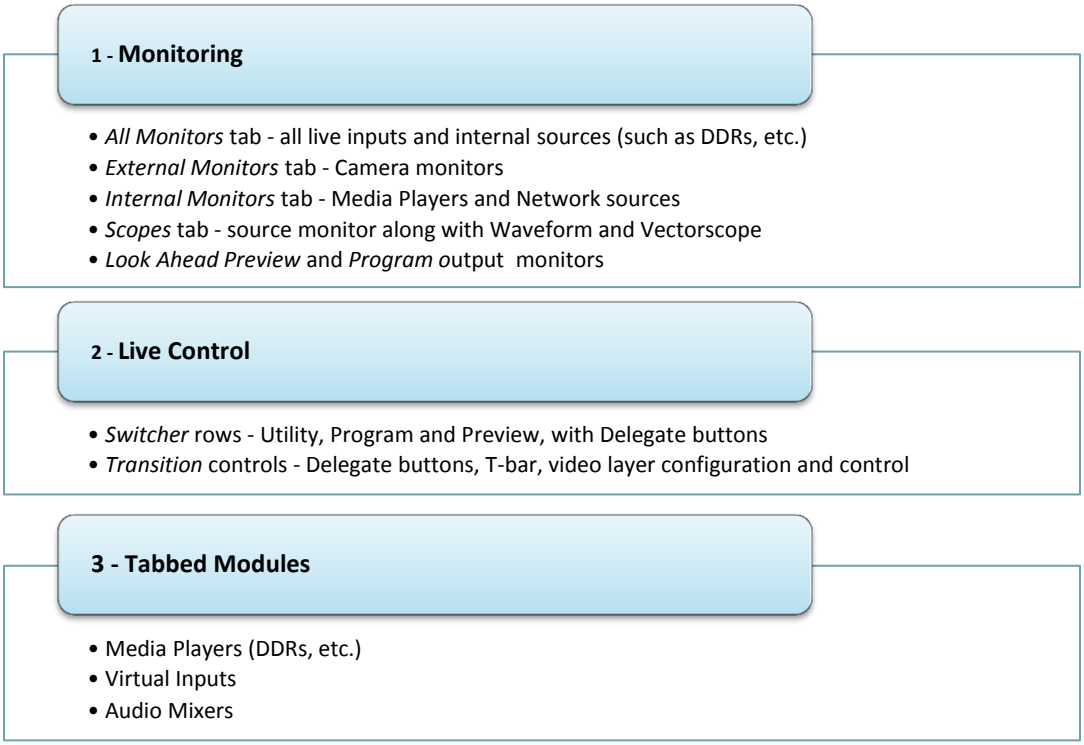
6.1 DISPLAY REQUIREMENTS

The *Live Desktop* requires a *minimum* screen resolution of 1440 x 900.

Figure 116

6.2 OVERVIEW

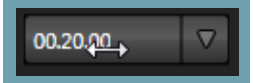
TriCaster's *Live Desktop* provides visual feedback for operations, including monitoring, live switching, and so on. It is divided into three horizontal bands. From top to bottom, these are:



6.3 A FEW HINTS

You will find various types of user controls in TriCaster's *Live Desktop*. Some examples are shown in the table below. Several convenience features are associated with these controls.

As you would expect, all slider controls (whether their motion is vertical or horizontal) can be set to a new value by holding down the left mouse button and dragging in the same direction as the control's orientation. Hold down the keyboard *Shift* key and double-click most controls to reset the associated value to its factory default.

Control Type	Type	Examples	Usage
	Slider (vertical or horizontal, single-value)	Gain, Balance	Drag in line with the control's orientation to raise or lower the current value.
	Radial slider (two-value)	Position, Size, Rotate	Drag up-down to adjust one value, left-right to adjust the other value, or diagonally to adjust two values simultaneously.
	Rotary Knob (single-value)	Audio Input 1 Trim	Drag left-right to adjust the current value.
	Combo-Slider	Speed, Zoom Duration	Drag in line with the control's orientation to raise or lower the current value, click to type in a new value, or select from the menu.

Hint: To make very fine adjustments to slider values, hold down the Ctrl key on your keyboard while dragging with the mouse (this increases accuracy by a factor of 10.)

6.4 CUSTOMIZING THE LIVE DESKTOP

The *Live Desktop* offers several convenient provisions for tweaking the user interface to suit your particular needs.

6.4.1 DESKTOP OPTIONS MENU

Several potentially very useful options are presented in the *Desktop Options* menu. Open this menu by clicking the gear button at extreme right (just above the large tabbed panes occupying the lower third of the *Live Desktop*).

Figure 117

- *Follow Preview Row for All Inputs* displays the tabbed pane for a *Preview* row source to be displayed automatically on selection changes.

- When *Tabs Follow Preview for Virtual Inputs* is checked, the tab shown updates only when you select a *Virtual Input* on *Preview*.

- The *Tabs Follow All Delegates* option is especially useful when a *TriCaster™ CS* (Control Surface) is connected, causing the interface to track your control selections.

- Enable *Link Audio Mixer Tabs* to show both *External* and *Internal Audio* tabs whenever you click the tab for *either* of these.

- See Section 10.3.2 (Network Sharing) for a discussion of the *Share Frame Buffer on Network* option.

- You may want to un-check the *Enable Keyboard Shortcuts* option when you wish to use a keyboard for text editing along with a control surface for switching.

Hint: Control surface operations can sometimes result in a tabbed module that you want to view being obscured because related Desktop Options are enabled. Press the corresponding control surface Delegate button again to re-display the tabbed pane you are interest in.

6.4.2 RENAME

As charming as descriptive names like *Camera 1*, *DDR 2* and *Virtual Input 5* are, we must admit that it's possible you might wish to change these default labels to something localized.

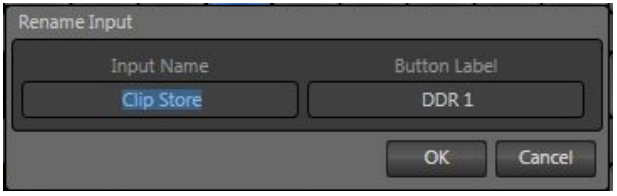


Figure 118

To do so, simply right-click on any of the following items to open the *Rename Input* dialog (Figure 118):

- Any monitor in the *All Monitors* pane

- Any *Switcher* source button
- Any *Virtual Input* tab

The dialog has two editable text fields, *Input Name* and *Button Label*. The latter is a short name that will be shown on *Switcher* buttons, while the longer name is used in dialogs where more space is available.

6.4.3 DUAL DISPLAYS AND MONITORING

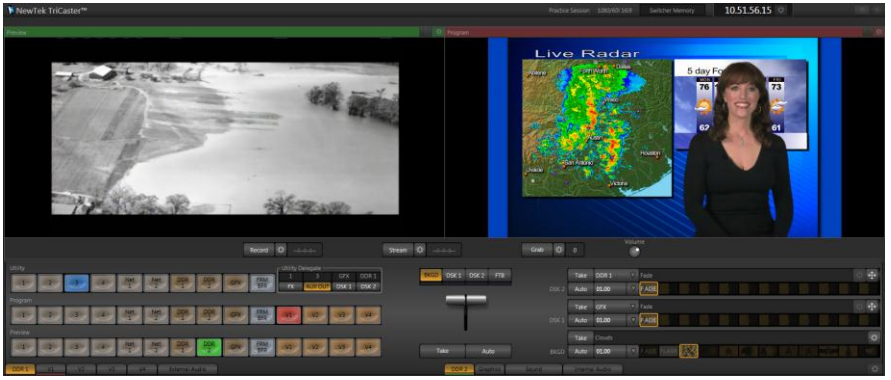


Figure 119

The *Live Desktop* monitor tabs and specific *Multiview* options can be flexibly combined to show *what* you want to see, *where* you want to see it.

Note: These options are suitable when Multiview output is not tasked to projection or similar display duties.

For example:

- You might select the *External* layout for the *Multiview* output. Then select the *Internal Monitors* tab on the *Live Desktop* – or reverse these choices. You'll get much larger views of all sources this way.

- Alternatively, choose the *All Monitors* tab as the *Multiview* layout and drag the horizontal divider between the monitors and the *Switcher* to of the top of the screen, hiding the *Desktop* monitors.

- You can also drag the divider between *Preview* and the tabbed monitor pane (see Figure 119, showing the *Program* and *Preview* monitors only).

Hint: Reset a Live Desktop divider to its default location by double-clicking it.

6.5 TITLEBAR TIPS

An information display in the *Live Desktop* titlebar provides useful data. Displayed info includes:

- (Session Name)
- (Session format)
- *Switcher Memory* – tracks how much system memory is required by currently selected virtual sets, transitions and the like. (If you do inadvertently overtax the effects system by pre-selecting many, many large custom effects – unlikely – you might just reach the limit, which could result in dropped frames.)
- *Timecode* (from an external LTC timecode source, or the system clock; may include optional Start/ End time displays)
- *Timecode Configure* button (gear)

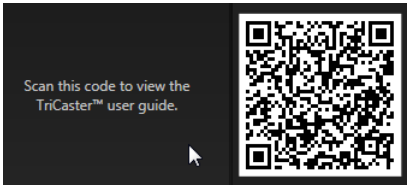
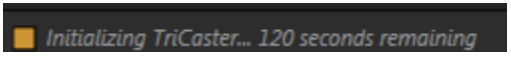


Figure 120

- *QR Code* (Documentation) – click this button and scan a QR code with your mobile device (such as an iPad™ or Android™ tablet) to download and view TriCaster™ documentation without interfering with your live production.
- *Eject*
- [x] (Exit button)

6.5.1 STATUS BAR



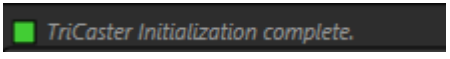


Figure 121 Figure 122

An information display is conveniently located below the titlebar, just above the *Program* and *Preview* monitors. From time to time this bar displays information pertaining to operations or system status, including any cautionary indications.

For example, a brief initialization is required following a system start (or restart) for *DDR* video playback to stabilize. During this brief 'warm-up' period, an *initialization countdown* is displayed (Figure 121) in the *Status Bar*.

At the end of the countdown, the status line is updated (Figure 122). The display automatically clears itself a few moments later, so as not to pose an unnecessary distraction.

6.5.2 EJECT

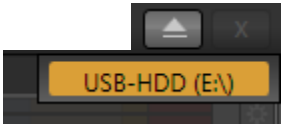


Figure 123

Clicking the *Eject* button (near the titlebar's *Exit* button) allows you to choose a drive to be safely disconnected from TriCaster™.

7 I/O CONFIGURATION

TriCaster™ provides extensive control over your video signal at both input and output stages.

Every video source has its own realtime Proc Amp and keyer (via LiveMatte). As well, TriCaster™ supports independent Proc Amp settings for its Program and Multiview outputs

It is very useful to be able to adjust each source and also the output stream independently. TriCaster's plentiful configuration options ensure that you can match camera inputs to each other, and that their signals fall within legal ranges (it's best to use camera white balance controls whenever possible, mind you).

Output proc amp settings allow you to compensate for specific circumstances. For example, independent *Proc Amp controls* make it simple to tweak the *Multiview* output to conform to local conditions such as projector color temperature variations, projection surface color and physical lighting conditions – without affecting the video output streams.

Let's begin with a consideration of *Output Configuration* tools.

7.1 OUTPUT CONFIGURATION

Figure 124

Roll the mouse pointer over *Program Output* to reveal a *Configure* button (Figure 124) above the top-right corner of the display. Click it to open the *Output Configuration* panel (Figure 125).

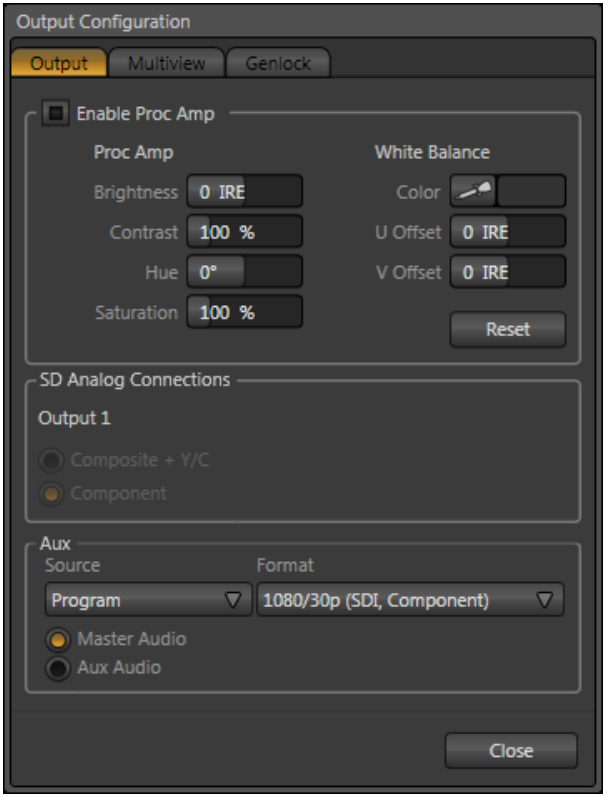


Figure 125

NOTE: The format for TriCaster's Program output (including HDMI) is dictated by the session format. At the time of writing, certain less common session formats are not supported by typical downstream monitors and devices. The Aux video output provides more configuration options, and may provide an alternative in such situations.

7.1.1 OUTPUT CONTROLS

Output Configuration contains tabbed panes providing:

- *Output*
  - *Proc Amp* (processing amplifier) controls for TriCaster's primary output
  - *SD Analog Connection* configuration controls

    - *Aux* output configuration controls
        - Including *Output Alpha Matte*
- *Multiview*
    - *Proc Amp* controls for *Multiview* output
    - *Multiview* output display options
- *Genlock*
    - *Genlock* calibration controls
    - *Center Frequency* setting

This panel closes when you click the *Close* button or click outside the panel.

7.1.2 PROC AMP

Proc Amp adjustments can be toggled on and off using the *Enable Proc Amp* switch at upper left in the *Main* and *Multiview* panes (note that the Multiview output Proc Amp affects only *Program* and *Preview* displays), or reset by clicking the *Restore Defaults* button. Each *Proc Amp* has numeric slider controls for:

- *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 from -180° to +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: your TriCaster™ system provides Waveform/Vectorscope monitors, an invaluable way to accurately monitor the video signal to avoid issues such as illegal color.

Figure 126

To serve as a visual reminder, small indicator lights appear at right above the *Program* monitor when *either* output has *Proc Amp* settings enabled (Figure 126). Click these to enable/disable the associated Proc Amps.

Note: TriCaster's input and output Proc Amps are very useful. However, please keep this important thought in mind: Whenever possible, it is best to perform color adjustments at the source or target device. For example, it is preferable to calibrate a camera's colors at the camera, before sending the signal to TriCaster™. Doing so will yield higher color precision.

Similarly, it's better to adjust output color using controls on down-stream devices – monitors or projectors – whenever possible. TriCaster's Multiview Proc Amp can never completely compensate for a badly calibrated monitor.

TriCaster's Proc amps are available for occasions when no external options are available (many cameras do not have built in color controls; projectors generally do, but at times the physical placement of the device can make it inconvenient to access to them).

WHITE BALANCE

A secondary group labeled *White Balance* adds *U Offset* and *V Offset* controls.

- The U portion of the video signal carries the blue and green color information. When you adjust the *U Offset*, you adjust only the blue/yellow portion of the video signal. Rotate *U Offset* clockwise to shift the signal toward blue and counter-clockwise to shift the signal toward yellow.

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

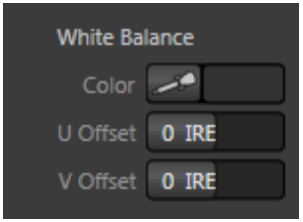


Figure 127

- To automatically white balance – click and hold the mouse button over the *Color* (eyedropper) button, and then slide the pointer on the monitor for the corresponding source. Release the mouse button over a part of the image that should be white.

7.1.3 SD ANALOG CONNECTIONS

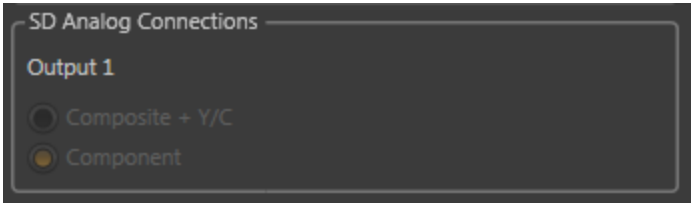


Figure 128

As discussed back in Section 3.7.2, TriCaster's *VIDEO OUT* connectors can variously output HD or SD or even both *simultaneously*. The second row, referred to as the *Aux* (Auxiliary) video output, is somewhat unique and in consequence is discussed separately in the next section.

Let's consider the different configuration possibilities for *Program* video output (Row 1*)*. First, note that the *Program* video output format always matches the session. In turn, this means its HD video output will be either 1080 or 720. Let's consider how this affects the *SD Analog Connection* options offered.

- The sole analog video connection type commonly supporting HD is *Component*. Consequently, the analog *Connection Type* for HD sessions is always Component (*SD Analog Connection* options are ghosted).

- This means that the four BNC connectors for *Program* (Row 1) output will be automatically configured as HD-SDI and HD Component (three connectors – Y, Pr and Pb) for all HD sessions.

Somewhat similarly, for SD sessions, *Row 1* outputs SD video. (If the session is 4:3, output is also 4:3. When the session is 16:9, video output is also 16:9.) Additional *Connection Type* options are made available for SD sessions.

- Select between *Composite + Y/C* or *Component* connection types.

- Choosing *Component* or *Composite + Y/C* results in the output connectors in the corresponding row being configured as shown in the following table:

Connection Type	BNC 1 (SDI)	BNC 2 (Y)	BNC 3 (Pb)	BNC 4 (Pr)
Component	SDI	Y	Pb	Pr
Composite + Y/C	SDI	Composite	Y	C

7.1.4 AUX OUTPUT

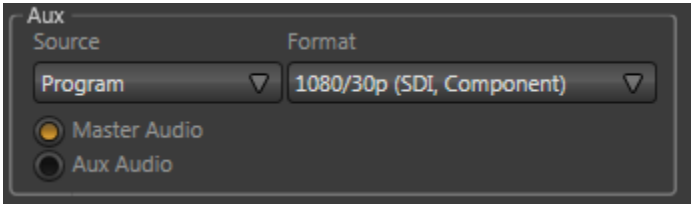


Figure 129

The *Aux* group in *Output Configuration* provides more options than are available for the first two video output rows. Two drop-down menus appear here, regardless of session format, labeled *Source* and *Format*.

SOURCE

The *Aux* video output is uniquely flexible as respects which sources can be displayed. While some of these mirror those presented as options for the Multiview output, others are not. Notably, the *Input* and *Frame Buffer* sub-menus support several exclusive displays. Here is the complete list of possibilities:

- *Input* – any primary Switcher source (Camera, Network, or Media Player)
- *Frame Buffer* – any individual Frame Buffer image.
- *Preview* – the Look Ahead Preview display.
- *Program* – TriCaster's main Program output.
- *Program (Clean)* – TriCaster's main Program output, minus the two primary Overlay channels and FTB.
- *FX* – the current FX source selection.

Hint: Remember than TriCaster's Record feature can optionally capture output from Aux, providing many useful capabilities – see Section 7.1.4.

FORMAT

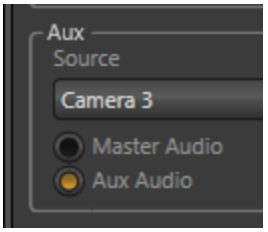
The options in the *Format* menu actually control *both* video output format and *Connection Type* for the *Aux* video output. The output options vary by session format:

- HD (1080i or 720p) options appear *only* when the session format is likewise HD.
- SD output options are always available – 480i (or 576i for PAL sessions, Multi-standard model only).
- When you select an SD output option for an HD session, you are able to choose between 16:9 (widescreen) or 4:3 (cropped) output.
- For each format option, the appropriate *Connection Type* options are also shown.

Let's try to clarify all of this by considering an example. For an NTSC 1080i session, you can select any of the following output connection and format conbminations:

- 1080i (SDI, Component)
- 1080/30p (SDI, Component)
- 720p (SDI, Component)
- 720/30p (SDI, Component)
- 480i, 16:9 (SDI, Component) 480i, 16:9 (SDI, Y/C + Composite)
- 480i, 4:3 (SDI, Component)
- 480i, 4:3 (SDI, Y/C + Composite)

AUDIO SOURCE



The audio options portion of the *Aux* control group allows you to choose which *Audio* accompanies the *Aux* video output in two situations. Firstly, this setting determines which audio stream is captured to a file by TriCaster's *Record* feature when it is configured to record *Aux*. Additionally, it governs the embedded audio accompanying the *Aux* row's SDI *video* output.

Figure 130

OUTPUT ALPHA MATTE

TRICASTER EXTREME™

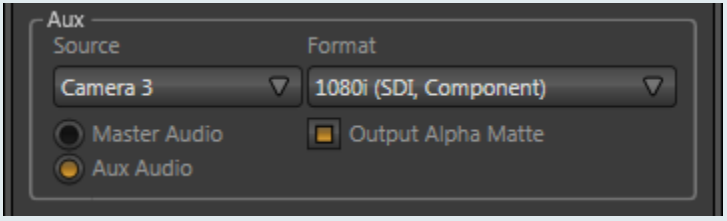


Figure 131

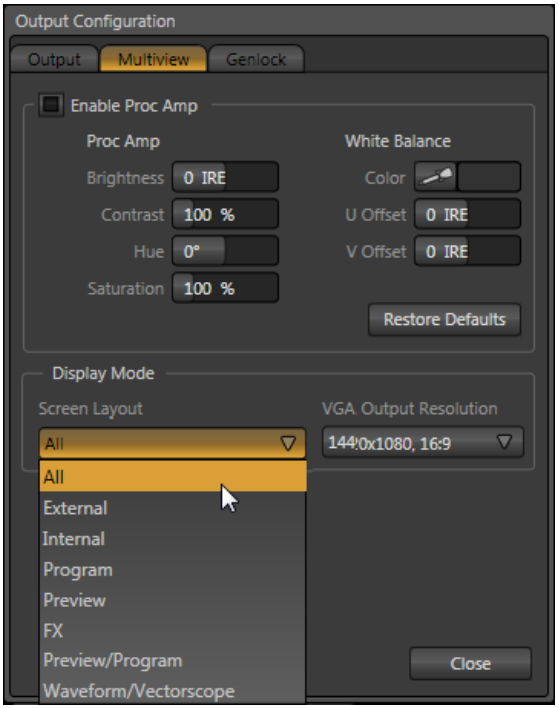
Aux options for TriCaster™ EXTREME systems include a switch labeled *Output Alpha Matte*. This feature can be used independently, or complement the *Act as Alpha* option (discussed in Section 7.2.2).

An alpha matte can be automatically derived from any suitable source. It might be the matte from a *LiveMatte* keyer effect, allowing *Aux* output to support downstream compositing of the full color source; or it could be drawn from the *Title* player; or even a pass-through from an upstream alpha channel source.

Output Alpha Matte is easy to use. Simply enable the switch in the *Output Configuration* panel, and select a suitable source using the *Source* menu.

> *Hint: The Format setting should match session resolution when Aux is used to supply an Alpha Matte signal to downstream devices.*

7.1.5 MULTIVIEW OUTPUT



TriCaster's *Multiview* output fills several valuable purposes. You might use it to provide a video stream to a projection or other remote display system at high resolution.

If you supply your projector inputs from TriCaster's SDI or analog video outputs instead, or don't require projection, the *Multiview* output can be used to feed a secondary display monitor.

Perhaps you wish to use *Multiview* to output something other than the main *Program* output. This is where the *Screen Layout* menu comes in.

Figure 132

> *Hint: See Section 5.3.1 for details on the time shown in Multiview layouts with clocks.*

Changing *Multiview* output options (*Layout* or *Resolution*) can cause frames to be dropped briefly. Changing these settings during live production is not recommended.

Figure 133

Screen Layout offers a diverse list including numerous optional displays as follows:

- *All*: this useful display is the default, and combines monitors for all Switcher sources plus Program and Preview and handy digital clocks.
- *External* – all 8 primary inputs plus large Program and Preview monitors.
- *Internal* – all Media Players (other than Sound) Plus Net 1 and Net 2.
- *Program* – TriCaster's main Program output.
- *Preview* – the Look Ahead Preview.
- *FX* – the current FX source selection.
- *Preview/ Program* – both video sources plus clock(s).
- *Waveform/Vectorscope* – the current Preview row selection along with large Waveform and Vectorscope monitors.

Hint: The External and Internal layouts complement Live Desktop monitor tabs, and can be used to provide an all-inclusive monitoring solution when the latter are used.

The *VGA Output Resolution* menu provides a long list of popular and useful options to allow you to configure TriCaster™ output to conform to your downstream external device. Note that it is important to select the native resolution of the external display device (monitor or projector) for best results.

7.1.6 GENLOCK

TriCaster's *Genlock* feature allows it to 'lock' its video output to a reference video signal (house sync, such as 'black burst') supplied to its Genlock input connector. This synchronizes TriCaster™ output to other external equipment locked to the same reference. Genlocking is not an absolute *requirement*, but it is very beneficial, and you should definitely use it if you have the capability.

TriCaster™ mixes and switches output from eight video sources. Miniscule local timing differences between these may force tiny delays during switching operations, which can also contribute to throughput latency. Thus, serving i) TriCaster's Genlock input and ii) other video devices in the chain with a single reference is the best approach.

Hint: "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'.

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 TriCaster's *Genlock* input ensures a match between TriCaster™ output and any downstream video devices required to handle both it *and* other (genlocked) sources.

Hint: 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). TriCaster™, however, includes live dynamic audio re-sampling for each input. Genlocking of SDI audio/video sources is not a requirement for TriCaster™. Still, genlocking sources and TriCaster™ to a house reference signal, or genlocking the cameras directly to the TriCaster™ output, is encouraged (to genlock cameras, see your camera manual).

VERTICAL POSITION, HORIZONTAL POSITION AND PHASE

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.

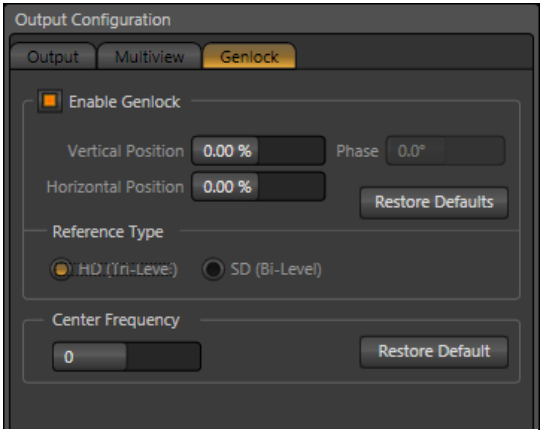


Figure 134

This is essentially why TriCaster™ provides several adjustments in its *Genlock* section. 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 TriCaster's *Genlock Input* (and your other equipment), select the *HD (Tri-level)* switch in the *Reference Type* area of TriCaster's Genlock settings.

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

7.1.7 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 TriCaster's video output to a downstream vectorscope. The vectorscope display is completely stable when *Center Frequency* is properly adjusted.

7.2 INPUT CONFIGURATION

Just as for *Program Output*, the source monitors also have contextual tools that appear when you roll the mouse pointer over them. In every case, the right-most button is a *Configure button* (gear). Clicking it opens the *Configuration* panel for a specific source (Figure 135).

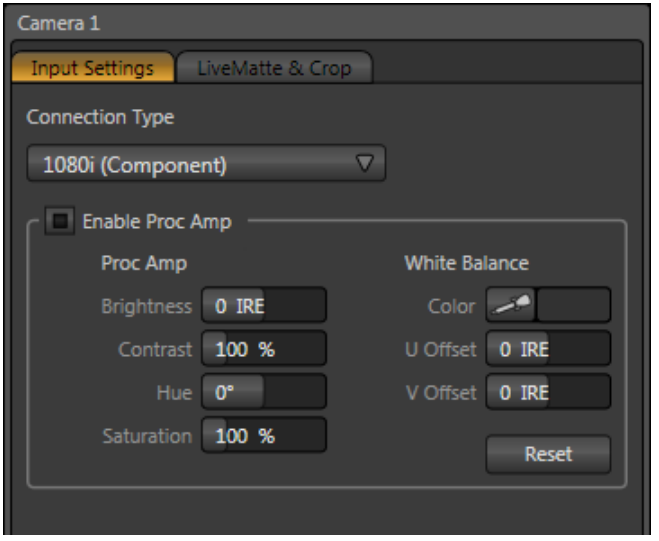


Figure 135

7.2.1 CONNECTION TYPE

The *Configuration* panel for the *Camera* inputs features a *Connection Type* menu at the top of its *Input Settings* tab. *Connection Type* menu options vary depending on the *Video Standard* for the session. TriCaster™ *Multi-standard* provides *PAL* and *NTSC-J* session options, in addition to *NTSC*.

The *Connection Type* menu options for a PAL session list PAL HD and SD format options. Choosing *NTSC* as the *session Video Standard* results in *a Connection Type* list with appropriate formats, and it is similar for *NTSC-J*. Changing from one Video Standard to another requires opening a new session.

Hint: All connected cameras must conform to the current Video Standard for the session.

The standard options are:

1080i (Component)

- Analog source, high definition, interlaced
- 1080/60i or [1]1080/50i
- 1920x1080 pixels, 16:9 picture aspect
- Connected to TriCaster by Y, Pr and Pb input connectors

1080i (SDI)

- Digital source, standard definition, interlaced
- 1080/60i or [1]1080/50i
- 1920x1080 pixels, 16:9 picture aspect
- Connected to TriCaster by SDI input connectors
- Optionally carries embedded audio

1080/30p (SDI), 1080/24p (SDI), 1080/24PsF (SDI), [1]1080/25p (SDI)

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

720/60p (Component), [1]720/50p (Component)

- Analog source, high definition, progressive scan
- 1280x720 pixels, 16:9 picture aspect
- Connected to TriCaster by Y, Pr and Pb input connectors

720/60p (SDI), 720/30p (SDI), 720/24p (SDI), [1]720/50p (SDI), [1]720/25p (SDI)

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

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

480/30i (Component)

- NTSC analog format, standard definition, interlaced
- 720x480 pixels, 4:3 picture aspect or anamorphic 16:9 picture aspect
- Connected to TriCaster by Y, Pr and Pb input connectors

480/30i (SDI)

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

480/30i (Y/C)

- NTSC (S-Video) analog format , standard definition, interlaced
- 720x480 pixels, 4:3 picture aspect or anamorphic 16:9 picture aspect
- Connected to TriCaster by Y and Pb input connectors

480/30i (Composite)

- NTSC analog format , standard definition, interlaced
- 720x480 pixels, 4:3 picture aspect or anamorphic 16:9 picture aspect
- Connected to TriCaster by Y input connector

[1]576/25i (Component)

- PAL analog format, Standard definition, interlaced
- 720x576 pixels, 4:3 picture aspect or anamorphic 16:9 picture aspect
- Connected to TriCaster by Y, Pr and Pb input connectors

[1]576/25i (SDI)

- PAL digital format , standard definition, interlaced
- 720x576 pixels, 4:3 picture aspect or anamorphic 16:9 picture aspect
- Connected to TriCaster by SDI input connectors
- Optionally carries embedded audio

[1]576/25i (Y/C)

- PAL (S-Video) analog format , standard definition, interlaced
- 720x576 pixels, 4:3 picture aspect or anamorphic 16:9 picture aspect
- Connected to TriCaster by Y and Pb input connectors

[1]576/25i (Composite)

- PAL analog format , standard definition, interlaced
- 720x576 pixels, 4:3 picture aspect or anamorphic 16:9 picture aspect
- Connected to TriCaster by Y input connector

[1] Multi-standard TriCaster™ PAL connection type.

7.2.2 ACT AS ALPHA

TriCaster™ optionally allows one or more neighboring pairs of video *inputs* to be combined as a single 'video + alpha' channel (sometimes also referred to as "fill and matte").

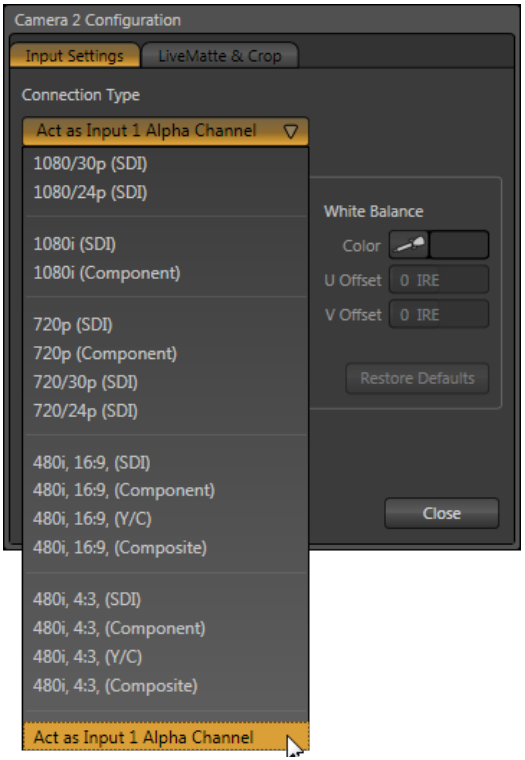


Figure 136

The ability to configure one input as the alpha channel source for another is absolutely *invaluable* for installations employing video feeds from high end external CG and chromakeying systems (such as Chyron® and Ultimatte®).

To use this feature, select *Act as Alpha Channel for Input (#)* as the *Connection Type* in the Input Configuration panel for an even-numbered input.

Note: The input configuration (video format and connection type) for the alpha input is automatically configured to match the fill source it is paired with.

7.2.3 PROC AMP

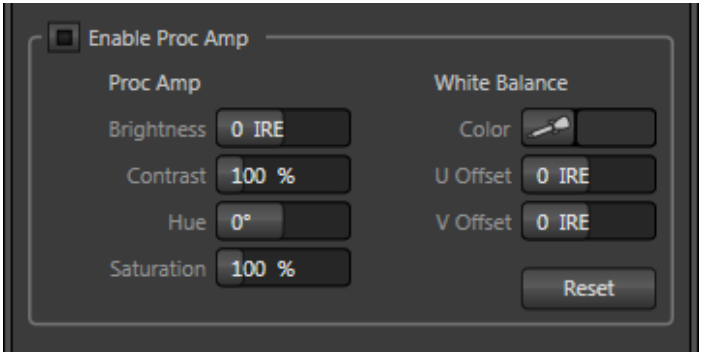


Figure 137

The main portion of the *Input Settings* tab contains *Proc Amp* settings. These settings are identical to those discussed in Section 7.1.2. Of course, Proc Amp settings are applied to the individual video *inputs*, thus before *output* Proc Amp settings (which affect all sources equally).

When the *Proc Amp* is enabled for a specific source, a small yellow indicator is displayed in the upper-right corner, just above the corresponding monitor in any of the three main monitor tabs.

Input *Proc Amp* adjustments are applied *after LiveMatte* is processed, which can help when composing greenscreen shots to match a background or *LiveSet*. You may also notice that changes to Proc Amp settings do affect stopped (or frozen) sources, including live camera feeds.

7.2.4 LIVEMATTE & CROP

The *second* tab in the *Input Configuration* panels is where you configure TriCaster's powerful realtime keying system for live production, *LiveMatte*.

Keying is a popular and powerful method of combining two images — whether photos, video clips or live camera streams. 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*, TriCaster's powerful virtual set technology.

Figure 138

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 (and *Crop* - please see Chapter 11).

When *LiveMatte* is enabled for a specific source, a small green indicator is displayed in the upper-right corner above the corresponding monitor in any of the three main monitor tabs. Similarly, *Crop* shows a blue indicator. These lights are actually interactive toggle switches.

7.3 TIMECODE CONFIGURATION

Figure 139

TriCaster™ can supply production time values based on the system clock, when necessary. To access timecode options, click the small gear icon next to the timecode display at right in the titlebar of the *Live Desktop*.

Hint: You can set TriCaster's system clock just as you would for any computer, by first exiting to the Windows™ desktop.

TRICASTER EXTREME™ TriCaster EXTREME™ systems can optionally use an external linear timecode (LTC) reference to drive its clocks (and timecode for capture). We'll discuss the shared timecode features first, and then focus on the unique aspects of the timecode support in TriCaster EXTREME™ (in Section 7.3.2).

7.3.1 SUBTRACT 12 HOURS

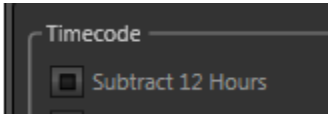


Figure 140

The current time value is embedded in the frames of MPEG-2 video files captured during the session using TriCaster's *Record* function. For this reason, a switch labeled *Subtract 12 Hours* is provided. This permits you to avoid confusion that might arise when sequencing files based on timecode that 'wraps around' past midnight.

(Otherwise, for example, a video frame recorded one minute *before* midnight would be assigned the timecode 23:59:59.00, while frames recorded one minute or more later would have timecode ≥ 01:00:00.00 – seemingly a *lower* (i.e., ordinarily *earlier*) timecode value.)

7.3.2 PRODUCTION TIME

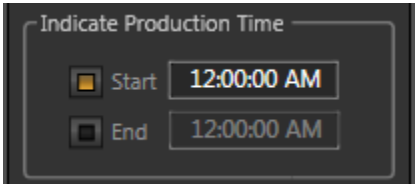


Figure 141

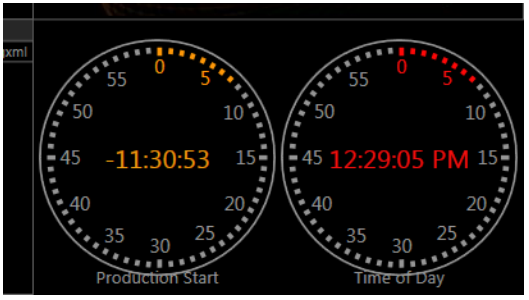


Figure 142

Two more switches, under the label *Production Time*, allow you to indicate *Start* and *End* times. Beside each of these is an editable time field (click inside the field to modify the time value).

During live production, the *Live Desktop* titlebar and several of TriCaster's *Multiview* layouts (Figure 142) provide *Broadcast Clock* displays along with current timecode. Secondary clocks show a useful countdown to the (production) *Start* or *End* times when the corresponding switches are enabled in the *Timecode Configuration* panel.

7.3.3 LTC TIMECODE

TRICASTER EXTREME™

Linear timecode is by far the most common 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. TriCaster™ 850 EXTREME™ uses *Audio Input 7* for this purpose, while TriCaster™ 450 EXTREME™ uses *Audio Input* 3 (see Section 3.6)

TriCaster decodes time stamps from the audible signal, and uses the values for clock displays and embedded timecode when recording video. This is a great asset for post-production purposes.

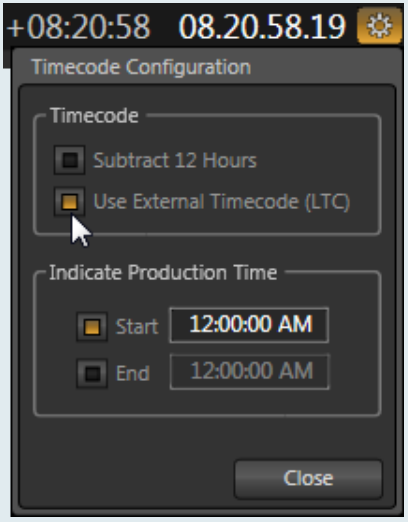


Figure 143

Enable linear timecode using the switch labeled *Use External timecode (LTC)* in *Timecode Configuration*.

Sound from the audio input tasked with supplying timecode is automatically muted for recording and output purposes when LTC timecode is enabled, but you can un-mute it briefly in the *Audio Mixer* to let you adjust input levels.

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 SWITCHER, TRANSITIONS AND OVERLAY

TriCaster'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, two independent downstream overlay channels, and some very useful automation.

This chapter reviews these vital aspects of your live productions.

The central band of TriCaster's *Live Desktop* – between the upper monitoring section and the tabbed modules below – is taken up by the *Switcher* and related controls and features, including the *Layer Controls*, which include main and local (layer) *Transition* controls and configuration features (Figure 144).

Switcher	Layer Controls

Figure 144

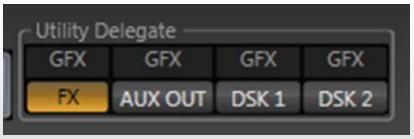
8.1 SWITCHER ROWS

Figure 145

From top to bottom, the three *Switcher* rows are labeled *Utility*, *Program* and *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 13).

8.1.1 UTILITY (AND DELEGATE)

Utility is a special purpose row, and offers additional capabilities, described next.



The function of the *Utility* row is governed by the nearby *Utility Delegate* button selection(s).

Click a single delegate button, or press the Ctrl key while clicking to dedicate the *Utility row* to selecting the source for the corresponding item(s) – *FX, AUX OUT, DSK 1* or *DSK 2*.

- Making a selection on the *Utility* row assigns that source to all selected delegates.
- The *FX* channel selection provides an auxiliary video stream which can serve in a variety of ways. For example, it could supply the background scene in a *Virtual Input*, or be assigned to an *Overlay* or *DSK* channel (Chapter 12.3).
- Selecting the *AUX OUT* delegate allows direct selection of the *Auxiliary Output* video stream, without requiring you to open *Output Configuration*.

  Hold down *Shift* on the keyboard when clicking the *Utility* row buttons on the *Live Desktop* as listed below to access extended *AUX OUT* selections:

  - 1-8 -> VI Frame Buffers 1-8
  - Net 1 -> Look Ahead Preview
  - Net 2 -> Program
  - DDR 1 -> Program (Clean)
  - DDR2 -> FX
- Selecting a *DSK* (1 or 2) delegate allows direct selection of the associated DSK source.

- When you make a delegate selection, the *Utility* row button corresponding to the source currently assigned to that *delegate* lights up.

- For a new multi-delegate selection whose current sources are different, no buttons are initially lit.

- At all times, the source currently assigned to a delegate is listed above its button in the *Utility Delegate* group.

8.1.2 PROGRAM AND PREVIEW

The *Program row* selection determines the dominant video stream of the *Background* (BKGD) *video layer* – the bottom-most layer of the composition shown on *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.

Figure 146

The *Program* and *Preview* rows are extended with buttons labeled *V1* to either *V4* or *V8*, depending on the TriCaster™ model. These buttons control display of the composite output of TriCaster's *Virtual Inputs* (Chapter 11).

8.2 VIDEO LAYERS

The concept of *video layers* is central to understanding how TriCaster's *Switcher* and *Transition* controls relate to one another, and how they combine to form the video seen on *Program Out*.

TriCaster's *Background* layer (often shortened to simply 'BKGD') is always the base for the video composition displayed on *Program out*.

DSK (Down Stream 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, three additional 'primary layers' can contribute to TriCaster's final *Program* output at any given moment:

The *Background* (BKGD) layer supplies the 'bottom-most' video layer, seen behind any other layers shown on Program Out.

At any given moment, *BKGD* may consist of a mix of video streams from *Program* and *Preview* rows, or even a more complex composition formed from the numerous sources of one or even more *Virtual Inputs*.

- Two overlay layers, *DSK 1* and *DSK 2*, 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.
- *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:

- Sub-layers may include video from the *Program* or *Preview* rows.

- Selecting a *Virtual Input* on *Program* or *Preview* can bring more sub-layers into the *BKGD* composite – *Input A, B,* and the dedicated Virtual Input *Overlay*. (This being so, the BKGD layer alone can at times actually comprise up to seven sub-layers.)

8.3 TRANSITIONS

Immediately to the right of the *Switcher* rows is the *Transitions* section. This group of controls and settings provides many creative and flexible ways to compose the video layers comprising *Program* output.

Main Layer Controls	Local Layer Controls

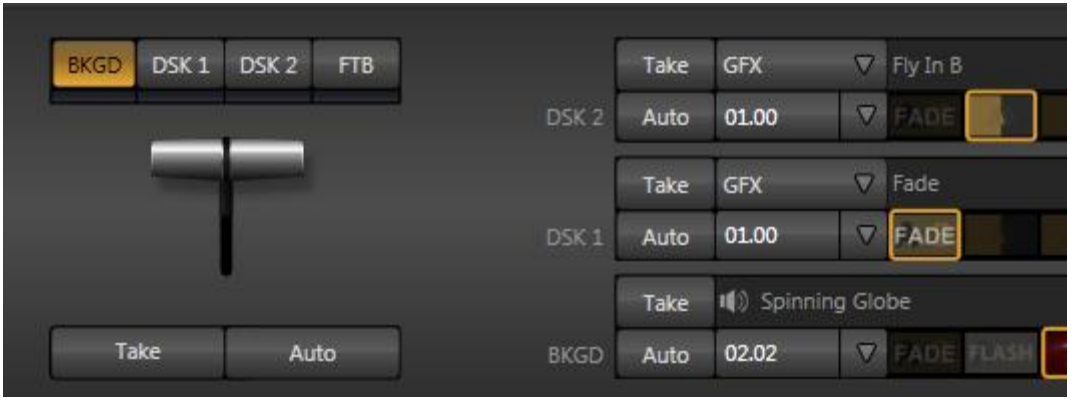


Figure 147

With video layers in mind, it's easy to comprehend the philosophy underlying the *Transition* control group.

The larger right portion of the *Transition* group provides *local* control and configuration options individually for three of the four primary video layers, namely *BKGD, DSK 1* and *DSK 2.*

We'll consider the local controls first.

8.3.1 LOCAL CONTROLS

BKGD Transitions and *Overlay (DSK) Transitions* are slightly different. *BKGD Transitions* have *Reverse* and *Ping Pong* options. The direction controls have been relocated to the *Transition Options* panel (opened using the nearby gear button).

Overlay Transitions always *Ping Pong*, so do not offer direction controls.

- Pressing the local *Take* button for the *BKGD* layer will swap the current *Preview* row selection to the *Program* row, and vice versa, just as you would expect.
- Pressing the local *Take* button for either *DSK 1* or *DSK 2* displays or hides the corresponding video layer (shown on top of the *BKGD* layer).
- Naturally, local *Auto* buttons perform similarly, but apply transition settings you configure with the controls at right for each layer.

Hint: DSK (Overlay) Positioning is toggled on/off in the Transition Options pane, opened by clicking the button labeled "Pos". A small sidelight beside this button indicates active positioning.

TAKE AND AUTO

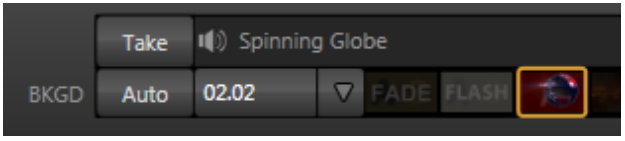


Figure 148

As we have seen, clicking a *local* (BKGD, DSK 1 or DSK 2) *Take* button performs a straight cut for that video layer. For *BKGD*, the *Program* and *Preview* row selections will be swapped.

If, instead, you press the local *Auto* button for *BKGD*, the transition currently selected in the *bin* at right is performed, but the end result is the same.

In similar fashion, *DSK* layers will be either hidden or displayed (above the *BKGD* layer) when you click their local *Take* and *Auto* buttons.

You can halt an *Auto* operation partway by clicking the button again during the transition. For *BKGD* transitions, the operation will be completed the next time you click the button.

A slightly different result occurs when re-initiating an incomplete *DSK* transition. If the effect was more than halfway complete when halted, clicking *Auto* again completes it. Otherwise it is reversed, returning the layer to its prior display state.

CONFIGURING TRANSITIONS

The duration of transitions is governed by a drop-down menu provided for each local video layer. The menu provides convenient two, one and ½ second duration presets.

Figure 149

Alternatively, you can either drag the mouse pointer left or right over the numeric display to set a custom time, or click the numeric field to enable direct keyboard entry (Figure 149).

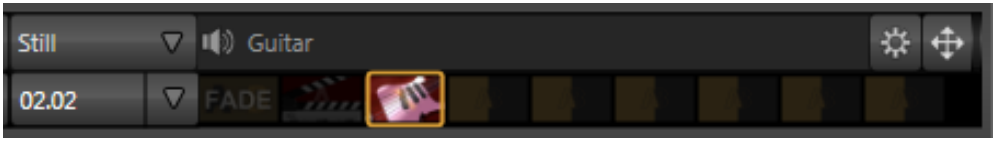


Figure 150

Completing the *Transition* section is the *Transition Bin*, which allows you to pre-select the transition effect that will be performed next by clicking its thumbnail icon. The active transition for each video layer is displayed with a gold border (Figure 148).

Click the *Configure* (gear) button at right above the *Transition Bin* to select and configure transitions for each video layer (Figure 151).

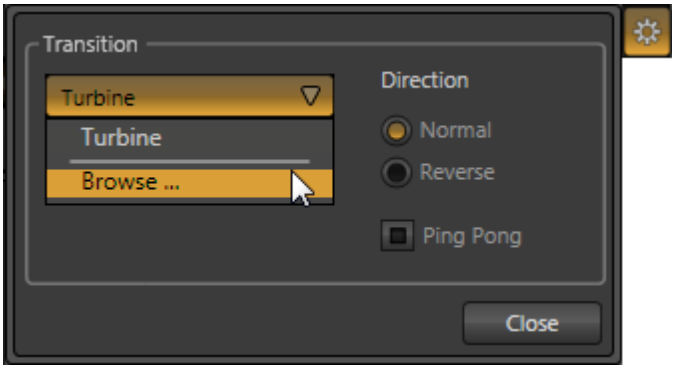


Figure 151

The options that appear when you do so differ, depending on whether you are configuring a *Background Transition* (BKGD layer only) or an *Overlay Transition* (DSK layers). The first time you click *Configure*, the only entry in the drop-down menu may be *Browse*. Selecting it opens a *Media Browser* to let you choose a transition to replace the current selection.

Hint: The frequently-used Fade transition is always available in the left-most slot in the bin. As it has no options and cannot be replaced, the Configure button is ghosted when Fade is selected.

By the way, note that the direction of the *Overlay Transitions* (i.e., *DSK* layer transitions) automatically alternates. That is, if the first click displays the layer using an effect, the next click removes it using the reverse transition effect, and so on (this behavior mimics the *Background Transition* option call *Ping Pong*, discussed momentarily).

BKGD TRANSITION OPTIONS

Clicking the *Configure* (gear) button for a *Background Transition* opens a panel (Figure 151) with a few added options, as listed below:

- *Normal* invokes default behavior for the transition.
- *Reverse* causes transitions to be performed in the opposite direction. For example, a transition that normally reveals the incoming video stream from left-to-right will operate from right-to-left instead.

- When *Ping Pong* is enabled, the *Reverse* behavior is toggled each time a transition is performed.

  Using the previous example, if the last transition progressed from left-to-right, the next one time you apply the same transition, it will automatically be reversed (and thus run right-to-left).

ANIMATION STORE TRANSITIONS

TRICASTER EXTREME™ A special type of transition can be found in the *Transition Bin* for either *BKGD* or *DSK* layers on TriCaster EXTREME™ systems.

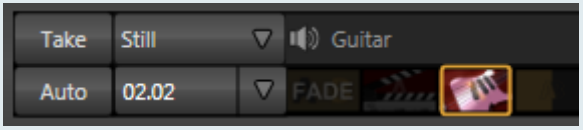


Figure 152

Animation Store transitions can have a full color animated overlay built into them, along with individual sounds for transitioning in and out (transition sounds are optional; also, level of audio control is provided in the *Internal Audio Mixer* tab).

These special *Animation Store transitions* are loaded into the *Transition Bins* in the same way as their less colorful cousins, using the *Browse* feature. A number of *Animation Store transitions* are included with TriCaster EXTREME™, 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 in TriCaster Startup.

DSK POSITIONING

Each *DSK* layer has its own *Position* button and settings. Click the neighboring button labeled with a double-headed arrow to open the *Overlay Position* panel.

Figure 153

Position panel settings are organized into two groups named *Crop Edges* and *Position*. The current settings can be toggled on/off using the *Enable* switch at upper left or *Reset* (for either group) with a single click.

The *Crop Edges* controls are similar to *Crop* settings in TriCaster's *Input Configuration* panel. However these local *DSK* settings are independent, and apply even when the *Crop* in *Input Configuration* is not enabled.

The rest of the panel is devoted to *Position* settings. At the top are three buttons: *Position*, *Rotation*, and *Scale*, viewed from left to right.

Click and drag on the *Position* button (a double-headed arrow) to relocate the associated *DSK* layer vertically or horizontally within the frame.

Notice that by dragging left or right on either of the two numeric controls below, you can adjust the position on a single axis.

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

Figure 154

In similar fashion, drag the pointer over the *Rotation* button with the left mouse button depressed to turn the overlay source in 3D space, as follows:

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

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

- Drag on a single numeric slider below, or hold down *Ctrl* while dragging to constrain rotation to one axis.

Dragging the cursor on the *Scale* button (magnifying glass) affects the size of the overlay.

When the nearby lock button is enabled, dragging in any direction affects scale equally on both axes. Otherwise, dragging vertically on *Scale* changes the height, while dragging horizontally affects width.

DSK layers automatically appear (temporarily) on Preview when the Position panel is open (regardless of the current Delegate selections or layer display state).

This frees you to tinker with Positioning without the result appearing on Program output prematurely.

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).

Again, if you drag just one of the numeric gadgets below the *Scale* button (with the lock *disabled*) or hold down *Ctrl* while doing so, you modify just one dimension of the DSK layer – width or height.

Individual settings (such as *Rotation* or *Size*) can be reset with one by clicking *Reset Positioning*, and the settings can be globally toggled on or off by clicking the *Position* buttons in the *Overlay* section of the *Switcher*.

Hint: See Section 10.3, Frame Buffers for a discussion of this special source option.

DSK TRANSPARENCY

Remember that the source for a *DSK* layer is selected using the Switcher's *Utility* row. Some *DSK* sources may be partially transparent. This might be because they are drawn from a *Media*

Player (DDR, Still or Title) file that includes an embedded *alpha channel*, because *LiveMatte* or *Cropping* are enabled for the source, or even all of the above

Regardless, *DSK* layers will automatically respect transparency when the source supplies it. The *BKGD* layer (and, for *DSK 2*, its lower-numbered sibling) will appear through or around sources with transparency as appropriate.

Important Note: Use straight (a.k.a. "non-premultiplied") alpha channels in TriCaster's media players. Premultiplied files may not yield correct results when overlaid on other imagery.

Figure 155

TriCaster's *DSK* layers offer a lot of creative possibilities. You might use one *DSK* to display a permanent station ID 'bug'. Or, you might superimpose a company logo from *Still* onto a title page, add a 'spinning globe' animation playing in the *DDR* to a lower-third, 'frame' a keyed source composed over a title (Figure 155), or set up many other elaborate effects in this manner.

8.3.2 MAIN CONTROLS

In large measure, TriCaster's main *Transition* controls (*Take*, *Auto* and the *T-Bar*) behave similarly to their local sidekicks. What makes them special is the Transition Delegate button group located just above the main T-Bar.

TRANSITION DELEGATES

An executive maxim suggests "Don't do anything yourself when you can delegate it. We briefly examined the *Utility Delegate* tools back in Section 8.1.1, where we discovered that delegating controls can multiply their functionality.

The familiar main *T-Bar*, *Auto* and *Take* controls occupying the *left* half of TriCaster's *Transition* control group are now joined by a set of *Transition Delegate* buttons. Let's see how applying the concept of delegating controls affects their use:

Figure 156

- Assign something suitable to both *DSK* layers, using the *Utility* row with FX delegated.
- Click the local *Take* buttons to hide both *DSK* layers, if they are visible on output.
- Click the *BKGD* button in the *Transition Delegate* group.
- Click the main *Auto* button (below the T-Bar).

The result of the last operation is identical to what would have occurred had you pressed the local *BKGD* layer *Auto* button at right instead.

- Now, hold down the *Ctrl* key and click the delegate button for *DSK 1. Or* if you have a TriCaster™ CS (control surface), press both the *BKGD* and *DSK 1* buttons in its *Transition Delegate* group at the same time instead.

You have just delegated the controls below to <u>two</u> *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 (Section 9.2) reflects your Transition Delegate selections, and allows you to configure video layers for upcoming switcher operations with great confidence.

A progress bar beneath the each of the *Delegate* buttons tracks transition progress. (For the two *DSK* layers, the bar will remain fully 'on' when the related layer is 100% displayed).

FTB

Let's discuss the final button in the *Transition Delegate* group - *FTB*. The acronym stands for *Fade to Black*. The result of selecting the button and displaying the video layer it controls will not likely surprise you very much. *FTB* offers a convenient method of doing precisely what is implied by its name, simply fading *Program Output* out completely (to black).

It might help to think of *FTB* as 'DSK 3', since it represents a final *video layer* added above all others before ultimate *Program* output. *FTB* has several unique characteristics, however. For one thing, *DSK 1* and *2* can display colorful video sources (with or without transparency); the FTB video layer is always 100% opaque black, and completely obscures everything below it.

Note: Like the DSK layers, hiding or displaying FTB triggers both Autoplay and Audio Follow Video when these settings are active for Media Players. FTB also fades Master Audio to mute when displayed, and back up again when hidden.

Also unlike other video layers, *FTB* does not support custom transitions (pressing *Auto* simply fades it on or off) or timing; FTB's fade duration is drawn from the *BKGD* layer setting.

TAKE AND AUTO

As we have seen, clicking the main *Take* button (keyboard shortcut *Enter*) performs a straight cut for all video layers (*BKGD, DSK 1, DSK 2,* and *FTB*) that are currently selected in the *Transition Delegate* group.

Likewise, if you press *Auto* (or the keyboard *Spacebar*), transitions configured at right for all delegated video layers are performed.

8.3.3 T-BAR

The *T-Bar* mimics the similar control on a traditional video switcher, and allows you to *manually* perform a transition between delegated *video layers* (see Section 0,

Video Layers):

Figure 157

- *FTB* delegated – show or hide the FTB video layer.
- *DSK 2* delegated – show or hide the DSK 2 video layer.
- *DSK 1* delegated – show or hide the DSK 1 video layer.
- *BKGD* delegated – transition between sources selected on the *Program* and *Preview* rows.

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.

9 DESKTOP MONITORS

The word “monitor” comes from the Latin “monēre” – meaning ‘to warn’. The word 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 when monitoring a process. As a noun, we understand it to mean devices that permit one to do just that.

Fittingly, TriCaster’s desktop monitors are just what you need to keep an eye on and control your live productions, warn you of conditions that might affect output quality, and also allow you to make any necessary adjustments.

Note: For convenience, several valuable controls and features are located in the monitoring section. Among others, these include the Proc Amp, Genlock, LiveMatte and Crop controls. To give these features their due, they are treated individually in Chapter 7, which is entitled I/O Configuration. Likewise, Network sources are discussed in Chapter 14.

9.1 PROGRAM AND PREVIEW

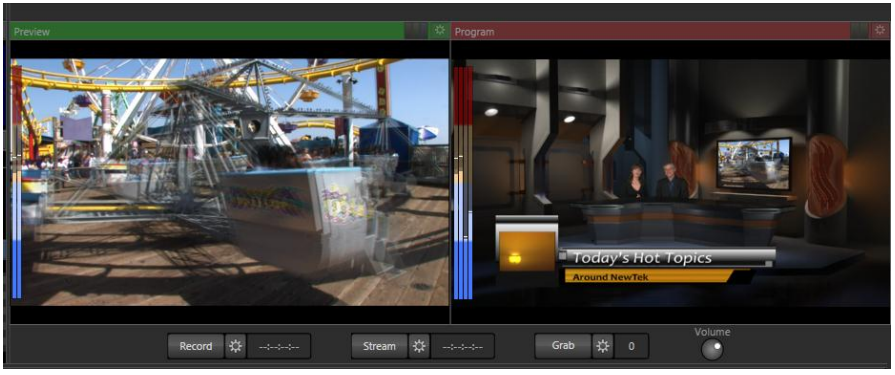


Figure 158

The *Program Output* monitor could hardly be more important, hence it’s prominent position at upper-right on the *Live Desktop*, and eye-catching red toned titlebar.

The *Program* monitor shows what TriCaster™ is displaying to your viewing audience at any moment. This includes the *BKGD* video layer as well as any other video layers (such as *DSK 1* or *2*, or *FTB*) that are displayed above it.

When you move your mouse pointer over the *Program* monitor, a *Configure* button (gear) appears above its upper-right corner. Clicking this button opens a tabbed panel that contains *Proc Amp* controls (for *Output* and *Multiview* video) and *Genlock* settings – see Chapter 7 for details.

9.1.1 CONFIGURATION INDICATORS

Small indicators (flags) may appear above the *Program Output* monitor. Their presence denotes that *Proc Amp* settings are enabled for *Program, Multiview* output, or both.

Figure 159

Hint: Click these flags to toggle the Proc Amps on/off without opening the Configuration panel.

9.2 LOOK AHEAD PREVIEW

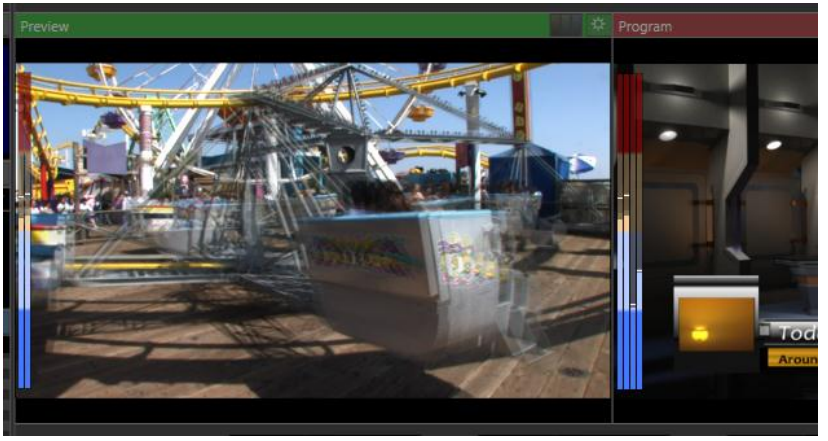


Figure 160

Right beside the *Program* monitor, the *Live Desktop* also displays the *Look Ahead Preview* monitor (labeled simply *Preview*) surmounted by a green tinted titlebar).

Figure 161

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 8.3.2).

IN OTHER WORDS, 'WHAT YOU SEE IS WHAT YOU *WILL* GET' – AFTER A TAKE OR AUTO.

This allows you to set up the next shot, check its composition (including titles and overlay positioning), and switch to it with sublime confidence.

When BKGD is delegated alone, Take, Auto and Preview work just as in other TriCaster models.

A green titlebar always highlights the Preview monitor.

- Selecting the *BKGD* delegate tells TriCaster™ 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 delegate is not active, the *BKGD 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.

9.3 ALL MONITORS TAB

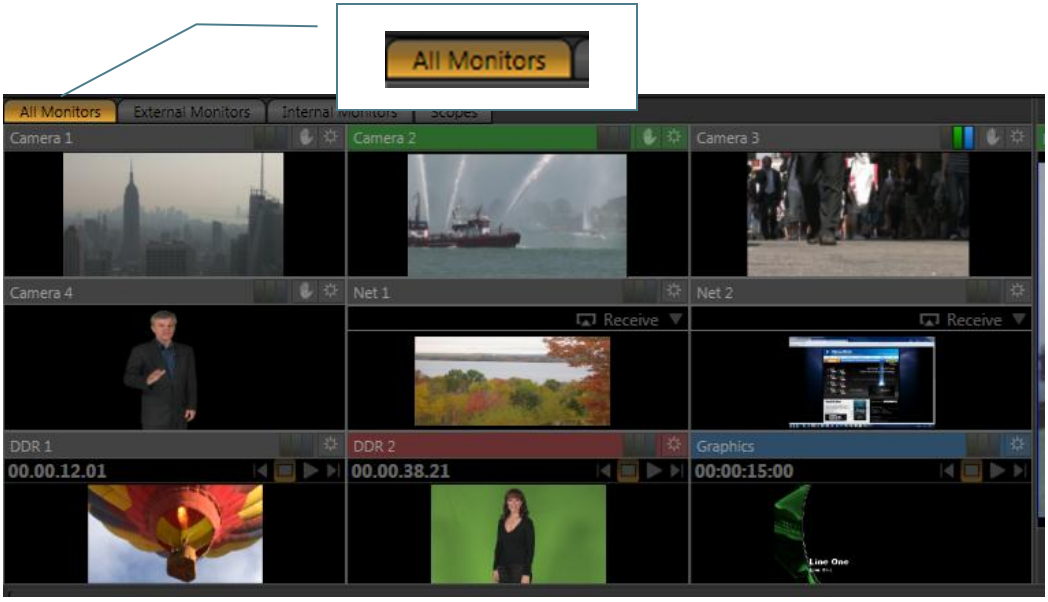


Figure 162

Click the *All Monitors* tab at upper-left to reveal a group of preview windows. These previews, often referred to as *ISO* (Isolation) monitors, display all primary video sources currently available for selection in the *Switcher* rows below.

The actual list of monitors varies according to your TriCaster™ model. Generally, monitors are provided for all live *Camera* inputs, along with previews for *Media Players*. Additional monitors show your current *Network* (external) source selection (if any).

9.3.1 CONTEXTUAL TOOLS

Additional controls pop-up when you move your mouse pointer over the onscreen monitors. The controls provided vary according to the source type represented by the monitor:

Figure 163

Camera monitors show *Freeze* and *Configure* buttons in the titlebar on mouse roll-over. The function of the first is obvious – click the button to highlight it and freeze the current frame; click it again to restore live input. The *Configure* button opens the *Configuration* panel for the related source (see Chapter 7, Section 7.2).

Note: Audio is not affected by the Freeze feature.

Additional controls appear if you roll-over the onscreen monitor for a *Media Player*. *Stop* and *Play* buttons are supplemented by *Previous* and *Next* (playlist item) buttons. These buttons all perform identically to the controls in tabbed modules below the *Switcher* (see Chapter 9).

Figure 164

As well, a timecode field is conveniently situated below the monitor label for *Media Player* modules (Figure 164). Like its sibling in the tabbed modules, right clicking on it opens a menu allowing you to *Reverse Direction* for the time counter, show or disable *Warning Colors*, or use the entire *Playlist Duration* for the timecode rather than just the time for the current item.

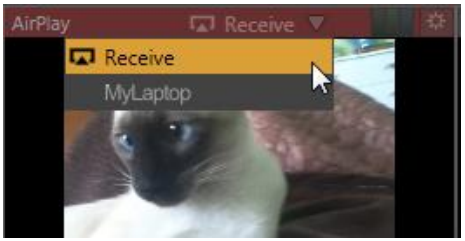


Figure 165

On rolling the mouse pointer over the monitor for either *Network 1* or *Network 2,* an additional control is shown – a downward-pointing triangle. Click the triangle to show a menu listing any valid network video sources TriCaster™ has recognized. This menu might list displays from other computers transmitted across the network via iVGA*™*, an AirPlay® stream, or perhaps the output from a companion NewTek LiveText*™* workstation. (LiveText™ and iVGA™ are considered in more depth in Chapter 14.) Slide the mouse down the menu to the entry you wish to select and click the source you wish to assign as the current *Network* source.

9.3.2 INTERACTIVE CONTROL

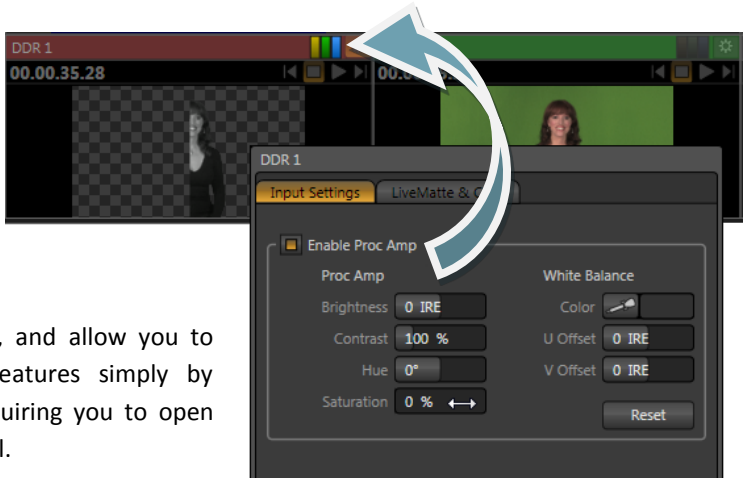
The onscreen monitors (with the exception of *Preview*) are actually interactive live production controls. You can click them to perform many *Switcher* operations. Here's a list of things to try:

- Click on an unselected monitor to place it on the *Preview* row.
- Click the same monitor again to perform a (*BKGD* layer only) *Take*, swapping it with the current *Program* row selection, and sending it to *Program Output*).
- Double-click any monitor to immediately send that source to *Program Out* (replacing the previous *BKGD* layer, and sending its predecessor to the *Preview* row).
- Shift + click the monitor selected on the *Preview* row to *Transition* it to the current *BKGD* layer, again sending its predecessor to the *Preview* row.
- Shift + double-click any unselected monitor to *Transition* the *BKGD* layer to it (sending the original *Program* selection to *Preview*).

(Observe that the *Autoplay* switches respond normally when you switch interactively in this manner.)

INTERACTIVE TITLEBAR INDICATORS

Small yellow, green and blue flags representing the *Proc Amp*, *Crop* and *LiveMatte* appear in the monitor titlebar when the corresponding features are active.



These are actually switches, and allow you to enable or disable these features simply by clicking them – without requiring you to open the *Input Configuration* panel.

Figure 166

TRICASTER EXTREME™ Monitors in TriCaster EXTREME™ views represents transparency in source imagery with a checkerboard background pattern – see Figure 166.

9.4 EXTERNAL MONITORS TAB

This tabbed pane supplies individual monitors for all camera inputs.

9.4.1 CONTEXTUAL TOOLS

Just as we noted earlier (Section 9.3.1) when discussing the *All Monitors* view, rolling the mouse pointer over the preview panes in the *External Monitors* view presents a row of context sensitive buttons above. These include a *Configure* button and other features relevant to the source represented by the individual monitors. (The function of these buttons is identical to the corresponding controls in the *All Monitors* tab.)

9.5 INTERNAL MONITORS TAB

The *Internal Monitors* tab provides yet another useful view (especially for times when you may be using TriCaster's *Multiview* output to show a complementary monitor set (such as *External Monitors*). This tab displays individual monitors for all *Media Players* with *Network 1* and *Network 2*. Again, depending on the TriCaster™ model, you may find other additions completing the array.

9.6 SCOPES TAB

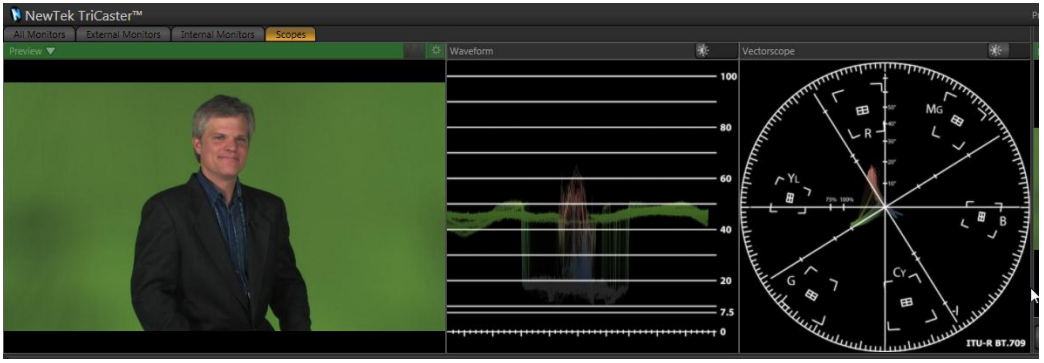


Figure 167

A further and very valuable monitoring tab option is *Scopes*. This selection presents a full color source video monitor along with *Waveform* and *Vectorscope* displays

A drop-down menu at upper-left lets you choose whether the current reference source for the scopes (and full-color monitor) is *Preview*, *Program*, or the *FX* row selection.

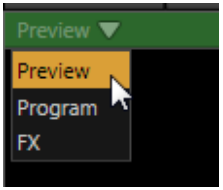


Figure 168

- When set to *Preview*, the two scopes and the associated monitor refer to the current *Look Ahead Preview* composition (including any delegated *DSK* channels, or *FTB*) as source.
- The *Program* setting likewise monitors the entire *Program Output* composition (not merely the *Program row* selection).
- When *FX* is selected, the scopes refer to the *FX* channel source, providing a handy way to calibrate a single *Switcher* source.

The scopes and monitor permit you to judge the effect of *Proc Amp* and *LiveMatte* adjustments while making them. (See Appendix C, Video Calibration for help on using TriCaster's scopes.) The titlebar for the video monitor shows a *Configure* button (gear) when appropriate. Click this button to access *Proc Amp* and *LiveMatte™* controls for the current *Preview* composition's *background* source – only.

Note: Adjustments you make in the source Configuration panel only affect the background source when the source is either Preview or Program. To use Scopes to adjust a DSK source, first delegate it to Preview by itself, or consider using the FX bus for this purpose.

Additional titlebar controls above the scopes let you adjust the *Brightness* for their display. Drag the slider left/right, or click the control to enter a value directly using the keyboard. As usual, you can also *Shift + double-click* to reset the slider to its default. *Right-click* inside the monitor display for either scope to show a menu that allows you to view the trace in full or solid color.

Hint: Drag the dividers between the monitoring panes and Switcher or Preview/Program pane to re-size the monitors. Double-click a divider to reset it to its default position.

10 MEDIA PLAYERS (DDRS, STILL, TITLE AND AUDIO)

TriCaster's Media Players permit you to integrate video, still images and title pages into your live presentation with utmost simplicity and professional style.

Preload content and display it sequentially as a playlist, or singly on demand. The media players can even play, stop and advance automatically in response to your Switcher operations.

10.1 SPECIALIZED MEDIA PLAYERS

TriCaster™ sports multiple *Media Players*, located in tabbed panes found in the bottom third of the Live Desktop. These are the *DDR 1*, *DDR 2*, either *Still and Title* (TriCaster™ 850 models) or a dual-purpose *Graphics* player (TriCaster™ 450 models), and *Sounds*.

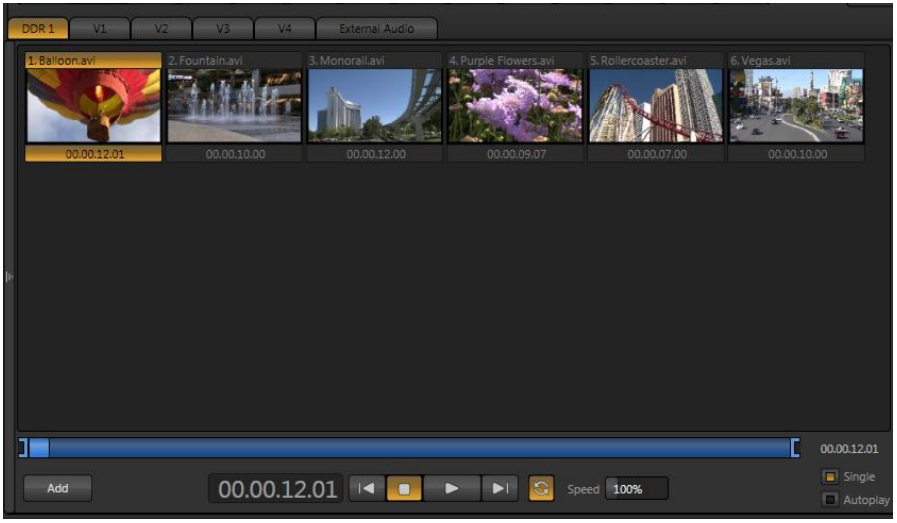


Figure 169

In essence, all of the different *Media Players* are specialized variants of a single module, intended for specific and complementary purposes. The foremost difference between players is in the file formats they each support (and even that distinction is not rigidly adhered to, as we will see.)

The *Title* player, when present, is principally intended for display and management of title pages (both those based on TriCaster's integrated titling system, and titles prepared as image files in third party applications). Even so, if you wished you *could* use it as a 'secondary' media player for a playlist consisting of photographs (for example).

Similarly, the *Still* player is meant for still images – photos, graphics, and the like; but you are not prevented from adding title pages to its playlist if you like (you can even edit a title page in Still, just as you can in *Title*). You can see that the 'difference' in these two modules is really no difference at all. And as mentioned earlier, TriCaster™ 450 models combine both the functionality of both *Still* and *Title* players in a unified *Graphics* module.

Of the various *Media Players*, however, *only* the two *DDRs* have the capability to play video clips (including motion titles such as scrolls). Like the other two, though, it can also host images, audio files, or title pages.

The purpose of the *Sound* player is self-explanatory, and perhaps it is obvious why it alone is not represented by a *Switcher* row button. *Sound* will play back standard .wav or .mp3 format audio files, but does not support graphics or clips of any sort. Its controls are similar to *other Media Players,* with the exceptions that no *Autoplay* or *Speed* controls are provided.

10.2 SHARED FEATURES

Individual *Media Players* are accessed by clicking tabs in the lower 1/3 of TriCaster's *Live Desktop*. Each appears as a 'half-screen width' panel.

10.2.1 PLAYLISTS

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

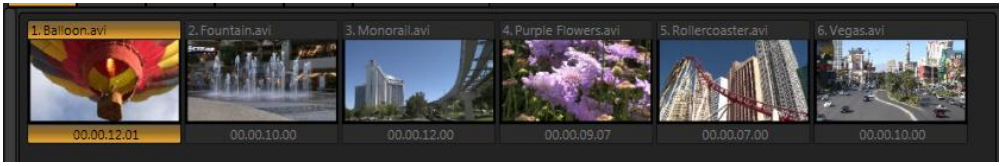


Figure 170

This arrangement offers large thumbnail icons for each entry. A scrollbar at right accommodates long playlists. Icons can quickly and easily be re-ordered 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). The filename (with extension) of each item in the current playlist is displayed above the thumbnails, and its duration is shown below.

Hint: The duration shown is the play time after any trimming operations, and thus may at times be less than the file length on disk for video clips or audio files. 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 the *Media Player* is stopped, its output to video monitors tracks your selection and trimming operations. The current item is displayed as the media player's output, and in consequence appears on the corresponding monitor in the *All Monitors* tab. Of course, only one item can be displayed on output at a time; the frame surrounding the thumbnail icon for the currently displayed item is illuminated.

Double-clicking a thumbnail (or clicking the *Play* button) begins playback from the *In Point* of the current file. Note that even still images and static title pages added to the playlist are given a play duration. The default duration for these items is fifteen seconds. This 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 frame around successive playlist items illuminate as each is played in turn. 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.

FILE OPERATIONS

- Click the *Add* button beneath the playlist pane to open a custom *Media Browser* (see Section 10.2.2). Alternatively, double-click in an empty part of the *Playlist* pane.
- 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*
    - *Rename*
    - *Clone*
    - *Set Duration* (Still image and title icons)
    - *Edit Title*
    - *Send to Frame Buffer* (Still image and title icons)*
    - *Set Audio Level* (clips with sound and audio icons)
- Standard *Cut, Copy, Paste* and *Delete* keystrokes are supported for playlist entries.
- Un-playable (missing, corrupt, or unsupported) file icons are 'ghosted'.

* The *Send to Frame Buffer* feature is reviewed in Section 10.3.

Interestingly, the playlist *Rename* feature edits a local alias, or 'playlist nickname'. It does not actually change the name of the file on your hard drive. Roll the mouse over the Alias in the header of the icon to see the actual filename.

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

ICON AUDIO SLIDER

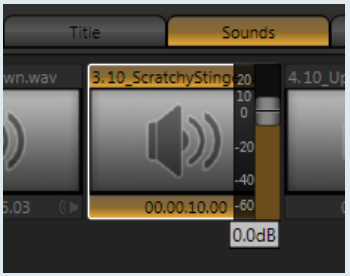


Figure 171

TRICASTER EXTREME™ In TriCaster EXTREME™ (only), the playlist of the two *DDRs* as well as *Sounds* have an additional audio feature. The icons of files with audio will display a small configure (gear) icon at lower right. Click this icon to pop up a small level slider (Figure 172).

Note: When playing files located in TriCaster's 'capture folders', DDRs automatically adjust the audio level according to the current Audio Headroom setting in the Record Configuration panel. This results in an improved match between the default playback level for captured audio and imported sounds or music (for which nominal levels are unknown).

SCRUB BAR

Just beneath the Playlist pane is a full-width *Scrub-Bar* (Figure 172). The width of the Scrub-Bar represents the full run time of the current clips or other file. Drag the central knob left or right to change time position in the current playlist item.

Figure 172

Initially, *In* and *Out Point* handles at opposite ends of the *Scrub-Bar* are at their extreme positions, marking the actual limits of the file on disk. Dragging these handles adjusts timing for the selected item (multi-selections are ignored for Scrub-Bar trimming). The duration (taking into account trimming operations) is displayed in a timecode field just to the right.

Hint: For longer durations, holding SHIFT while dragging In/Out handles increases precision.

During playback, the *Scrub-Bar* knob traverses the span between the *In* and *Out Points*.

ALPHA CHANNEL SUPPORT

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

TRICASTER EXTREME™ Monitors on TriCaster EXTREME™ models show a checkerboard background behind transparent content.

10.2.2 MEDIA BROWSER

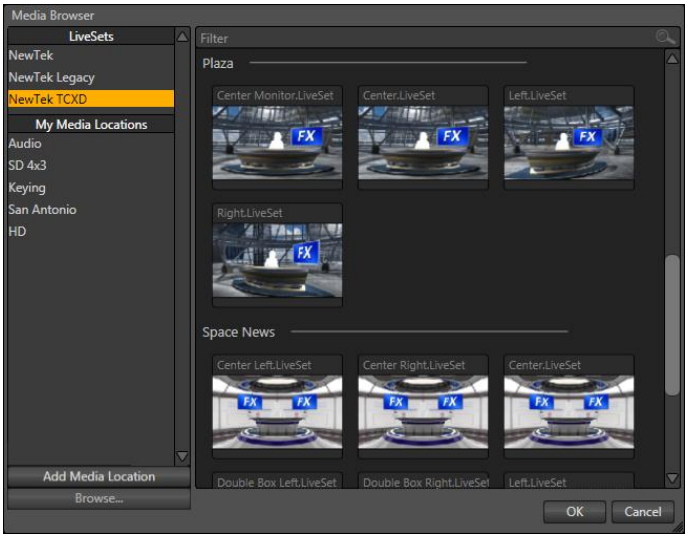


Figure 173

The custom *Media Browser* is available anywhere in the *Live Desktop* interface 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 comprised of left and right panes we'll refer to as the *Location List* and *File Pane* respectively.

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 is populated – this is the *File Pane.*

ADD MEDIA LOCATION & BROWSE

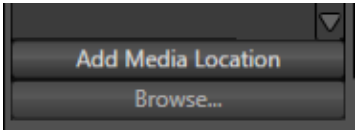


Figure 174

Clicking *Add Media Location* opens a standard system folder selector. The name of a folder you selected using this is added to the *Media Browser's Location List* under the main-heading *My Media Locations*. These locations can be accessed in others sessions opened by the same user.

File recursion for listings under *My Media Locations* is limited to one sub-folder below the folder (sub-heading) selected in the *Location List*. Recursion is deeper (infinite) for default locations.

Note: External devices used with Add Media Location must be fast enough to support realtime playback of the files on it. Really, it's better to use the Import feature instead of Add Media Location – but the latter can be handy for those times when you need to add smaller files wish after your production is already underway.

Click *Browse* to substitute open and use a standard system file explorer for file selection, 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.

Figure 175

FILE FILTERS

The *File Pane* view is filtered to show only relevant content. For example, when selecting *LiveSets*, the browser only shows *LiveSet* files (.vsfx).

An additional filter appears above the *File Pane*. This is a smart filter, which 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 would display all content at the current location with that string as part of its filename. This would include any file with the filename extension ".wav" (WAVE audio file format), but also "wavingman.jpg" or "lightwave_render.avi".

CONTEXT MENUS

Right-click a *Location* listed under *My Media Locations* to show a context menu with just one item in it. *Remove* de-lists the location (but does not delete the folder and its contents from the hard drive).

Note: this menu is exclusively for use in the "My Media Location" section, and is not available for other headings in the Location List.

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.

10.2.3 PLAYER CONTROLS

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

Figure 176

TIME DISPLAY

Figure 177

During playback, a timecode field in the transport controls area displays the *Current Time* for the player. This may be the current time position relative to the active playlist item, or the duration for the entire playlist, as discussed next (when *Single* mode is enabled, the duration used is always that of the current playlist item.)

Left-click the field to type in a timecode, then press *Enter* to jump to that point in the file (*or* playlist).

If you right-click the timecode field instead, a menu allows you to choose to between showing *current time* and *remaining time* (*Reverse Direction*), enabling or disabling *Warning Colors*, or toggling *Playlist Duration* on and off (versus single playlist item duration).

Hint: With Warning Colors enabled, the time display 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 turn amber. When only five seconds are left, the numbers are shown in red.

SINGLE

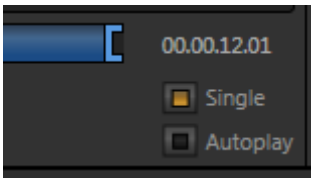


Figure 178

Media Player playback normally conforms to typical playlist practice – each item in the playlist playing back in orderly succession. When *Single* mode is enabled, 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).

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
- *Loop* – repeat playback continuously (respecting the *Single* switch state)

AUTOPLAY

When enabled, the *Autoplay* switch has several important effects. Firstly, 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* – as an input for a *Virtual Input* or *Overlay*.

Secondly, 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). In similar fashion, for a media player with *Autoplay* enabled, performing an *Overlay Effect* automatically begins playback.

Note: Unlike Switcher Transitions, the reverse overlay effect does not occur automatically as the end of play approaches.

In either case, when the *Media Player* is in *Single* mode, the current play position advances to the next item after playback is automatically stopped.

10.2.4 PRESET BIN

Another very useful feature shared by all three of TriCaster's *Media Players* is the *Preset Bin*, which provides quick and convenient access to multiple playlists. As mentioned back in Section 4.8.1, presets also store the state of various *Media Player* controls.

To display the preset bin, roll the mouse pointer to the edge of the screen in a tabbed *Media Player* or *Audio Mixer* tab. If you change playlists by selecting another preset, it's almost as though you are accessing another media player. Use presets 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.

Presets are named, and conveniently display a small representative image (taken from the first entry in the playlist). As you move the mouse over preset icons they expand to provide an enlarged view of the icon for the first playlist item. To populate a new preset, simply click a blank preset icon.

Figure 179

To modify the default name assigned to a preset, right-click a preset icon to open its context menu, and select *Rename* from the list. Other menu options include *Delete*, *Export* and *Import* (the file will be saved with the extension '.pst').

10.2.5 SPEED

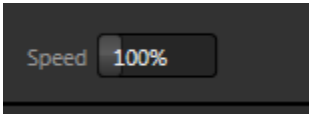


Figure 180

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

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. As is common for numeric input controls in TriCaster™, 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.

10.3 FRAME BUFFERS

TriCaster's *Frame Buffer* system provides a very convenient and important alternative source system for *Virtual Inputs* (including their associated *Overlay* channels) and the Switcher's two primary *Overlay* channels.

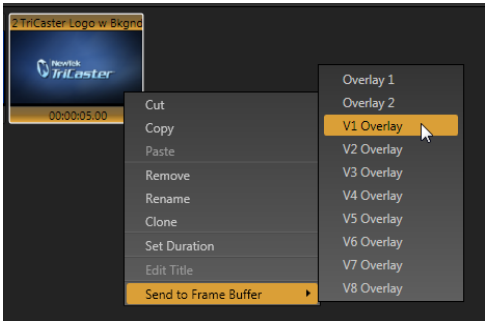


Figure 181

Graphics (i.e., a title page or image file) assigned to *Frame Buffers* serve independently from *Media Players*.

These sources are represented by the *FRM BFR* button on all three *Switcher* rows (thus available to *DSK 1* and *2*, *FX*, *Program* and *Preview,* plus dedicated to each *Virtual Input*.

Hint: We considered a Frame Buffer example back in Section 4.11.

Any still image or title page in the playlist of one of TriCaster's *Media Players* can be assigned to any one (or more) of the *Frame Buffers* (the number of *Frame Buffers* provided on your TriCaster™ is related to the number of *Virtual Inputs* it offers).

- Right-click a playlist icon, and choose *Send to Frame Buffer* from the playlist context menu.

- Select *FRM BFR* or the specific *Virtual Input Overlay* you wish to the file to be assigned to from the hierarchical menu.

This actually *copies* the selected image into a specially provided folder located on the hard drive at C:\TriCaster\Effects\Frame Buffer*session_name*\. The copied image file remains available in that folder, even when the original file is not only unavailable from the playlist, but has actually been deleted from the hard drive.

Naturally, if an image has previously been assigned to this particular *Frame Buffer*, the current file is overwritten by the new one. This has no effect on the original *source* image or title page, however; only the Frame Buffer copy is affected.

Hint: Title pages sent to a Frame Buffer are converted to a snapshot – that is, an image – before the copy operation is performed. Modifying the source title page subsequently in the playlist does not affect the copy in the Frame Buffer. (To update the Frame Buffer copy, simply use the Send to Frame Buffer menu item again after modifying the source title page.)

10.3.1 UNIQUE ADVANTAGES

Several characteristics differentiate *Frame Buffer* content from other sources (such as *Media Player* content). First, any possibility of accidentally displaying the wrong image or title (as might happen if the current playlist item was not the correct one) is eliminated. In fact, even when the original source file no longer *exists* on the system, the *Frame Buffer* copy can still be referenced on demand. Among other things, this all means that you can effectively lock a specific title or graphic to one *Virtual Input*.

Second, each of TriCaster's *Frame Buffers* is uniquely linked to one specific *Overlay* channel. Selecting the Frame Buffer button (labeled *FRM/BFR*) for any given Overlay channel reliably refers to the correct graphic for that channel. This provides assurance when you might temporarily switch to another source and then want to return to the *Frame Buffer*.

Frame Buffers have another extremely powerful feature – *network sharing*, discussed next.

10.3.2 NETWORK SHARING

Another very useful advantage of this system is that, if you wish, you can share the *Frame Buffer* folder and its content across a network.

Share Frame Buffer on Network is easily enabled or disabled even during a live production using the *Live Desktop Options* menu at the right-hand end of the *Switcher* (beneath the local Transition controls).

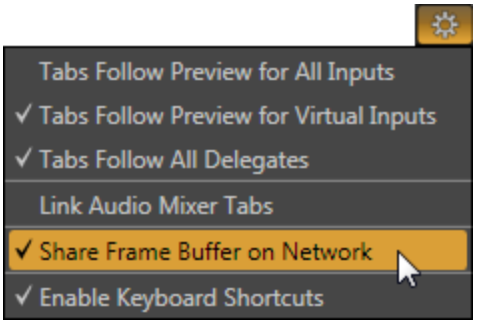


Figure 182

TriCaster™ automatically presents the *current* session's *Frame Buffer* folder using the network share name "Frame Buffer".

This arrangement allows *Frame Buffer* files to be individually updated across a network using any suitable graphics application (such as Photoshop™) or similar method. When you save the edited image, the remote copy (on the TriCaster) is immediately updated – even if it is currently displayed live. This allows you to refresh an overlay virtually instantly using your graphics software of choice from any computer with a network connection.

Frame Buffer files are stored using the popular 32 bit PNG (Portable Network Graphics) image format. The specific file associated with any *Frame Buffer* is easily identified by its unique name – overlay_1.png, virtual_input_1.png, etc.

Note: This special share name assignment is dynamic. It is automatically updated whenever you enter a session with network sharing enabled, to ensure that applications on the remote system can access and update Frame Buffer graphics for the current (or most recent) TriCaster™ session.

10.4 EDITING TITLE PAGES

On mouse-over, title page icons 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*.

Title Page content can be edited during both play and display (changes are detected and shown immediately). Opening the pop-up *Title Page Editor* during playback *is* permitted. The panel can be re-sized by dragging its lower-right corner, and re-positioned by dragging its titlebar.

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

Figure 183

If you begin editing the text by pressing a character on your keyboard, a text edit field opens (alternatively, double-click to open the text entry field). Press *Enter* or click outside the box to complete the operation.

A number of keystroke shortcuts are available to help you edit text quickly. Typing keystrokes as listed below will produce the result shown:

- *Any character(s)* – text input box opens with the current string cleared and (only) the new character(s) entered.
- *Home* – text input box opens with cursor *before* the first character of the current string.
- *End* – text input box opens with cursor *after* the last character of the current string.
- *Delete* – text input box opens empty (the original string is cleared).
- *Spacebar* – text input box opens with original text string deleted and a space character inserted in its place.
- *Up* or *Left Arrow* key – text input box opens with the cursor *between* the last two characters of the current string.
- *Down* or *Right Arrow* key – text input box opens with cursor at the end of the string.
- *Backspace* – text input box opens with the last character of the string deleted and the cursor at the (new) end of the string.
- *Tab* – advance to next entry field (Shift + Tab to prior field).

Hint: A red line under a character or word indicates the spell-checker is questioning its spelling. Right-click the word to open a menu showing various suggested alternatives. Click one of these if you wish to update the original.

Figure 184

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

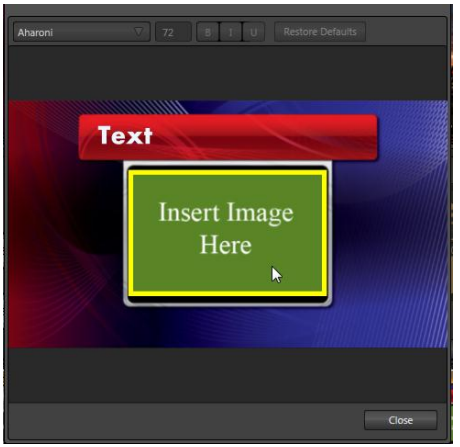


Figure 185

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 yellow border is displayed around the image, the image is a *stand-in*. Click a stand-in to open the *File Browser*, allowing you to select a replacement image file.

You can find out which, if any images are unlocked (stand-ins) and which are locked, and toggle the status of any image. Hold down the *Shift* key while rolling around inside the *Title Page*. With *Shift* depressed, a red border is shown around any *locked* image under the cursor. *Stand-in* (unlocked) images display a green border on roll-over when *Shift* is depressed. To *toggle* the *stand-in/locked* status for an image, left-click it with *Shift* depressed.

If you right-click a stand-in image, a menu is presented that provides 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').

11 LIVEMATTE & CROP

Although its controls are deceptively simple, TriCaster's LiveMatte™ is a very powerful chromakeying technology, capable of extremely high quality results.

Whether uses alone or in conjunction with TriCaster's Overlay or LiveSet features, you will find LiveMatte can play an important 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 a different background. TriCaster™ also relies on this method to insert talent seamlessly into virtual sets via *LiveSet*™.

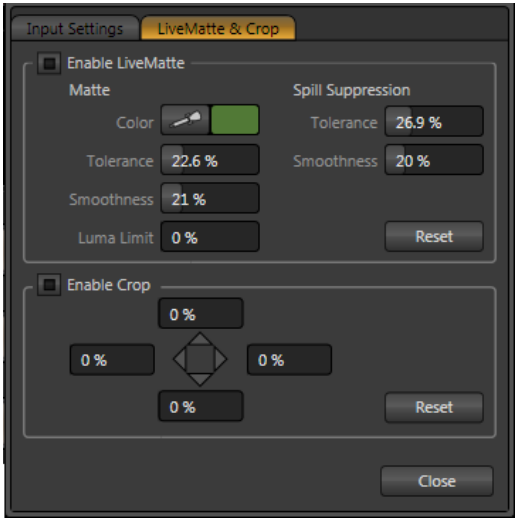


Figure 186

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 & Crop*.

Hint: Clicking Configure for the video monitor in the Scopes tab likewise opens the Input Configuration panel for the corresponding Switcher row source. For Program and Preview selections, note that the controls only affect the Background source (not any active DSK channels). Also, Configure controls are not provided when the Program or Preview source is a Virtual Input.

11.1 CHROMAKEYING

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.

Note: Internally, LiveMatte actually goes well beyond simple chromakeying techniques to provide its great realtime results - but we'll stick with fundamentals for our discussion here.

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.

Figure 187

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.

Of course, if you choose inappropriate settings, foreground areas may inadvertently be cut away as well. Ideal settings require judicious balance between 'too much' and 'too little'. Let's consider the tools provided to help you achieve a good result.

11.2 MATTE

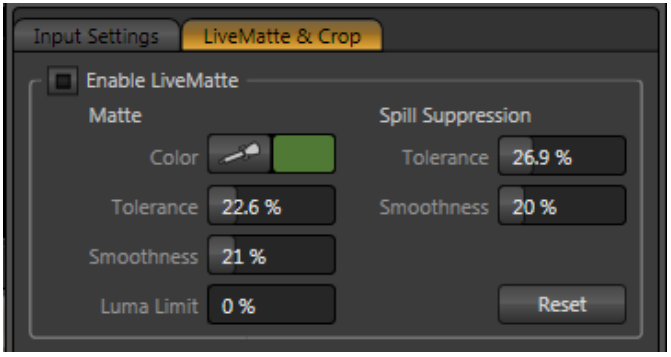


Figure 188

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

TriCaster's 'matte' is 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.

11.2.1 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 button (Figure 188) 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.

11.2.2 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, TriCaster™ provides a numeric slider labeled *Tolerance j*ust beneath the *Color* picker.

The *Tolerance* setting allows you to broaden the range considered as the key color, including more 'near-neighbor' colors to be included in the matte. A low tolerance removes only color values close to the primary or key color. As you raise the tolerance, you extend the range of values on either side of the primary color that will be treated as transparent. This allows you to deal with those imperfections we mentioned.

On the other hand, it may be that there is (usually unplanned for) detail in the foreground that is somewhat similar to the key color. Reducing *Tolerance* may allow you to prevent unwanted holes appearing when the subject opts to wear his St. Patrick's Day tie.

11.2.3 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'.

11.2.4 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 if the subject wears dark 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.

11.3 SPILL SUPPRESSION

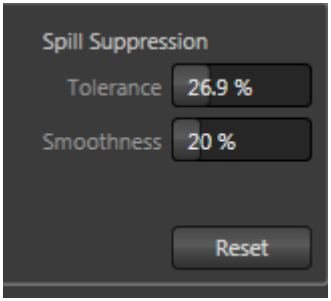


Figure 189

The term *Spill* refers to key color unintentionally reflected or 'spilled' onto the foreground subject. It's very common for a little green spill to occur on the shoulders of a person in a greenscreen shot, for example.

The *Spill* controls, when enabled, 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 it 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.

11.4 CROP

It is very common for a greenscreen shot to have unintentional inclusions that remain after the base chromakey process is applied, but which need to be removed along with the background.

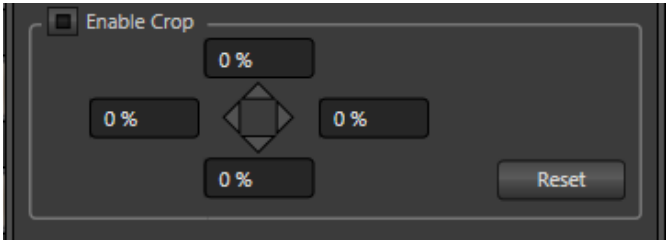


Figure 190

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

Essentially, the four 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 four controls will be completely cropped.

Hint: For added convenience, similar cropping tools are available separately in the Position panels of Overlay channels and Virtual Inputs.

11.5 COMPOSITING

When you enable (and configure) *LiveMatte* for an input, the onscreen monitor for that input shows the source keyed over a checkerboard pattern.

If you select the (*LiveMatte*-enabled) input as *Input A* in a *Virtual Input* tab, the keyed source is overlaid on the source you selected as *Input B*. You will see the composite result when the Virtual Input is selected on either the *PGM* row or the *PVW* row.

11.6 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.

Hint: The best method for optimizing the key is to begin with the best incoming source possible; if your cameras have both composite and S-video outputs, check to see which one gives you the best picture quality.

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 a 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 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.

11.7 PRACTICAL STAGING FOR LIVEMATTE

We'd like to offer a few suggestions here to guide you in preparing, so you get the most out of LiveMatte.

11.7.1 LIGHTING

The single most important aspect of 'pulling a clean key' is lighting. The lighting should be even and diffuse. Hotspots and shadows create different green or blue 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).

11.7.2 CONNECTION CONSIDERATIONS

As mentioned above, washed-out areas in the video signal lack sufficient color information to provide good separation. For similar reasons, it's worth considering the color characteristics different types of video signals.

SDI connections are ideal, if you can use them. Otherwise, in the analog video realm you will encounter three main types of camera connections. We present them here in ascending order

according to the quality of video signal they provide (and as things go, in the reverse order of their cost, and the likelihood that you will have access to them):

Composite – a two conductor design using the classic RCA connector (also referred to as a phono connector or CINCH/AV connector)

Y/C – typically using a round, 4-pin mini-DIN connector or two BNC connectors, Y/C keeps Y (luminance) and C (chrominance) signals separate.

Hint: Y/C is occasionally called "component" (which while technically correct, can be a bit confusing given the name of the next class), S-Video (legitimate) or "S-VHS" (completely incorrect, though a common error.)

Component (a.k.a. 'YUV' or 'Y, Pb, Pr') – a three wire system typically using BNC (push & twist-on) connectors.

For analog connections, either of the last two methods is to be preferred – but it is entirely possible to succeed with only a composite signal. When you have something better available, however, you should naturally use it. (Try to avoid downgrading the pre-LiveMatte signal from a Y/C camera, for example, by connecting it to your TriCaster™ using composite cabling.)

Hint: cameras using IEEE 1394 connection (such as mini-DV or HDV format) are not supported as live switching sources, for several reasons. However they may often be connected by Y/C cable (mini-DV cameras only) or Component cabling. This configuration may actually provide a better color rendition for keying purpose than if it were possible to connect them by IEEE1394 cable.

12 VIRTUAL INPUTS

Virtual Inputs are a wonderful TriCaster™ innovation, opening up whole new levels of convenience and production value.

You can pre-configure Virtual Inputs as multi-source compositions (with or without an overlay) and introduce them into your productions like any single Switcher source.

Virtual Inputs also provide TriCaster's connection to LiveSet, NewTek's astonishing realtime virtual set technology, investing it with great new capabilities.

We illustrated the value of *Virtual Inputs* back in Section 4.10 of the Live Production Walkthrough chapter. Now we'll look into this powerful tool in depth.

Figure 191

Virtual Input tabs straddle the lower-left pane of the *Live Desktop*. These correspond to similarly labeled *Switcher* buttons in the *Program* and *Preview* rows (there are no *Virtual Input* buttons in the Switcher's *Utility* row).

Hint: The actual number of Virtual Inputs available varies by TriCaster™ model.

As you would expect, selecting one of the *Virtual Input* buttons on the *Program* row displays the output from the corresponding *Virtual Input* output on *Program Output*.

Likewise, clicking a *Virtual Input button* (labeled V1, V2, etc.) on the *Preview* row cues up that *Virtual Input's* composite output for an upcoming *Take*/*Transition* operation (and also displays the corresponding control panel in the tabbed area below).

This all makes it easy to *Take* or *Transition* directly to, from or between *Virtual Inputs* with a single click – even if the video sources used in the composition for both are identical.

12.1 PRIMARY VIDEO SOURCES

Figure 192

Virtual Inputs support two *primary* video sources. These two sources are labeled *Input A* and *B*. Selection is made using buttons in the lower part of the tabbed panel. (The number of buttons corresponds to the *Switcher* source count for the TriCaster™ model.) When a *Virtual Input* is displayed, *Input A* appears above (or, if you prefer, 'in front of') *Input B* by default.

This means that when *Input A* is fully opaque it completely hides *Input B*. However, when *LiveMatte* settings for *Input A* result in transparency, or the *Input A* source has transparency by virtue of being a 32bit file, or its active *Position* settings mean it does not *completely* cover *Input B*, then *Input B* will appear through the transparent regions in the result.

12.2 POSITION

Figure 193

Position controls for both *Input A* and *Input B* appear to the right of their respective selector button rows (Figure 193). Click the double-headed arrow button to open the *Position* panel (Figure 194) for either input. Enable or disable all settings using the switch provided at upper left.

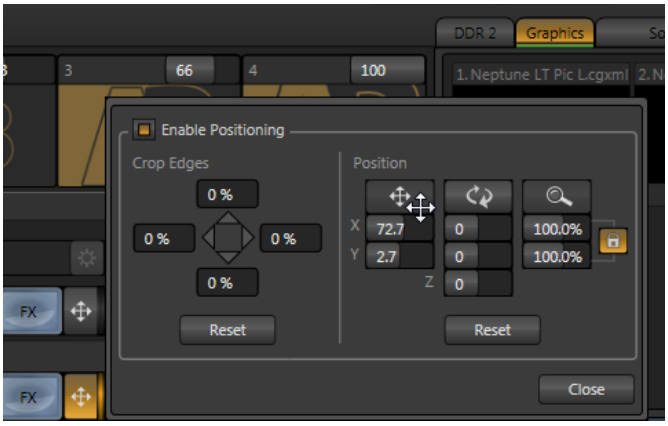


Figure 194

At left is a group of controls labeled *Crop Edges*, which provide identical but independent functionality to that found in the *LiveMatte & Crop* tab of *Input Configuration*. *Position* controls are grouped at right. Located at the top of this section are three interactive buttons; from left to right these represent *Position, Rotation,* and *Size*.

Click and drag on *Position* to adjust the location of the source within the output frame. (It is useful to display the corresponding *Virtual Input* using the Switcher's *Preview* row while making adjustments). Notice that by dragging left or right on either of the two numeric gadgets below, you can adjust *Position* on a single axis.

Hint: If you click a numeric field a second time (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).

In similar fashion, drag the pointer over the *Rotation* button with the left mouse button pressed to turn the source in 3D space, as follows:

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

- Drag up/down to rotate the source about the X (horizontal) axis.
- Hold down *Alt* on the keyboard while dragging to rotate about the Z axis.
- Drag on a single numeric slider below, or hold down Ctrl while dragging to constrain rotation to one axis.

Dragging the mouse on the *Size* button (magnifying glass) affects the *scale* of the overlay. When the nearby *lock* button is enabled, dragging in any direction affects size equally on both axes. Otherwise, dragging vertically changes the height of the overlay, and dragging horizontally affects its width.

Again, if you drag just one of the numeric gadgets below the *Size* button (with lock *disabled*), you modify just one dimension of the overlay stream – width or height. *Position* and *Size* can be reset by clicking *Reset Positioning*, and can be toggled on or off by clicking the *Position* button located to the left of the Configure button (gear). You will likely have realized by now that simply using the *Virtual Input* controls considered so far, you could scale a live video source down, and position it above another source to create a picture-in-picture effect – or even two live insets (with a black background).

12.3 OVERLAY

Figure 195

Another switcher-style source selector is situated right above the *Input A* row in *Virtual Input* tabs. It is labeled *Overlay.* Just above that at right, you will also see local transition controls that are quite similar to those found in the Switcher's *Transition* pane.

Really, the Virtual Input *Overlay* feature matches the *DSK* channels found in the *Switcher's* main *Transition* section in almost all respects. Unlike the *DSKs*, though, its inclusion in *Virtual Input* tabs make it a 'pre-*Switcher'* sub-layer (along with *Input A* and *B*).

This means that the *Overlay* is applied before that composition is sent to the *Switcher*. Thus content in a VI *Overlay* appears beneath anything displayed via the two (*Switcher*) *DSK* channels.

The *Overlay* selection and *Position* controls work just like their *Input A* and *B* cousins, discussed earlier (see Section 12.2).

12.4 LIVESET

This brings us to the *LiveSet* section of the *Virtual Input* tab. LiveSet allows you to achieve the look of a large, sophisticated studio setting (Figure 197) within a very small studio space (Figure 196) without the need for external equipment.

Figure 196

Figure 197

12.4.1 LIVESET SELECTION

An information line at the top of the *Virtual Input* tab lists the current *LiveSet* (if any) for this Virtual Input. The default *LiveSet* simply composites *Input A* over *Input B* (if any part of the image assigned to *Input A* is transparent, *Input B* will show through).

Hint: Many virtual sets require LiveMatte settings to be applied to Input A. Input B does not support keying.

To select a different LiveSet, click the *Add* button at the right-hand end of this field line, opening a custom *Media Browser* (Figure 198).

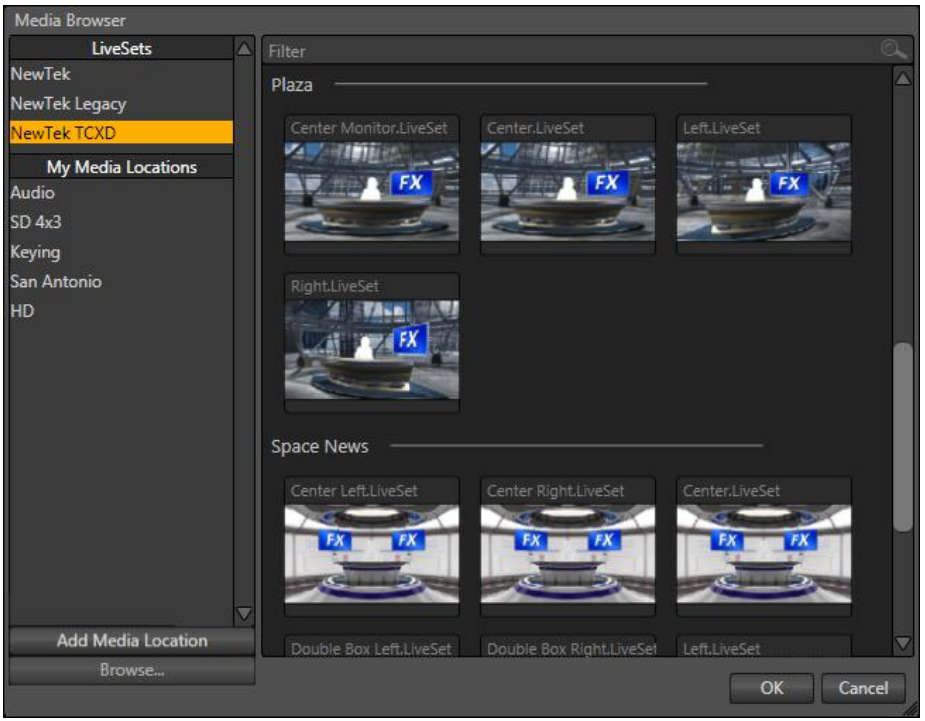


Figure 198

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*.

12.4.2 VIDEO SOURCES

Virtual Inputs provide *LiveSet* with a new standard of flexibility, allowing you to easily and flexibly assign inputs from the *Virtual Input* tab(s), without Switcher involvement*.

**Hint: One special case is when you select FX as a LiveSet input. Conveniently, this allows you to use the Switcher to change the input without either interfering with other common Switcher operations or accessing the corresponding Virtual Input tab.*

Figure 199

Virtual sets in the *LiveSet* system display video from either one *or* two different TriCaster™ sources. It will not surprise you that these correspond to *Input A* and *B*, the primary video sources we discussed back in Section 12.1. (Again as you might expect, *Input B* is often assigned to secondary purposes, such as to supply the display for a 'monitor' in a virtual set.)

12.4.3 ZOOM PRESETS

Unlike earlier LiveSet implementations, *LiveSet* does not need multiple LiveSets to mimic different 'virtual camera distances' (for a single camera angle). Making a single selection populates four *Zoom Presets* just below (Figure 200).

Figure 200

Initially, these four presets represent default stops between the maximum and minimum distance for the specific set - the 'closest' view is 100%. Click a preset thumbnail to jump to the camera view it represents. An active *Zoom Preset* is shown with a gold border (a white border tracks your cursor when selecting presets).

Notice that a numeric slider is provided above right for each preset. These work the same as other numeric sliders in TriCaster's Live Desktop – drag to adjust the value, click to type directly into the field using the keyboard, or press (keyboard) Shift and then double-click to restore the default value for that preset.

Note: Some LiveSets (e.g., double-box sets) do not support zooming. In such cases, the Zoom Presets and the Zoom T-Bar are inactive.

12.4.4 ZOOM T-BAR

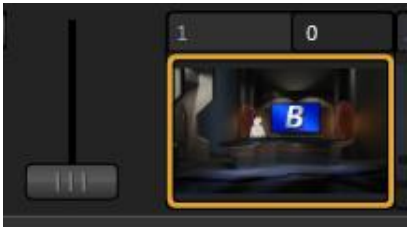


Figure 201

The *Zoom T-Bar* is located beside the *Zoom Presets*. Dragging it vertically adjusts the virtual 'camera distance' for the active *LiveSet*, between 0-100%.

When you click a *Zoom Preset*, the T-Bar updates to the new zoom level (displayed numerically above). Conversely though, adjusting the *T-Bar* does *not* change the value for a *Preset*. (When the current T-Bar position does not correspond to any presets, none of them are shown with a white border.)

12.4.5 INPUT POSITION

We discussed the *Position* controls for video *Inputs A* and *B* back in Section 12.2. It's worth adding here that these controls, when active, do affect the scale, rotation and position for LiveSet video inputs (this is another unique advantage of this LiveSet implementation).

You will find that you can often use *Position* controls to ensure a 'good fit' and natural appearance of talent or other source appearing in your virtual sets (greatly reducing the need to fuss with physical camera positions to do so).

12.4.6 ANIMATE ZOOM

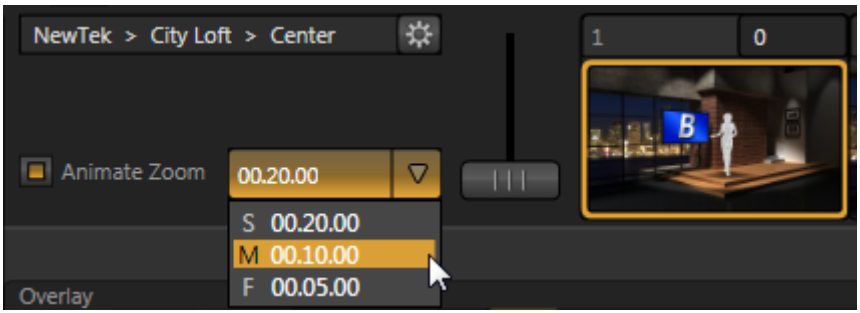


Figure 202

As noted earlier, you can use the *Zoom T-Bar* to manually zoom in on most *LiveSets*, even when displayed on *Program Output*. The *Animate Zoom* switch makes it possible to easily perform this realtime zoom automatically with a single click.

With *Animate Zoom enabled*, simply clicking a preset automatically zooms from the current position to the virtual camera 'distance' represented by the preset. A built-in ease in/out is applied to ensure a smooth zoom.

The duration for the animated zoom is controlled by a menu beside the *Animate Zoom* switch. This works just like the similar *Duration* menu buttons in the Switcher's *Transitions* section, providing instant access to three preset durations. Alternatively, click and drag in the neighboring numeric field to set a custom duration – or click the field once more to enter a value directly using the keyboard. The maximum duration for an animated zoom is 120 seconds.

Hint: LiveSets each 'zoom in' on a predetermined target. A given group of LiveSets may offer variations on the basic set that allow you to zoom in on an actor at center stage, or a 'virtual monitor' situated on a desk beside the talent, or something else entirely. You will find many creative uses for the different versions of the LiveSet.

13 AUDIO

Less than 100 years ago, movies were silent. We've come a very long way since "The Jazz Singer" (1927, Warner Bros.) High quality audio and audio management tools are almost certainly a requirement for your live productions.

When it comes to audio, TriCaster™ provides professional quality and convenience, which we'll explore in this chapter.

External audio connections and configuration were briefly discussed back in Sections 3.4.1 and 3.7.1. You'll observe that there are two side-by-side audio tabs – *External Audio* at left and *Internal Audio* on the right (Figure 203 and Figure 204).

- *External Audio* controls govern all external audio sources, including sound from TriCaster's analog (XLR) and digital (SDI-embedded) sources.

- The *Internal Audio* pane provides control over internal audio sources like the *Media Players*, along with controls for TriCaster's several audio output streams.

Figure 203

Compact sub-panels in each tabbed pane provide configuration and control for one audio source or output stream.

Figure 204

Note: Illustrations in this chapter depict the TriCaster™ 450 EXTREME™ unless otherwise noted. TriCaster's Audio tab layout is virtually identical for all models, but for the following items:

- *The number of inputs.*
- *Net 1 and Net 2 control location varies.*
- *TriCaster EXTREME™ has several exclusive features:*
  - *The Configuration button in the titlebar, which provides access to advanced configuration options.*
  - *The Group color swatch just below the titlebar.*

13.1 EXTERNAL AUDIO

The sub-panels in the *External* tab are labeled for correspondingly numbered *Input rows* on TriCaster's backplate.

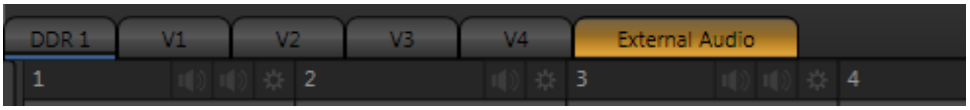


Figure 205

You may choose to think of these audio sources as being associated with the same-numbered *video* inputs in the nearby rows (see the sub-heading Follow, below) but you are completely free to use them in various other configurations.

13.1.1 MUTE

Figure 206

The labeled header for each input or source is also where *Mute* switches are located. Click anywhere in the header's grey band to toggle Mute for all associated channels; or (when multiple *Mute* switches are shown) click a single speaker icon directly to disable that channel.

Mute has a couple of interesting and potentially useful features:

- Enabling *Mute* for a source removes its sound from *all* outputs except *Aux*. For *Aux*, the source is not muted except when the *Aux* source setting is "All".
- *Solo* can mimic mute, in that a soloed source is also removed from *Master* and *Stream* outputs, but (even when muted) continues to be sent to *Aux* when the latter's source is set to "Solo".

Note: Audio 7 is automatically muted when Use Linear timecode (LTC) is enabled in Timecode Configuration. You can un-mute it briefly to adjust signal levels, but of course you don't want this to be audible during a live production – Solo might be useful in such cases.

13.1.2 CONNECTION TYPE

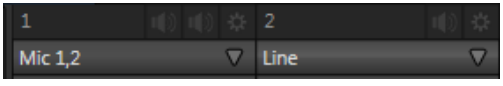


Figure 207

Individual sub-panel panels for external sources govern a group of audio connections comprised variously of two XLR or ¼" phone jack inputs, or an *SDI Embedded* digital audio source.

Only one input type can be operative for a given audio input group at any moment. A drop-down *Connection Type* menu at the top allows selection of one of the following options:

- *Mic 1, 2* – low impedance microphones and other common professional audio sources.
- *Mic 1, 2 + Phantom* (power) – microphones (typically condenser mics) requiring supplementary DC power.
- *Line* – generally consumer audio sources such as CD players, VCRs, etc.
- *SDI Embedded* – digital audio embedded with digital video transmitted via a Serial Digital Interface (SDI) connection.
- *Line Quad* – for convenience in some environments, neighboring (same-type) input groups can be configured as a single quad input governed by one set of controls.

13.1.3 MICROPHONE SPECIFIC CONTROLS

Certain controls are only shown when the *Connection Type* for an input is set to one of the *Mic* options, as follows.

TALK

It is often useful to reduce all other audio source levels so that an important announcement can be clearly understood by the audience. The *Talk* switch (also known as "Talk Over") makes this a simple matter. Enabling *Talk* for a source (typically a microphone) reduces the output level of all *other* audio sources by 20dB.

PAN

When the *Connection Type* is set to one of the *Mic options*, TriCaster™ presents two small *Pan* sliders above each of the *VU meters*.

Pan

Figure 208

Pan adjusts *placement* of the corresponding input sound on output channels, and progressively modulates levels in the process so that the overall volume neither rises nor drops as a result of adjustments. Using Pan, one can send part of channel 1 to channel 2, and vice versa.

Let's consider an example:

- When *Pan* is set to the extreme left position for *Input 1a*, its audio signal is passed exclusively to *Program Output 1a* (ignoring Aux output 1a for this discussion).

- Centering the *Pan* knob *splits* the sound from *Input 1a*, so that it is heard equally on outputs 1a *and* 1b. (The levels in this case are automatically reduced, so that the overall level sent from *Input 1a* sent to output remains constant).

- Sliding *Pan* for *Input 1a* all the way to the right results in that source only being audible on *Program Output 1b*.

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

TRIM

Figure 209

When the *Connection Type* is set to one of the *Mic* options, input controls also include *Trim* knobs for each microphone input. This is a variable gain setting, enabling you to adjust input gain to suit the level of a variety of audio sources.

LOCK

Figure 210

Clicking the *Lock* button links the level sliders above relative to each other. This enables them to be adjusted in unison.

13.1.4 MORE BASIC CONTROLS

Most of the features that follow are common to all **Connection Types**, with exceptions as noted.

FOLLOW

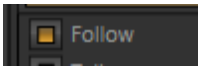


Figure 211

Enabling the *Follow* switch for an audio source directs TriCaster™ to track switcher operations for the related video source.

This results in the audio for this source being completely *muted* until the associated video source is displayed on *Program Output* (whether as the Switcher's *Program* row selection, via *Overlay*, or as *Input A* for a *Virtual Input*).

Hint: When Follow is enabled but the corresponding video source is not displayed on Output, the audio level display on the VU meter is displayed as a grayscale, rather than in full color.

When *Follow* causes an audio source to be added to TriCaster's output, the audio from this input is ramped up (or down, on removal) over 1 second.

TRICASTER EXTREME™ The *Follow* feature is especially powerful used in concert with *Audio Group* features offered by TriCaster EXTREME™ – please see Section 13.1.5 for more detail.

MONO

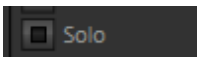


Figure 212

A *Mono* switch appears in the control panel for sources set to any *Connection Type other* than *Mic*. Enabling Mono centers audio sources on both channels.

For digital inputs (*AES/EBU* or *SDI Embedded*) with more than two channels, only channels 1 and 2 are centered. (If present, two additional digital audio channels are passed through unchanged on channels 3 and 4.)

SOLO

Solo implementations and options vary widely in the audio industry, but broadly speaking, the feature provides several very useful functions. TriCaster's *Solo* feature offers remarkable flexibility without overly confusing complexity. Consider a few basic principles:

- When all *Solo* switches are off, the combined audio mix from all sound sources is sent to the *Master* and *Headphones* output connectors.

- Enabling *Solo* for a source sends its sound to the *Headphones* output, but removes any *non*-soloed sources from that output.

- The *Solo* switch state, *by itself, never has any impact on *Program* out audio.

- Enabling *Solo* for one or more sources affects *Headphones* output as follows:
  - The (after-fader) audio from all *soloed* sources is sent to *Headphones*.
  - All *un-soloed* sources are removed from *Headphones*.

- *Aux* output mimics *Headphones* whenever *Solo* is selected in its *Source* option menu.

*An understanding of the relationship between *Solo* and *Mute* is useful. Enabling *Mute* for any source removes it from the main *Program* mix, but not from *Aux* (unless *Aux* is set to "All"). Likewise, soloed sources are not muted on *Headphones.*

Let's consider some practical applications using these options.

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* it (to remove it from *Program* output).

2. Then enable *Solo* – allowing you to hear it on *Headphones* output (and *Aux*, at times when Solo is selected as its *Source*).

ISOLATING A SOURCE

At other times, you may want to output specially configured audio signals using TriCaster's *Aux* audio output. For instance, some installations call for sending the output 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 *Program* audio. This arrangement is often referred to as 'mix-minus.' It 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 main Program mix to him, he will be forced to endure a late-arriving echo of his own voice – since that, too, is carried on the master mix. Needless to say, this would be confusing and undesirable.

Suppose your interviewer is speaking into a microphone connected to *Input 1*. The audio from your interviewee is routed into another TriCaster™ input.

1. Enable the *Solo* switch for *Input 1*.
2. Selecting *Solo* as the *Source* for *Aux*.

This setup gives you a clean output consisting of just the interviewer's voice on *Aux*. By connecting the local input of your remote call hookup to TriCaster's Aux output, you can send that clean signal to your remote caller (and control its level), eliminating annoying echoing, feedback and the like. Meanwhile, both participants can be heard on the main *Program* output.

Hint: See also Audio Groups – Section (13.1.5)

BALANCE

A *Balance* slider is likewise shown for all source types other than *Mic*. In a conventional stereo environment, centering the *Balance* knob will result in *Gain* being applied equally to the left and right channels. Sliding the knob to the left decreases the gain applied to the right channel (channel 2), while moving to the right of center decreases the gain applied to the left (channel 1).

Of course, TriCaster™ provides supports four audio output channels (quad). When considering how *Balance* works in this configuration, it may help to think of these four channels as comprising two independent stereo (left/right) pairs – channels 1 and 2 (or a and b, if you like) forming one pair, and 3 and 4 (c and d) the other. Sliding Balance to the left decreases Gain for channels 2 and 4 (the notionally 'right' channels), and so on.

VU METERS AND GAIN

The largest portion part of the individual control panels is devoted to *VU* (Volume Unit) meters with *Gain* control knobs. The VU meters displayed vary depending on the *Connection Type*.

Two *VU Meters* are displayed when an analog *Connection Type* is set to a *Mic* option, with individual knobs to control the *Gain* for each input channel (see Figure 213).

When the *Connection Type* is *Line*, the VU meter displays the levels for the two analog input channels, controlled by a single *Gain* knob. Also, the *Pan* sliders are replaced with a *Balance* control.

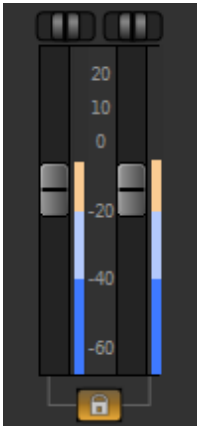


Figure 213

Figure 214

Other connection *Type* selections and sources display a *single* VU meter with either two or four level graphs controlled by a single *Gain* knob (Figure 214).

AUDIO LEVELS

TriCaster's analog audio conforms to SMPTE RP-155. The maximum input/output level is +24 dBu. Nominal input level is +4 dBu (-20dB FS), and the sample rate is 96 kHz. Levels above 0dB are shown in red in the *VU meters*, to caution you that overly high levels can result in clipping in recordings.

Hint: An error message appears in the Status Bar above the main Program output monitor to warn you if clipping occurs – see Section 6.5.1.

See also Section 13.4, Advanced Audio Configuration, and the heading Audio Headroom in Section 16.1.1.

13.1.5 AUDIO GROUPS

TRICASTER EXTREME™

Figure 215

Audio control panels for TriCaster EXTREME™ sources (both internal and external) have a drop-down *Group* menu that allows you to link different audio sources together. This allows you to assign individual sources to groups identified by color.

Audio Groups are especially useful in two respects:

- First, a selected *Audio Group* can be assigned as the source for TriCasters *Aux* output (see Section 13.3.1)

- *Audio Groups* are also very useful in the context of TriCaster's *Audio Follow Video* feature (see Section 13.1.4). Enabling the *Follow* switch for any member of a group affects the way the Follow feature works.

  When a *video source* that corresponds to any group member is displayed on *Program Out* (whether it is selected on the Switcher's *Program* row, or perhaps via a *DSK* or *Virtual Input*), the total contribution of the all members of the same *Audio Group* will be heard on output.

Audio Groups are very useful in connection with *Follow*. Consider a typical scenario:

- Two participants are behind a sports desk. Cameras 1, 2 and 3 are left, center and right views, and there are individual close up cameras as well – 4 and 5.
- An external audio mixer is connected to TriCaster at Audio Input 1.
- Video clips will be played back from the DDR on demand.

Audio from Input 1 need to be heard whenever any camera (1 through 5) is on output. When we switch to the DDR, we want to hear DDR output exclusively.

To accomplish this, we simply need to assign Inputs 1 through 5 to the same group in the mixer, and enable the Follow switch for input 1 and the DDR.

13.2 INTERNAL AUDIO

Figure 216

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

Separate sub-panels are provided to control audio added to TriCaster's *Program* output mix by the *DDR* and *Sound* media players.

13.2.1 NET 1 AND NET 2

The *Net 1* and *Net 2* audio control groups affect sound associated with the *Switcher* sources by the same name. At present, AirPlay® and 3Play *Source* selections support audio (see Chapter 14).

Note: Net 1 and Net 2 controls may be found in either the Internal or External Audio tabs, depending on the model.

13.2.2 EFFECTS (TRANSITIONS)

TRICASTER EXTREME™ This control group is found only on TriCaster EXTREME™ models, and governs the sound from *Animation Store Transitions*.

13.2.3 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 streams are ignored. The options and controls in these sub-panels are similar to those in the input control panels, with the obvious exception that a *Connection Type* menu is unnecessary.

Note: See also Sections 13.1.5, Audio Groups, and the heading Follow in Section 13.1.4.

13.3 OUTPUT CONTROLS

Each of the audio *sources* discussed earlier provides its own contribution to TriCaster's audio output mix.

Settings in the *output* control panels in the *Internal Audio* tab take effect downstream from all sources, further governing audio levels sent to two different sets of output connectors plus headphones, and – when in use – the Internet stream.

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

13.3.1 AUX AND STREAM

Aux Output, as you might expect, controls audio sent to the four *AUX* output connectors. An important addition to its control group is the *Source* drop-down menu. This allows you to decide to supply sound to the AUX outputs exclusively from one of the following selections:

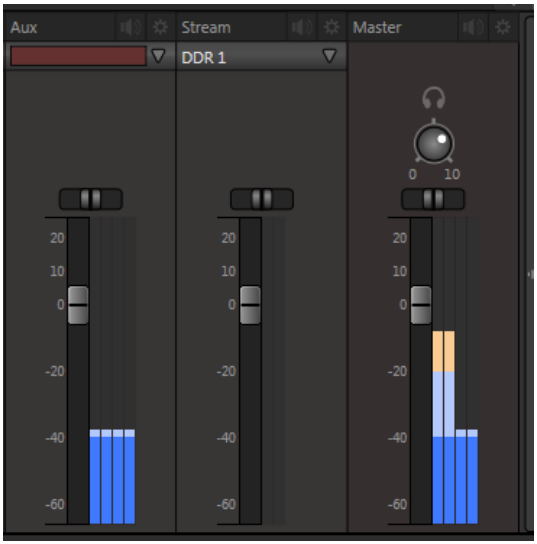


Figure 217

- *DDR 1* - The meters show the levels for audio (the first 4 channels) from DDR 1 output, which are individually sent to AUX output connectors (2a-2d).

- *DDR 2* - The meters show the levels for audio (the first 4 channels) from DDR 2 output, which are individually sent to AUX output connectors (2a-2d).

- *Sound* – The meters show the levels for audio (the first 4 channels) from the Sounds player output, which are individually sent to *AUX* output connectors (2a-2d).

- *Internal* – This is a unique configuration, providing support for a number of interesting and useful situations.

    - The first two channels from *DDR1* are blended with output from the *Sounds* player and placed on the left *AUX* output pair (*2a* and *2b*).

    - The first two channels from *DDR2* are placed on *AUX* outputs *2c* and *2d*.

- *All* – The AUX outputs provide a supplementary program output channel with independent level control.

- *Solo* – When this option is selected, AUX connectors will output a blend of all soloed sources (i.e., audio inputs that have their respective Solo switches enabled).

- TRICASTER EXTREME™ *Group* – Send the selected group (color) output to the Aux connectors.

The *Stream* sub-panel provides a method of independently adjusting (stereo) audio levels sent to the network when streaming is enabled. Its sources options are similar to those above.

13.3.2 MASTER (AND PHONES)

The main *Program* outputs (labeled PGM on TriCaster's backplate) are controlled by the *Gain* knob and *Balance* control in the *Master* sub-panel, located at far-right in the *Audio tab*. Just above this is a simple level control for the *Phones* output. Remember that both *Aux* and *Phones* outputs are affected by source *Solo* switches. When Solo is on for one or more sources, *only* those sources will be sent to *Aux* and *Headphones*.

13.4 ADVANCED AUDIO CONFIGURATION

TRICASTER EXTREME™ Each audio input (including internal sources) as well as every output sports a configuration button in their respective mixer panels. Clicking the familiar 'gear' icon opens the new *Advanced Audio Configuration* panel.

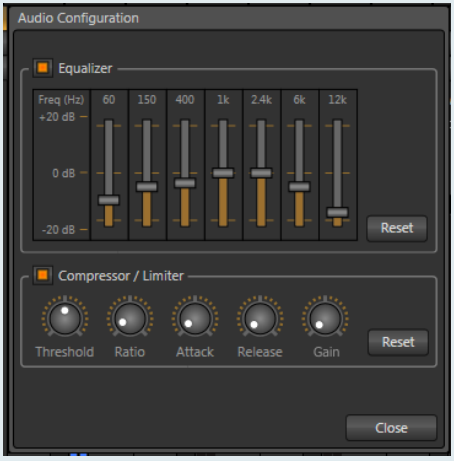


Figure 218

13.4.1 EQUALIZER

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

Enable or disable the *Equalizer* using the switch beside the label above its control group. The sliders attenuate or boost the tonal range centered on the frequency shown at the top, with the amount of effect applied falling off toward neighboring frequencies on either side. Click *Reset* to return all sliders to 0dB.

> *Hint: Naturally, reducing or increasing hanging 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*

input or output involved.

13.4.2 COMPRESSOR LIMITER

The *Compressor/Limiter* is capable of preventing clipping 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.

Compressor or Limiter – what's the difference?

Compression and limiting are not really different processes, but really 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 generally consider compression with ratio of 10:1 or more as limiting.

THRESHOLD

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

RATIO

A *Ratio* of 4:1 means that if input level is 4 dB over the threshold, the output signal level after compression will be just 1 dB over the threshold. The gain (level) is reduced by 3 dB.

Very high ratio settings are the reason for 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 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.

13.5 PRESET BIN

Audio presets work just like their counterparts in the *Media Players*. Presets are a convenient way to quickly store and recall audio steps and settings for different venues, productions, and users.

Hint: When you roll the mouse to the edge of the screen, the very same Audio Preset bin appears either at left (in External Audio) or at right in the Internal Audio tab. In other words, there is just one uniform set of Audio presets, rather than one for each tab.

14 NETWORK SOURCES

The network source features of your TriCaster™ are very useful. TriCaster™ supports two simultaneous network sources, so you can live switch displays from networked computers as part of your productions.

Connecting to a networked workstation or laptop computer running LiveText™, NewTek's powerful realtime title and graphics software, means you can optionally assign CG preparation and display to a second operator. This frees you to focus exclusively on live switching, and expanding your production capabilities.

External computer display inputs served across a network can be selected as video sources in TriCaster's live production environment.

Potential sources include displays from network connected (Windows™ or OS X™ based) computer systems (via iVGA™), and text and graphics overlays from LiveText™. The currently selected *Network* sources are directly available for selection on the *Switcher*, and can of course be captured or streamed as well as included in your presentation.

Note: Gigabit networking is highly recommended, and should be considered mandatory for HD sessions in particular.

14.1 IVGA™

For an iVGA source to be recognized by TriCaster™, you must first install a small iVGA client program a computer on your network. iVGA client programs are supplied for Microsoft Windows™ (2000, XP and Vista, and Windows 7) or Apple OS X. You will find the iVGA installation files in the C:\TriCaster\iVGA folder, or on the supplied iVGA disk.

14.1.1 IVGA FOR OS X™

The iVGA installation for OS X is supplied as a zipped *disk image* (.dmg) file. To install it, first copy this file to your Macintosh™ Desktop (either using a network connection between your Macintosh and TriCaster™ systems, or perhaps by using a USB thumb drive).

Figure 219 – mounting the iVGA disk image

Figure 220

- Double-click the Zip file to decompress it, and then double-click the .dmg file to mount it.
- The *NewTek iVGA* icon shown above will be placed on your *Desktop*. Open it (by double-clicking, and you will see two files in a Finder window – the readme file, and the *iVGA* client program.
- Drag the *iVGA* icon from the finder to your *Applications* folder.
- Run it by double-clicking the icon, and in a moment or two the iVGA swirl will be placed in your Dock, and an onscreen dialog reporting 'iVGA Ready and listening!'

When you roll your mouse over the *Net 1* or *Net 2* monitors in TriCaster's *All Monitors* tab, a triangular button appears next to the *Configure* button (gear). The new source (your 'Mac' desktop) will be listed in the drop-down selection menu that opens when you click the triangle.

Hint: A single iVGA source cannot be connected to both Net 1 and Net 2 simultaneously.

When iVGA is running, the icon in the (OS X) Dock has a menu you can access by right-clicking it:

Figure 221

- Engaging *Privacy Mode* prevents the client display from appearing accidentally on the TriCaster™ display when you don't want it to.
- *Keynote Mode* allows the iVGA client to update the screen even if Keynote™ is running. (This also can be used with some games, though the framerate will likely be only one frame per second.)
- You can set iVGA to show either desktop monitor when you have more than one attached using the *Monitor 1* or *Monitor 2* options in the menu.
- The *Options* list contains settings for *Open at Login*, *Remove from Dock*, and *Show in Finder*.

14.1.2 IVGA FOR WINDOWS®

The iVGA installation for Microsoft Windows® systems is supplied as an executable (program) file.

To install it, copy this file to the client system from the supplied iVGA disk, or its archived location in the iVGA folder on TriCaster™.

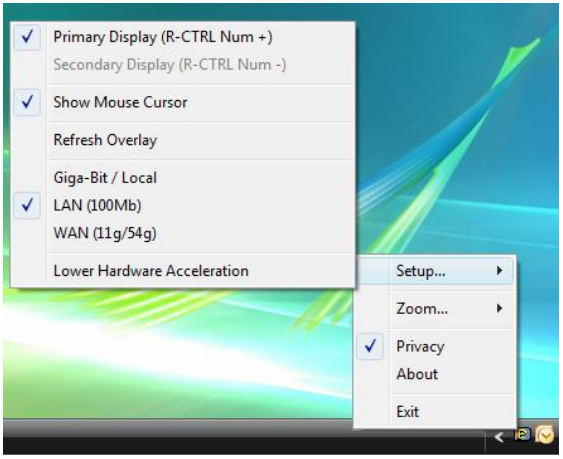


Figure 222 – iVGA context menu, Windows® version

Note: iVGA will run from anywhere you put it on the client hard drive, but you might wish to install it in the Program Files folder (Program Files (x86) for a 64bit version of Windows.

Run iVGA on the client computer by double-clicking its icon. A smaller icon will be added to the Windows *task tray*. To select this external computer as a network source, click the triangle that appears next to the *Configure* button for the *Net 1* or *Net 2* monitor when you roll the mouse pointer over it. The iVGA icon begins cycling – notifying someone viewing the monitor for the external source that this input is 'live'.

Hint: A single iVGA source cannot be connected to both Net 1 and Net 2 simultaneously.

Right-clicking the little icon (on the iVGA client system) reveals a menu with various options (Figure 222):

- *Setup* allows you to choose between monitors on a dual-screen system.
- You can also decide whether or not to *Show Mouse Cursor* in the display.
- *Refresh Overlay* is there in case you need to quickly reset iVGA. Selecting this is equivalent to stopping and re-starting iVGA.
- This is also where you set the transfer speed your network can safely handle. *Gigabit* network connection provides the best transfer rates. Slower connections may drop frames, and should be considered unsuitable especially for HD sessions (in extreme cases, where network capability is low or unreliable because of other traffic, *iVGA* would still be useful for static displays).

*Hint: **Lower Hardware Acceleration** may help in some cases where a client application uses display technology that would otherwise not work with iVGA. (Normally this can be left disabled.)*

- *Zoom* allows you to magnify an area of the Windows display, which can help when fine detail is important for an application display on the screen. The portion of the screen sent to iVGA output is determined by the position of the cursor on screen.

  You can set zoom to 150, 200 or 400 percent, or disable it. When you do not want your

zoomed view to move once set, you can lock zoom position with a hotkey — Right Ctrl + Numpad 9. The hotkey is a toggle – use it again to cause the display to track the cursor again (this is useful to re-position the display, too.)

- *Privacy* mode allows the client some discretion if they need to check e-mail, or perhaps view or arrange something without risk of the audience observing. When selected, this will display a large "Privacy Mode" banner in TriCaster's preview monitors, so the operator is aware this source is temporarily off-line. The client icon also has a 'P' across the face, to remind the client that privacy mode is active.

- Lastly, selecting *Exit* shuts down the iVGA client, and removes the icon from the task tray.

14.2 AIRPLAY®

AirPlay® is Apple's protocol for getting audio and video from 'here' to 'there' – specifically, from an AirPlay source (which may be an Apple® computer, or a mobile device such as iPad™, iPod™, or iPhone™) to a second device.

The local network is the means of transmission between units, and a wireless connection from the player to the network is perfectly acceptable. Typically, the target device for AirPlay might be a television display or set of speakers, but in this case, your TriCaster™ is the beneficiary. It basically works as follows:

- You select the AirPlay entry in the *Source* menu for *Net 1* or *Net 2*, just as you would select an iVGA or LiveText source. (Unlike iVGA, embedded audio, with level control, is supported.)
- TriCaster™ identifies itself as a network client for AirPlay apps/applications.
- You can then designate TriCaster™ as the output device for content played on the device.
- AirPlay streams audio, video. or both from the device to the local network, and on to TriCaster™.
- The AirPlay output is available just like any other TriCaster™ *Switcher* source.

Consider just a *few* of the countless possibilities: Use your iPad as a touch-driven external (wireless) DDR, or capture video or snapshots on your iPhone, and instantly stream this content to the TriCaster™.

Note: Please see Appendix A, Section A.1.12 for more on Airplay connections.

14.3 LIVETEXT™

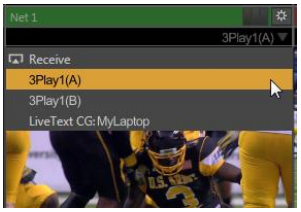
As we noted in the Walkthrough chapter (Section 4.5.2) a companion workstation on your TriCaster™ network with LiveText™ standalone installed serves as a dedicated CG and title solution for your live presentations.

When running and connected, LiveText will be listed in TriCaster's *Net 1 and Net 2* drop-down menus, similar to an iVGA source.

For more information on installing and using LiveText, please refer to its manual.

Figure 223 – LiveText LIVE Output pane

14.4 3PLAY™



3Play's *Output A* and *Output B* are available as *Switcher* sources to TriCaster. They appear in the source selector menu for TriCaster's *network* inputs as "3Play(A)" and "3Play(B)," where "3Play" is the name for the system. Conveniently, the output includes embedded audio, freeing up multiple TriCaster a/v inputs for other purposes.

Figure 224

15 STREAMING

Live webcasting has dramatically altered the broadcast landscape. Information can now be shared among audiences around the world with very small transmission costs – and the future is bright.

Without question, the live streaming market will continue to expand, providing many creative and profitable opportunities. When it comes to taking advantage of this new medium, TriCaster™ places you in the forefront of all the excitement.

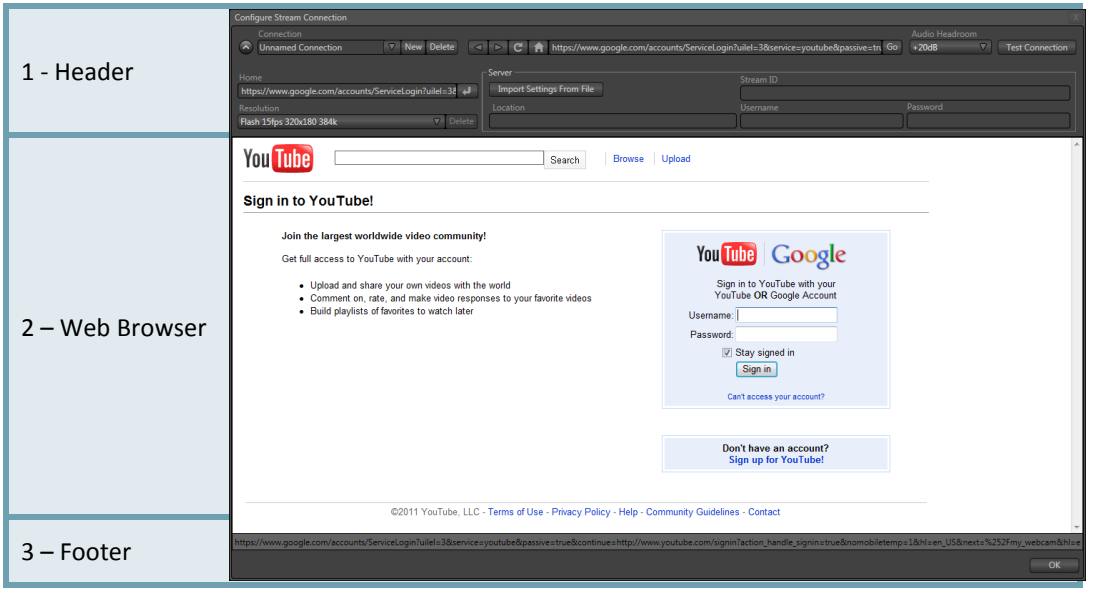
Internet streaming for different purposes involves a wide variety of attributes; at times, too, account login details are required for your streaming service (or CDN – content delivery network), or possibly even multiple accounts you maintain for different purposes.

Figure 225

TriCaster's *Streaming Configuration* panel supports the creation and configuration of all of the information and settings you are likely to need in this context. The information you enter for a given *Connection* is retained in a preset that is easily accessed afterward from a convenient drop-down me. In addition, this panel has built-in web browser capabilities, permitting you to both view your stream from the remote site (just as your audience will see it) and use webpage based controls as required.

15.1 OVERVIEW

To open the *Configure Stream Connection* panel, click the *Configure* button (gear) beside the *Stream* button, just below the *Stream* (on/off) button monitor.



The panel is comprised of three bands:

- The uppermost contains the controls for creating and managing *Connection* profiles, along with familiar web browser navigation tools.
- The larger area beneath this displays the current webpage, if any.
- Finally, beneath this is the footer, which contains a status line and *OK* button.

15.1.1 COMPACT VIEW

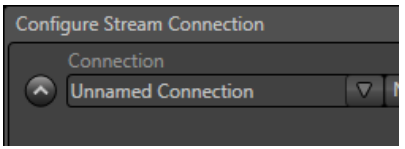


Figure 226

Just to mention it in passing, once you have configured one or more *Connections*, you can collapse the header to a compact view using the up/down control to the left of the connection name field (Figure 226).

15.2 WEB BROWSER

A simple set of *navigation controls* (Figure 227) is provided above the *Web Browser viewport*.

Figure 227

Easily recognizable *Backward*, *Forward* and *Refresh* buttons operate just like those on a typical web browser. The *URL field* allows you to type in a webpage address, and access it using the *Go* button at right.

The operation of the *Home* button varies a bit from familiar usage, and bears a little explanation.

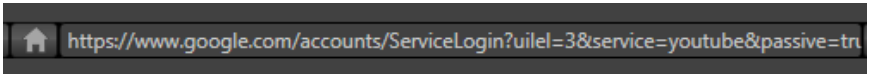


Figure 228

It helps to understand the distinction when you recall that this is not a general purpose web-browser. The purpose here is to access the main account page you use for a specific *Connection* (as opposed to a 'landing page' you like to use for more mundane browsing). Thus, you very likely want the *Home Page* for one custom *Connection* to be different than the one you use for another Connection you configure for a different end use.

The *URL* field above the viewport is always the current URL (Uniform Resource Locator, or simply, web page address). A second URL field, labeled *Home*, is located below the selected connection name at left. The address shown in this field is the assigned *Home Page* for the current *Connection*. To copy the address for the currently displayed webpage into the *Home* field for the *Connection*, simply click the *Return* button at right of the *Home* field *(*Figure 229).

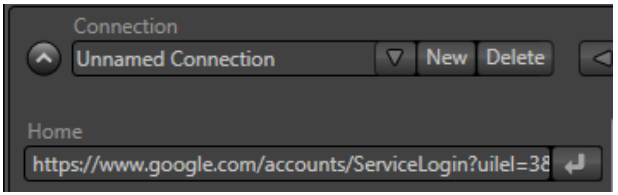


Figure 229

Afterward, clicking the *Home button* in the *navigation control group* at upper center will always return you to this location.

15.3 CONNECTION OPTIONS

The process of configuring a *Connection* (preset) begins with clicking *New* to create it. This action will immediately open a dialog entitled *Choose Configuration Type*. The options available are as shown in Figure 230.

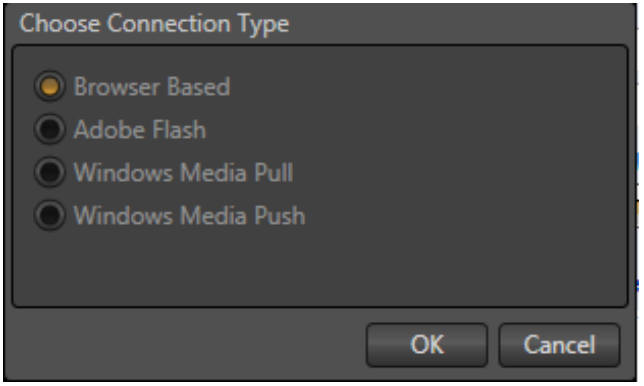


Figure 230

Hint: The Connection Types options may seem unfamiliar if you are new to streaming. You may find it helpful to read over Section 15.6, entitled Streaming Strategies, in this case.

After selecting a *Connection Type* and clicking *OK*, the *Name* field in the main *Configure Stream Connection* panel is highlighted, to encourage you to supply a descriptive name for the preset.

15.3.1 BROWSER BASED

The basic *Browser Based* connection option can arguably be thought of as the lowest common denominator, and also the least demanding approach in terms of learning curve for you, the operator. The only local setting required beyond the initial *Connection Type* selection is the URL of the *Home* field (see Section 15.2) for the streaming site you intend to use.

Many of the organizations providing streaming services offer free accounts with limited capabilities and options, often ad-sponsored. These arrangements can be just what you need to get started experimenting with live streaming, or may even satisfy all of your needs in this regard. Generally, the companies involved also offer paid-for accounts as upgrades. The benefits may include such things as removing the ads, more streaming options (such as higher bitrate and resolutions or multi-bitrate streaming), two-way live chat, and so-on.

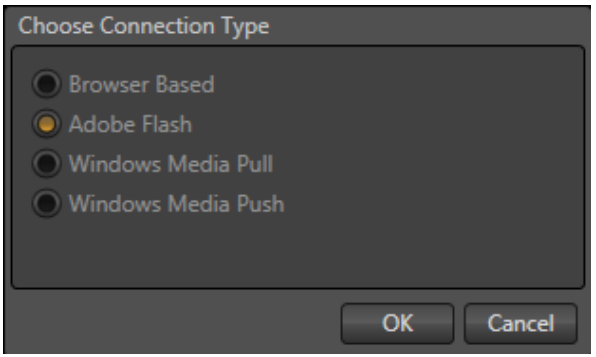
Note: The steps involved in creating an account with a streaming service provider and configuring the stream vary widely, and unfortunately cannot really be dealt with in depth here. Generally, though, they are pretty simple, and the provider offers step by step information and support through the site. And, of course, NewTek's own TriCaster™ forum membership can generally be relied upon for helpful hands-on experience and advice.

Once configured on the remote site, you can audition your streaming broadcast using the *Test* button provided in the *Configure Stream Connection* panel. After leaving this panel, the *Stream* button underneath the *Program Out* monitor on the *Live Desktop* toggles streaming (note that if you start streaming with the *Test* button, then close the *Configure Stream Connection* panel, streaming continues uninterrupted.) If you do not wish to archive your test stream, disable the *Archive File* switch beforehand – but remember to re-enable it later if desired.

Hint: Some services may show you what they are receiving from TriCaster™ when you press Test or Stream, but do not actually broadcast that stream until you indicate that you are ready to go 'on air', using controls on the website.

For *Browser Based* streaming, the encoding of your program into a stream for transmission to the service provider (and ultimately beyond, to your Internet audience) is performed by an applet running on the website. As mentioned before, however, this arrangement often doesn't give you as much control or as many options as you might want. Other *Connection Type* options are more hands-on in this respect, but require you to manually select related settings, as discussed next for each type.

15.3.2 ADOBE FLASH™



TriCaster™ can encode and stream using Adobe Flash™, and this is a very popular choice. In determining whether you should choose Flash or another encoding method for your own purposes, you might find it helpful to review the section titled Live Streaming in Section 15.6.1.

When you select *Adobe Flash* as the *Connection Type*, the controls presented in the header of the *Configure Stream Connection* panel update accordingly.

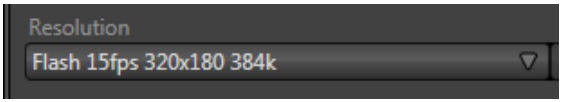


Figure 231

The first thing you might notice is the *Resolution* menu at left beneath the *Home* field (Figure 231). This drop-down selector lets you choose from a prepared list of streaming profiles, labeled to show their respective frame rate (fps), resolution and bandwidth settings.

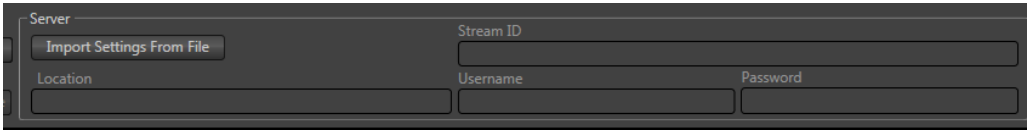


Figure 232

At right, you will see the *Server* control group (Figure 232), where you will enter the specific parameters required by your streaming service (or CDN – Content Delivery Network). Let's consider the information you need to complete this successfully.

The *Username* and *Password* are supplied to you by the streaming service, and are specific to your account.

Location (also referred to as the Server Address) is the address TriCaster™ will send the stream to (this is supplied to you by the service provider). The *Stream ID* may or may not be provided, depending on the service provider; In some cases you can simply enter a custom ID number.

Many service providers will supply you with a streaming profile in the form of an XML file for use with *Flash Media Encoder*. If this is the case, you can click the button labeled *Import Settings From File*, navigate to and select the XML file, and TriCaster™ will automatically import the *Location* and *Stream ID* values for the *Connection*.

Note: By design, the Import feature does not automatically change the Resolution profile you have selected at left. You should ensure that this setting is compatible with your service.

BROWSE (IMPORT A CUSTOM PROFILE)

A related function involves the ability to directly import a custom *Resolution* profile.

You might create such a profile for a specific purpose, using either the Adobe Flash Media Encoder™ or Windows Media Encoder™ application installed on your TriCaster).

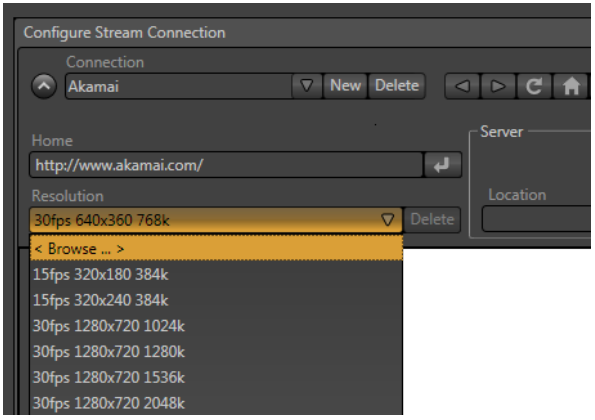


Figure 233

The *Browse* item at the top of the *Resolution* menu (Figure 233) allows you to select an appropriate file in a system file explorer, which is then copied to the correct location for it to be listed in the menu for your use in future.

Note: the nearby Delete button allows you to dispose of unused imports of this type. The default Resolution profiles cannot be deleted, however.

Figure 234

One other Flash-related detail may require your attention. The first time you configure a Flash stream, a webpage applet may pop-up up a configuration dialog (Figure 234) asking you to permit Flash to access your TriCaster audio and video devices.

Click **Allow**, and checkmark **Remember, too**. Then, in turn, click the 'microphone' button and 'webcam' button, selecting TriCaster's audio and video devices from the drop down menus provided. (If you ever need to open this panel again, you can get to the settings by right-clicking on a flash applet in the browser, and select Settings.)

15.3.3 WINDOWS MEDIA PULL

If you are streaming internally (to people in your building or inside your own corporate firewall), *Pull* streaming may well provide the easiest approach. (Be aware that since your stream may be constrained by lower bandwidth than a commercial streaming service typically offers, Pull streaming may falter when more than a few users are viewing the stream.)

For a Pull *Connection Type*, the *Location* field attempts to automatically display the Internet address you would provide viewers, or in some cases, your streaming service provider. This the IP (Internet Protocol) address of your computer on the network. This information will be provided as 'punctuated' numeric value.

IMPORTANT Note: routers provide a measure of network security by masking the details of systems connected to them, thus preventing direct external access.

If TriCaster™ is connected to the network by a router, the IP number shown in the location field is only valid for viewers connected on the same side of the router as your TriCaster™ (as they might be in a local intranet configuration.)

The Location provided in this case is merely a local number assigned by the router, and is not accessible to the world at large. To find out how to provide external access to your stream in this configuration, please see Section 15.8, Diagnostics and Troubleshooting, for information on routers and "port forwarding".

You can provide any clients or streaming providers this address. Entering this address into the File menu of Windows Media Player™ (using copy, and pasting it into the Open URL window) will direct the player to show the stream from your system on client computer system(s) connected to the Internet.

Hint: Most web browsers can be also configured to invoke a compatible player when required, as well, but using WMP directly in this fashion may save some steps.

Beyond this, simply select a suitable profile from the *Resolution* menu for your need.

Once you are done setting up the connection, click *OK* to close the panel. Your live program stream will be sent continuously to the network while the *Stream* button is enabled.

15.3.4 WINDOWS MEDIA PUSH

A Push *Connection Type* is often the most convenient method, especially in cases where TriCaster™ is connected behind a firewall. Push streaming is also usually simpler when you need to stream from major venues (such as hotels or convention centers). The program stream passes quietly out through any firewalls or routers between the facility and your streaming server.

Also, once your streaming provider has provided you the connection specifics, you can resume the stream at any time without intervention from the server. When a *Push* profile is chosen, the *Server* control group updates to allow entry of the (pre-arranged) host web address (*Location*), *Username* and *Password*.

Note: The publishing point is placed at the end of the URL, following a forward slash (i.e., http://225.21.1.4:8080/NewTek).

Enabling the *Stream* button then "pushes" the stream from your location, logging into the pre-arranged web address using the username and password you provided. The streaming service then re-transmits your stream for all to see.

Note: You will find information on the use of custom streaming profiles including MBR (multi-bitrate) options at Section A.7.3 in Appendix A.

15.4 AUDIO HEADROOM

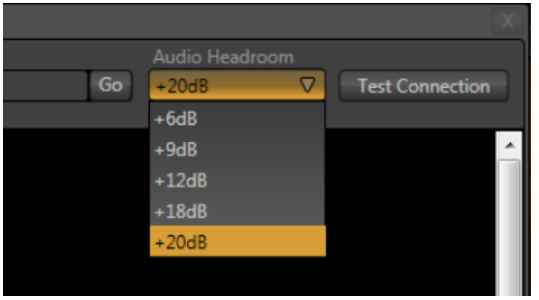


Figure 235

TriCaster™ provides an *Audio Headroom* setting that provides the ability to choose how far below 0dB FS (the maximum allowable digital level) to set the nominal level for your streaming audio.

This lets you customize your streaming audio headroom level separately to make sure your audience hears sound at an appropriate level, while still eliminating any possibility of audio clipping in captured streaming files.

Hint: Recall, as well, the Stream control group in the Internal Audio Mixer tab provides a Compressor/Limiter that can help you deliver the best possible sound to your listeners.

15.5 CAPTURING THE STREAM

TriCaster™ archives your live stream file as it is created. A new folder will be automatically created as needed (at D:\Media\Clips*sessionname*\SavedStreams) to receive the captured stream file. (You have the option of deleting the file on completion of a streaming session if you wish.)

15.6 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.

15.6.1 ON DEMAND OR LIVE?

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

On demand streams are stored on a server (often supplied by an external service provider), ready to be transmitted whenever a viewer wishes. Live streams are available at the time they are broadcast, such as during a live concert or event.

ON DEMAND HOSTING

TriCaster™ 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, TriCaster™ 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. TriCaster™ supports two popular and prolific encoding systems, Microsoft's Windows Media™ and Adobe Flash Media ®.

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).

- Flash has a very wide installed user base, and seems poised to increase in proliferation in the foreseeable future.

- Flash works well across multiple platforms (PCs, Macs, Linux, etc.). Windows Media is well represented, but perhaps not quite to the same degree.

- Some sources report that the Flash movies will have a larger file size and use greater bandwidth than Windows Media for a given stream quality. (This is hard to assess, and changes constantly as developers update their products).

- Codecs for both types are updated with fair regularity, and when you choose the 'latest, greatest' encoding, your viewers may not all have the current player, requiring them to download and install updates.

BANDWIDTH CONSIDERATIONS

You'll often hear the term 'bitrate' in connection with streaming video. 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 *Stream Profile* in TriCaster's *Stream Configuration* panel. 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 connection your viewing audience may have.

Consider an example scenario: Even though you know that most of your audience is going to connect to your program using (relatively slow) wireless devices, you use a very high outgoing bitrate – thinking that this will surely be enough to fill the need. The fact is, though, a high bitrate actually ensures their experience will be poor!

The client player tries to play the stream at the bitrate you specified, but (in this example) the wireless bottleneck impedes flow. It is as if you connected a fire hose on your end, giving them a suitable high capacity nozzle for their end – but in the last stage of flow, the stream must pass through a small garden hose. Sadly, the stream will be quite insufficient, and output from the 'nozzle' (the client player) will falter badly.

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

Also consider the expected download abilities of your viewers. Ideally, a safety margin 1.5 times the stream's bitrate is desirable. This may mean you need to consider using a lower resolution, or lower framerate for your stream – but doing so when required will generally deliver a smooth result, and is the wise course. (Nothing inclines viewers to turn away quicker than a stuttering, start and stop stream. See "Speed Tests" in Section 15.8.1 for some useful resources.)

15.6.2 STREAMING PROTOCOLS

Additionally, there are two primary streaming methods, known as *Pull* and *Push*. Choosing the best method for your needs is important. Let's review each, and consider what is best for your needs.

PULL BY END USERS

Simply put, the Windows Media Encoder in TriCaster™ allows your (networked) audience to connect directly to it, and it distributes the stream to them.

Connecting in this manner requires you to have a connection with sufficient bandwidth to deliver a stream to each individual user. For this reason, the simple Pull streaming method rarely works well for more than 1 or 2 viewers.

- Advantages:
  - When TriCaster™ is not behind a firewall or does not have a public IP address, this is a very simple way to let a few viewers watch your program stream.
- Disadvantages:
  - Requires either a public IP address or requires users to be on the same network. Facilities such as hotels or convention centers will usually not provide a public IP address. Even if they do, getting them to open holes in their firewall is next to impossible.
  - If TriCaster™ is behind a router, your router must be configured to 'port forward'.
  - Requires significant bandwidth -- for example, with TriCaster™ connected to the Internet by a DSL or Cable Modem line, upload bandwidth is often less than 400kbits/second. Allowing for network overhead, at best a 320kbit steam can be accommodated. This bandwidth would be fully consumed by two viewers watching 160kbit streams, or a single viewer pulling a 170-320kbit stream. (Even a T1 digital line can only handle four simultaneous 300kbit streams).

A variation on the Pull method involves using an external streaming provider. At one time the *only* method for streaming using such a provider was to have the server 'pull' it from the encoder.

Under this system the server did not receive the stream until the first user requested it. Then the server would connect to the encoder, pull the stream to it, and finally begin re-distributing it to everyone requesting it. This method worked passably until firewalls became more common.

- Advantages:
    - Pull doesn't waste bandwidth; no signal is being sent out to the server unless somebody wants to view it.
    - If you lose your connection to the (provider side) server, the server will re-connect to your encoder automatically when Internet connection resumes.
    - Providers typically have significant bandwidth, and are able to meet necessary requirements to deliver stutter-free, high quality streams to large numbers of viewers.
- Disadvantages:
    - Like the "Pull by End Users" method above, this requires a public IP address, preferably a "static IP address" (which does not change dynamically if you need to reconnect) as well as open ports for the connection to be established. These requirements are becoming increasingly difficult to meet (given common security measures).

PUSH TO PROVIDER

Windows 2003 Server introduced "Push" technology. With this method, the encoder sends the stream to downstream servers. This allows the encoder to establish a connection to the server on a specified port. Once this connection is established, additional network ports may be opened as required (since the Encoder established the connection, not the server.)

- Advantages:

- Easy to connect to the provider. There are no requirements for open ports on your local system, or public IP's. In addition, firewalls do not get in the way.

❖ Disadvantages:

- Live streams that have no viewers are still consuming bandwidth. From a provider point of view, it is possible that all of our bandwidth could be utilized with no viewers. However, that is more theoretical than practical.

- Some external streaming providers prefer to Pull streams, as re-connection can performed from their end automatically if necessary. But in many venues system administrators are very reluctant to configure their system with an open port to have your stream Pulled from.

15.6.3 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 a few hours notice, they can scale up your allotment on demand 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.

15.6.4 OTHER RESOURCES

If you're still struggling with the differences between Push and Pull streaming methods, you can find lots of online resources (in addition to excellent information available in NewTek's user forums!)

The popular web resource Wikipedia® hosts many articles on the subject, notably these two:

http://en.wikipedia.org/wiki/Push_technology
http://en.wikipedia.org/wiki/Pull_technology

Microsoft even hosts an animation on the subject at:

www.microsoft.com/windows/windowsmedia/knowledgecenter/wminaction/streaming_pushpull.asx

(Ignore the detailed discussion of configuring the encoder, and just enjoy the pretty pictures – your TriCaster™ makes that part easy for you!)

15.7 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 TriCaster's DDR, edited in SpeedEDIT, or even be transferred to another computer (even on a different platform) for external processing or editing.

Hint: use an external hard drive to transfer the files between systems, or simply transfer them across a local network.

You can always convert these files to a streaming file format if you later decide you'd like to supply them for 'on demand' Internet viewing. This lets you retain best quality right through to final output. When you eventually encode for streaming, you can choose settings that best suit the intended audience and streaming environment.

At the very least, if (perhaps to save conversion time) you capture video for web distribution, it's best to capture it at least at the size that you intend for final output, to ensure satisfactory video quality for your viewers. When video is compressed (as it invariably is for web viewing) you can

lose important detail; compressing a full-screen video down to a quarter or a sixteenth of its size is a lesson in humility!

OTHER FACTORS

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

Also, web streaming doesn't handle detail, transitions and motion all that well -- so your best shots should be close up, and without a lot of movement.

Too, audio from cameras and camcorders is rarely as good as that from external microphones. You should at least use a clip-on lavaliere microphone, if not a directional or shotgun microphone to be sure you record only the audio you really want.

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

15.8 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. TriCaster™ 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.

15.8.1 TESTING YOUR STREAM

When it comes to using your TriCaster™ 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 and his Law are alive and well. So you plan for this, bringing the appropriate equipment, such as uninterruptable

power supplies, backup recording devices (there's no shame in having a VCR backing up your digital record – 'low tech' still has a place in the grand scheme.)

But you also need to perform onsite testing, to ensure your live stream is working well before 'zero hour.' No-one will thank you for excuses, no matter how brilliantly they point the finger at forces beyond your control.

1. Set up and enable a test program stream from your TriCaster™.

2. You can use the tools and integrated web browser in the Streaming Configuration panel, but you may want to confirm using an external system, too. Open Windows Media Player™, and select *File> Open URL* from its file menu (in some versions, you need to right-click WMP's title bar to present the menu).

3. Enter the *IP address* and *port number* for your stream here.

4. You should be able to connect and view your program stream.

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…

FLASH® MEDIA LIVE ENCODER NOTES

Unfortunately, there are cases in which Flash® Media Live Encoder fails to report significant error conditions. For example, no error message is displayed if the network cable is disconnected while streaming, or if the connection to the remote server is lost.

Note: If the connection to a server is lost after initial success, the encoder attempts to resume streaming automatically if the connection becomes available again during the session.

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 TriCaster™.

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.

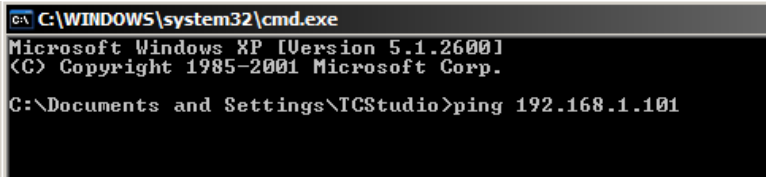


Figure 236

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 237. A success ping will display a report like Figure 238.

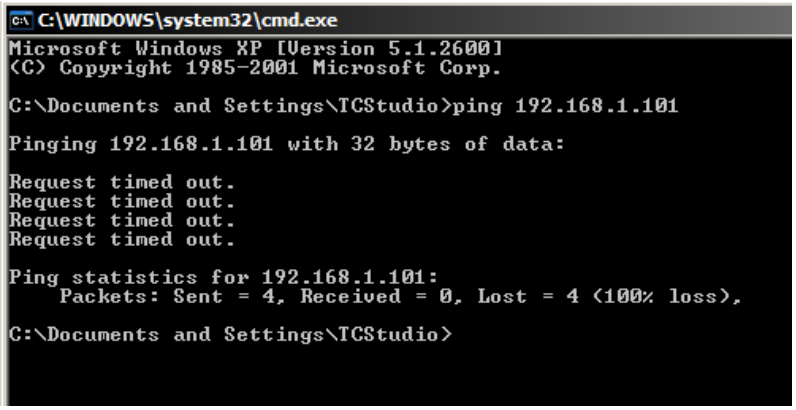


Figure 237

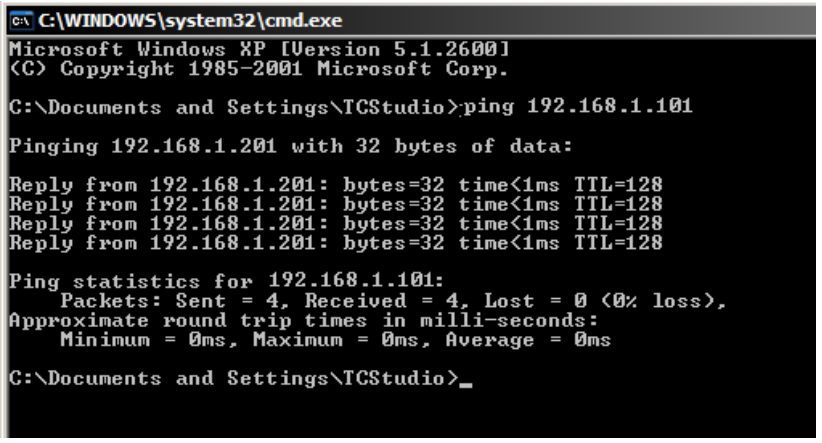


Figure 238

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.

PULL CONNECTION ISSUES

Note that - if you are *Pull* streaming from 'behind' a router – the IP number shown in the TriCaster's *Location* field will only be valid for other systems behind the router. You will need to derive the true external IP address to pass to your viewers (or service provider.)

Again, in this environment you may wish to consider Push streaming with the aid of a Content Delivery Network (a commercial service), as this is generally free of firewall and router woes that often require a friendly system administrator to resolve otherwise.

You will also need to enable "port forwarding" on the router, as discussed next.

Port Forwarding

If you are streaming from behind a router, to preserve a reasonable level of security while allowing outside computers to connect to your system you will need to 'port forward' your router.

Port forwarding permits a sort of 'blind hand-off' between external clients (your viewers) and a local transaction port which you manually specify. (The router will pass requests to view the stream through to the TriCaster™, without exposing the internal IP routing.)

To enable port forwarding, you need three pieces of information:

- The login information for the router. Your router's manual will have this information, which typically involves entering a specific IP number into your web browsers URL field, and perhaps also a password you have set previously.

- The specific IP local number that the router has assigned to your TriCaster™. You can read this right from TriCaster's *Location* display. It will comprise the entire string of punctuated numbers before the colon (the colon separates the port number you chose for your stream).

- The port number just mentioned (the part *after* the colon).

Although the steps vary a bit by brand and model, generally you would proceed as follows:

1. Log into the router, so it shows its control panel in your web browser.

2. Select the port forwarding page of the router controls. These options may be found in an obscure place, such as the router's "Applications and Gaming" page (since online gaming often requires port forwarding).

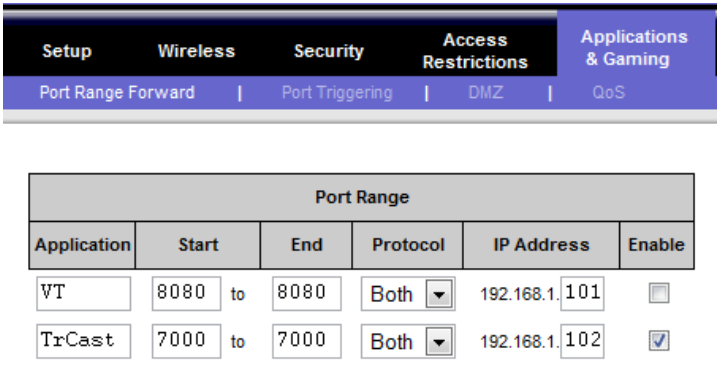


Figure 239

3. Enter an *Application* name, if required (this is for your own recognition purposes, so use anything you like).

4. Enter the *Start* and End *port* values – you can use the same port number in both fields, but of course it must be the one you set in TriCaster's *Port* field.

5. IF possible, select Both for *Protocol* (or select UDP).

6. Enter the full (punctuated numeric) local IP address shown in the *Location* field of your TriCaster™ after you enable the stream.

7. Checkmark *Enable.*

Some routers may have other security settings that need to be modified for your Pull stream to be visible from the outside. For example, the Linksys® router shown above has a setting in the ***Security*** *page named* ***Block Anonymous Internet Requests****. While this may be a great idea normally, it's not going to help much when outside computers request that your system permit them to Pull the video stream, is it?*

There are countless makes and models of routers – for information on various models, and a great deal of help on port forwarding generally, we can recommend the following site:

http://www.portforward.com/english/routers/port_forwarding/routerindex.htm

Firewalls:
You may also run into software firewalls. Generally, these can be configured in similar to permit exceptions to the firewall policy, permitting specific ports or applications to be opened to the world. Information on exceptions in the Microsoft Windows™ Firewall can be found in its Help system.

FINDING YOUR EXTERNAL IP NUMBER

Again, the numbers assigned behind your router only work locally. In a Pull scenario, you need to supply the true external IP number (and port) for your TriCaster™ to viewers outside the LAN (Local Area Network.)

You can find this number in several ways. For example, your router will display it as its "IP Address" in its Status page. Or, you may want to use one of several handy websites that will quickly supply your current IP number (one such is http://www.whatismyip.com). Simply go to the website in your browser and read the IP number from the screen. Append a colon and the port number you are using to this number and you've got everything you need for your viewers to connect.

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

15.8.2 IS IT REALLY A TRICASTER ISSUE?

With regard to streaming issues, don't overlook the fact that TriCaster is just one of the pieces of the puzzle. There are many others that are just as important. Here are some useful things to try:

CHECK THE FILE

Archive the streaming output file locally, and then examine it to see if it has any problems. This file corresponds exactly to what TriCaster is sending the downstream server. In cases of sync problems, low frame-rate problems, audio popping problems, etc., if it's a TriCaster issue, the problem will be seen in this file. On the other hand (if the file looks good), then the issue has to be up-stream of the TriCaster.

DROPPED FRAMES

To really confirm that TriCaster is outputting the frame-rate you chose (i.e., not dropping frames) you can edit a profile inside Flash® to cause FMLE to write out frame-rate stats. These settings apply when using the TriCaster, which lets you verify that it is uploading the stream at the rate designated. (In FMLE, select the *Encoding* tab, and check mark "Log To File").

16 RECORD AND GRAB

You will often want to capture video clips from external sources, as well as to record your own outgoing live production.

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.

16.1 RECORD

TriCaster™ provides a great deal of flexibility when it comes to capturing your production, a part of it, or a wide array of internal and external sources (with embedded timecode) to files. This ability will be very helpful for immediate post production purposes, or as a way to capture video clips for playback from the *DDR during* a live production.

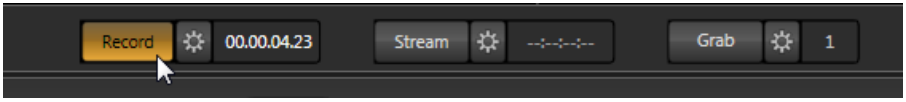


Figure 240

TRICASTER EXTREME™ The unique IsoCorder™ technology built into TriCaster EXTREME™ systems brings even more powerful capability to TriCaster's *Record* feature. It's even possible to record all incoming sources simultaneously (with embedded timecode), or a mix of sources and output streams, including Program, Program (Clean) and Aux.

Settings and controls for recording are grouped in the *Record Configuration* panel. Click the *Configure* button (gear) near the *Record* button to open this panel (Figure 240) .

16.1.1 RECORD CONFIGURATION

The *Record Configuration* panel allows you to select a *Primary* source for recording and configure it. (TriCaster EXTREME™ systems allow you to go on to set up as many as seven additional (*Secondary*) recordings – we'll discuss that a bit later).

BASIC SETTINGS

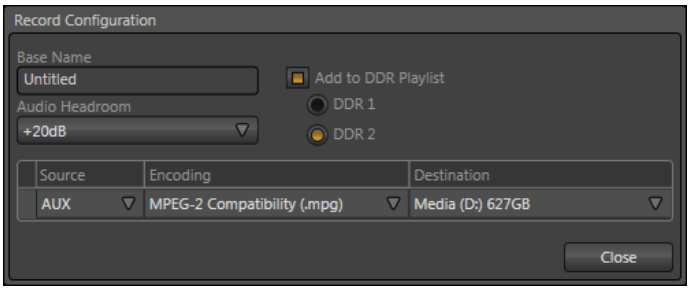


Figure 241

The first thing you may want to do is enter a *Base Name* for captured files. The name you enter will be numerically incremented as necessary when you start and stop recording.

ADD TO DDR

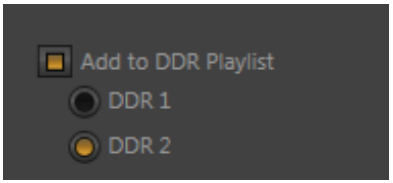


Figure 242

Enable the *Add to DDR Playlist* switch to automatically include newly captured clips from the designated (primary) source to the end of the playlist of the *Media Player* designated below. These clips are available for immediate playback during your live production.

AUDIO HEADROOM

In digital audio systems, signal levels exceeding allowable values are clipped (uniformly assigned the maximum value), inevitably entailing audible issues. TriCaster's *Record Configuration* panel provides an *Audio Headroom* setting that lets you choose an offset value (in decibels) between 0dB FS (the maximum allowable digital level) and the benchmark 'alignment level'.

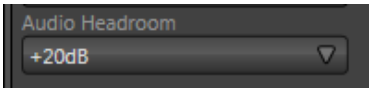


Figure 243

This lets advanced users record files with a professional level of headroom right up to 20dB, selectively conforming to regional standards or local preference. It also effectively eliminates any possibility of audio clipping in recorded files.

TRICASTER EXTREME™ The Audio Mixer tabs for TriCaster EXTREME™ systems feature Compressor/Limiters for each input and output. These can also be valuable in defeating clipping due to over-modulation.

In a related point, when playing playlist files located in TriCaster's default 'capture folders', *Media Players* automatically adjust the audio level by a commensurate amount. This automatically produces an improved match of playback levels for captured audio added to playlists that include imported sounds or music (for which nominal levels are unknown).

PRIMARY RECORDING

Other common controls permit you to define the video steam to capture (again, this is the recording stream used for the 'Add to DDR' feature, and that is controlled by an optional TimeWarp™ control surface when connected).

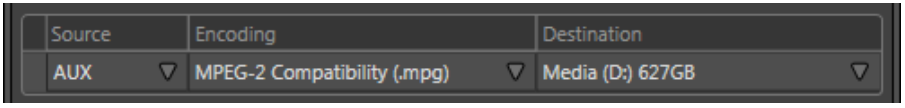


Figure 244

A drop-down menu labeled *Source* permits you to choose which video stream to capture. TriCaster™ provides numerous source options. Beyond simply selecting *PGM* (Program output), you might select *AUX* (a particularly flexible option, since it can be independently set to a variety of useful configurations in *Output Configuration*). In addition, any single camera input can be designated as a source (allowing the *Aux Output* to be freely assigned to something else).

Hint: The Aux video output format can be configured in Output configuration, and it can likewise be accompanied by either Aux or Program audio. For this reason, directly selecting Cam 1 (for example) as Source can easily produce a very different recording than would occur if you assign Aux to Cam 1 and then select Aux as Source.

ENCODING

The *Encoding* option menu allows you to choose between encoding formats for the recorded file. Let's consider the differences in the two MPEG-2 format options first.

MPEG-2

TriCaster's 'double-rate' MPEG-2 format for records is comprised entirely of 'I-frames', resulting in excellent image quality. Two variants are provided; your choice principally affects color sampling applied to captured clips:

- *MPEG-2 Compatibility* encoding invokes 4:2:0 color sampling (similar to that of the popular 'DV' and 'HDV' formats).

- *MPEG-2 High Profile* encoding raises color sampling to 4:2:2. These files retain more color information than standard DV/HDV files as well as many other file formats. The increased color fidelity is especially valuable for chromakeying purposes. (Please see the notes which follow regarding file compatibility.)

COMPATIBILITY CONSIDERATIONS

The 4:2:2 sampling and high fidelity of the *MPEG-2 High Profile* format make it especially suitable for chromakeying applications. Support for High Profile MPEG-2 files by various applications is not universal, however. It would be prudent to test file compatibility with your favorite third-party programs before making extensive use of this option.

Note: TriCaster's High Profile MPEG-2 files meet the "High Profile" MPEG-2 definition established by the Moving Pictures Expert Group (MPEG). Please see http://en.wikipedia.org/wiki/Mpeg2 for more detailed information on High Profile MPEG-2 encoding.

EXTENDED ENCODING FORMATS

TRICASTER EXTREME™ TriCaster EXTREME™ systems feature provided a number of additional file formats for recording purposes. The optional selections are discussed next.

SPEEDHQ AVI

Selecting *AVI* encoding tells TriCaster to capture the designated source using NewTek's native AVI format, *SpeedHQ*, which is a high quality, 4:2:2 file format suitable for both SD and HD applications.

Hint: Users of Microsoft Windows™ can download a free NewTek codec pack from their personal downloads page in the Registration area of the NewTek website.

H.264

Another important encoding option is *H.264*. TriCaster supports two different bitrates, designated *High Quality* and *Web Quality*. The former uses 20 Mbit/sec encoding, while the latter option invokes a 2 Mbit/sec bitrate suitable for online use.

Note: H.264 encoding is processor intensive. We recommend this format be used to encode just one video stream, to avoid dropped frames or other glitches.

QUICKTIME™

Quicktime encoding is recommended for use for convenient transport to Apple Final Cut™ systems and the like. Encoding uses an all I-frame format similar to SpeedHQ (AVI), and is suitable for realtime playback without conversion.

DESTINATION

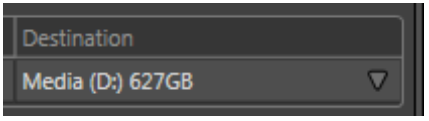


Figure 245

Select drives or other storage volumes as targets for the different recordings using the *Destination* drop-down menu.

SECONDARY RECORDINGS

TRICASTER EXTREME™ NewTek's IsoCorder™ technology provides further recording capabilities to TriCaster EXTREME™ systems. An additional list of *Secondary* sources can be added in the Record Configuration panel (the number depends on the model). These are configured in exactly the same manner as the *Primary* source discussed previously.

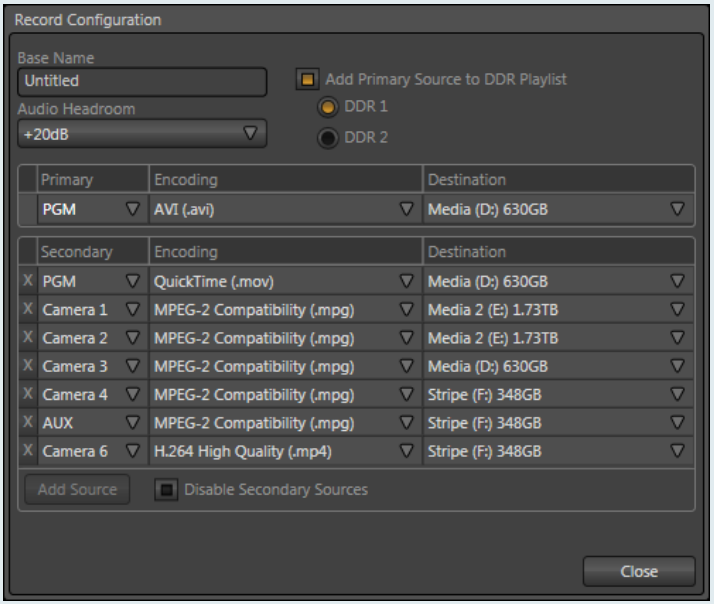


Figure 246

Click the *Add Source* button to place an additional entry into the list, up to the total limit for the model – either four (TriCaster™ 450 EXTREME™) or eight (TriCaster™ 850 EXTREME™) sources in total, including the *Primary* source. To remove an entry, click the corresponding [X] button at left.

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

16.2 GRAB

At times, all you really want to capture is a still image from the current *Program Output* video stream. This is the purpose of TriCaster's *Grab* function.

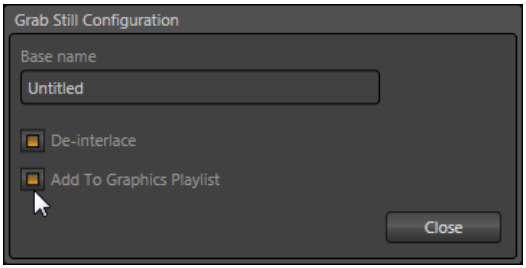


Figure 247

Click the *Configure* button (gear) next to *Grab* beneath the *Program Output* monitor to open the *Grab Still Configuration* panel.

The options presented are similar to those of *Record Configuration*, though a bit simpler. Again, enter a *Base Name.* The name you supply which will be numerically incremented as required. Enable the *Add to Graphics* (or *Still*, depending on the model) *Playlist* switch to automatically include newly captured clips at the end of the current *Still* tab playlist, ready for immediate playback during the live production.

Close the *Grab Still Configuration* panel by clicking *Close*, or clicking anywhere outside the panel. Then click the *Grab* button to capture the selected a/v source to your hard drive. Image files are stored in a folder named for the session, inside the main *Still* folder.

Hint: During a session, the 'grab counter' situated beside the button keeps track of the number of images stored for the current base name entry.

17 SPEEDEDIT AND LIVETEXT

LiveText™ is a powerful title and CG application, allowing you to create title pages for use in the Live Desktop's Media Players. Title pages can be still or motion pages, including scrolls and crawls.

SpeedEDIT™ provides a host of world-class editing tools for pre and post production purposes. You'll find it innovative and powerful, ready to handle numerous editing and also file conversion chores.

SpeedEDIT and LiveText are both full-blown, powerful, professional program also available as a standalone applications. Each of these programs has its own complete manual, which can be accessed from the Help icon in the Startup Screen (the source .pdf files are located in the C:\TriCaster\Documentation folder, in case you wish to print them out). In this section, then, we will review matters specific to the different applications when running in as an integrated part of the TriCaster™ environment.

17.1 SPEEDEDIT

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

17.1.1 SESSIONS, PROJECTS AND DISPLAY

Normally, SpeedEDIT uses the current session settings for output on TriCaster's video outputs. The session format is also used for new projects created using SpeedEDIT's *File* menu (New) or from TriCaster's *Session Page*.

SpeedEDIT sends output to TriCaster's audio and video outputs continuously, without selecting any menu setting. Unlike the arrangement for *Live Desktop* output, for SpeedEDIT purposes TriCaster's video outputs (rows 1-3) will all conform to the session format. That is, if the project is HD, the SDI outputs will all be HD, and the analog outputs will all be Component HD.

Likewise when the project is SD, the SDI outputs will all be SD. As there are multiple connection options for analog SD video, please refer to the following table in this case:

Row Number	SDI	Analog BNC 1	Analog BNC 2	Analog BNC 3
1	SD	Y	Pb	Pr
2	SD	Composite	Y	C

Note: It is possible to use SpeedEDIT's File menu to open an existing project not using the current session settings. TriCaster™ will attempt to provide video output, which may require it to reset the display hardware from HD to SD (or vice versa). It's possible that this could result in a monitor, its connection type, or both being inappropriate for TriCaster's output mode.

17.1.2 FILEBIN QUICKTABS

SpeedEDIT's Filebins 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 TriCaster™ version of SpeedEDIT does not support user-added Quicktabs.

17.1.3 IEEE1394 I/O OUTPUT

The realtime IEE1394 (DV/HDV) preview found in SpeedEDIT standalone is not supported for TriCaster™, which has other (superior) video display options. However, the *File* menu point *Send to DV Tape* (and the similar icon context menu in the *Filebin*) is available.

Hint: SpeedEDIT's Output menu is not required in TriCaster™ for this reason.

17.1.4 SPEEDEDIT DESKTOP

TriCaster™ launches SpeedEDIT on a desktop of its own, spanning all connected monitors. You can exit SpeedEDIT by clicking the [x] button in the upper-right corner of the desktop, or by using the *File* men item *Close*.

If you have a secondary monitor connected to TriCaster™, you can drag SpeedEDIT's *Video Output* window (opened from the *Window* menu) onto that screen, then maximize it by double-clicking *inside the preview area* (double-clicking a second time restores the standard floating window).

Similarly, you might find it convenient to maximize the SpeedEDIT window to fill the primary monitor display. To do this, double-click the window border. In this configuration, the Desktop exit button is not available, but you can exit the application using the File menu's *Close* item.

17.2 LIVETEXT

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

17.2.1 SESSIONS, PROJECTS AND DISPLAY

LiveText uses the current session settings for output to TCXD850 video outputs, new projects (created within the LiveText *File* menu or from the *Session Page*) and bitmap file exports. If you use the File menu to *Open* a project whose settings do not correspond to the current session settings, TriCaster™ will attempt to display it on its hardware video outputs, if possible.

LiveText sends output from the canvas to TriCaster'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 TriCaster's LiveText interface.

When LiveText is running, TriCaster's video outputs (rows 1-3) will all conform to the session format. That is, if the project is HD, the SDI outputs will all be HD, and the analog outputs will be Component HD.

Likewise when the project is SD, the SDI outputs will all be SD. As there are multiple connection options for analog SD video, please refer to the following table in this case:

Row Number	SDI	Analog BNC 1	Analog BNC 2	Analog BNC 3
1	SD	Y	Pb	Pr
2	SD	Composite	Y	C

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

17.2.2 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 TriCaster™ 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 these 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 TriCaster'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.

17.2.3 NAMING STAND-IN IMAGES

Among other things, the *Title Editor* in TriCaster's *Media Players* (DDR, Still and Titles) allows you to substitute a different image for stand-in (or "placeholder") images in Title Pages (.cgxml) exported from LiveText (working with stand-in images is discussed in Section 10.3).

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

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 TriCaster™ operators may have (and of course we'll provide the answer, too).

The 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 TriCaster™ 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 video sources to the appropriately labeled BNC input connectors on TriCaster's backplate according to your camera's video output connection type (see Section 3.4). (Because of the 'busy' nature of the backplate, you may find the BNC removal tool provided with TriCaster™ helpful for this purpose).

2. Open a TriCaster™ session (or create a new one) from the *Home Page* of the *Startup Screen*.

3. Click the *Live* icon on the *Session Page* of the *Startup Screen*, and press *Enter* (or click the *Start Live Production* link).

4. Click the *All Monitors* tab at the top of the *Live Desktop*, roll the mouse pointer over the camera monitor you want to set up, and click the *Configure* (gear) button that appears above it.

5. Choose an appropriate *Connection Type* for your camera in the *Input Settings* tab (see Sections 3.4 and 7.2.1).

A.1.2 CONNECT FILL + ALPHA SOURCES?

1. Connect the Fill (color) source to an odd-numbered video Input.

2. Connect the Alpha channel source to the next higher even-numbered video Input.

3. Open a TriCaster™ session (or create a new one) from the *Home Page* of the *Startup Screen*.

4. Click the *Live* icon on the *Session Page* of the *Startup Screen*, and press *Enter* (or click the *Start Live Production* link).

5. Click the *All Monitors* tab at the top of the *Live Desktop*, roll the mouse pointer over the camera monitor you want to set up, and click the *Configure* (gear) button that appears above it.

6. Choose the appropriate *Connection Type* for the source attached to the odd-numbered input in the *Input Settings* tab (see Sections 3.4 and 7.2.1).

7. Choose *Act as Alpha Channel for Input (#)* as the *Connection Type* for the even-numbered in the *Input Settings* tab. (See Section 7.2.2).

A.1.3 CONFIGURE ALPHA MATTE OUTPUT?

TRICASTER EXTREME™

1. Open the *Output Configuration* panel, by clicking the *Configure* button (gear) above the main *Program Output* monitor.
2. Click the *Output* tab in *Output Configuration*, and enable the *Output Alpha Matte* switch.
3. Select a suitable source using the (Aux) *Source* menu.

A.1.4 COLOR CORRECT MISMATCHED CAMERAS?

TriCaster™ 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 official broadcast standard for SD video is *Rec. 601*, but HD video conforms to *Rec. 709* – and TriCaster™ output color space is governed by the session format.

When the natural color space for a connected source does not match TriCaster's current output specification (in this example, Rec. 709), TriCaster™ automatically attempts to compensate – but as always, it's good to refer to the scopes for critical accuracy. As required, TriCaster'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 convenient reminder.)

A.1.5 CONNECT MONITORS?

COMPUTER MONITOR

With the power off, connect an external computer monitor to a DVI port on TriCaster's backplate, using an adapter if necessary. For TriCaster™ 450, use the DVI connectors nearest to the *Video In* group for the interface (DVI connectors located at left below the power supply are normally capped and should not be used.)

MULTIVIEW MONITOR (OR PROJECTOR)

TriCaster™ supports the use of its secondary output connector by means of its *Multiview* output feature. This output can serve as a supplementary program output for projection, or for operational monitoring purposes (see Section 7.1.5).

1. Connect the external device to the secondary output on TriCaster's backplate using an appropriate cable (and/or adapter, if required).

2. Open a TriCaster™ session (or create a new one) from the *Home Page* of the *Startup Screen*.

3. Click the *Live* icon on the *Session Page* of the *Startup Screen*, and press *Enter* (or click the *Start Live Production* link).

4. Roll the mouse pointer over the main *Program* output monitor, and click the *Configure* (gear) button that appears above it.

5. In the *Output Configuration* panel's *Multiview* tab, set *VGA Output Resolution* to match the native resolution of the external device.

6. Select an optional display mode from the *Screen Layout* menu.

SUPPLEMENTARY QUESTIONS:

Q1: *Why don't I see the Multiview monitor resolution I want listed in the VGA Output Resolution menu?*

A: Normally the VGA Output menu option list is updated using DDC (Display Data Channel) information the monitor itself provides. In some cases this information may not be not available (e.g., a monitor switch or adapter might prevent the available display mode information from being supplied to the operating system).

If you are sure your monitor supports an unlisted mode, you can attempt to add it to the menu manually by editing an (XML format) configuration file supplied for this purpose. The file is named *multiview_resolutions.xml*, and is located in the folder at C:\TriCaster\Configuration. Comments in the file provide details of its use. (Note that if your display hardware declines to work with additions you make to the menu, the *Live Desktop* error flash line may show an 'unsupported display mode' message, and the monitor may either revert to the previous mode or simply not show anything at all.)

NOTE: Changing Output Resolution can cause frames to be dropped briefly. We do not recommend changing this setting during live production.

Q2: *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 TriCaster's *Live Desktop*, the operating system can have difficulty with monitor recognition and configuration. To avoid problems, naturally it's best to leave display devices connected to the DVI ports along 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.

VIDEO MONITORS/DEVICES

Downstream video monitoring devices must be compatible with the video broadcast standard (such as NTSC or PAL) you intend to use in the TriCaster™ session.

1. Connect cables between downstream devices (whether monitors or other devices) and appropriately labeled connectors on TriCaster's backplate (see Section 3.7.1).

2. Open a TriCaster™ session (or create a new one) from the *Home Page* of the *Startup Screen*.

3. Click the *Live* icon on the *Session Page* of the *Startup Screen*, and press *Enter* (or click the *Start Live Production* link).

4. For SD display devices, you may need to adjust the connection options found in *Output Configuration*:

    a. Move the mouse over the *Program* monitor, and click the *Configure* button (gear) that appears above it to open *Output Configuration*.

    b. Click the *Output* tab, and select either *Composite + Y/C* or *Component* according to the connection type used by your device. (Please see Section 3.10 for more information.)

A.1.6 CONNECT A SUPPORTED EXTERNAL CONTROL SURFACE?

Connect the USB cable from the *Control Surface* to one of TriCaster's USB ports.

SUPPLEMENTARY QUESTION:

Q: *TriCaster™ TCXD850 CS has suddenly stopped working. What can I do?*

A: The foremost reason this might happen is if the cable (or extender cable) you are using between the control surface and the TriCaster™ failed to deliver sufficient current consistently. In the short term (if you are in the middle of a show), you can generally resolve this issue by simply unplugging and re-plugging the control surface.

However, please note that the use of so-called "USB extenders" is not recommended. Whenever possible, use a single USB cable of the correct length. Each added connector on the signal path is a potential connection problem, and also causes signal 'reflections'. Such an arrangement may seem to work for a while, then fail unpredictably.

If you are using a very long USB cable (or a poor quality cable), you should supply a powered hub at the end of the cable nearest the control surface, then complete the connection with a short USB cable from the hub to TriCaster™ TCXD850 CS. (An unpowered hub will be of no help.)

A.1.7 INSERT/REMOVE A DRIVE FROM TRICASTER'S REMOVABLE DRIVE BAY

1. If TriCaster™ is running, and if applicable – Eject the hard drive you wish to remove (see Section A.1.9).
2. Open TriCaster's front panel.
3. Open the removable drive bay door.
4. Pull the hard drive currently in the drive bay (if applicable) to remove it.
5. Insert the new hard drive ('connector end' first)

Figure 248 (TriCaster 850 shown)

6. Close the drive bay door.
7. Close TriCaster's front panel.

SUPPLEMENTARY QUESTION:

Q: *What hard drives are recommended for TriCaster's removable drive bay(s)?*

A: NewTek supplied storage media has been carefully tested to meet exacting specifications, and can be expected to provide optimal performance and reliability. Of course, you are free to purchase storage media from other sources. Keep in mind that manufacturer specifications and reviews may highlight favorable statistics, focusing on results from 'typical' (i.e., less demanding) operating environments. Naturally, NewTek cannot guarantee that hard drives obtained from such sources will provide performance adequate to TriCaster's requirements. Here are some guidelines to keep in mind if you employ hard drives purchased from other sources:

- All else being equal, larger drives are normally faster – try to use 1TB drives or above.
- Use SATA 3.0GB/s drives with rotational speed of 7200 R.P.M. (or better).
- Drives should have a larger onboard cache (32Mb or better is recommended).

A.1.8 CONNECT AN EXTERNAL HARD DRIVE?

Connect a suitable USB cable from the external hard drive to one of TriCaster's USB2.0 ports. Note that the hard drive should probably be formatted using the NTSF file system (the FAT file system chokes on exported files exceeding 4 Gigabytes, as will often be the case).

A.1.9 EJECT A HARD DRIVE?

8. Launch TriCaster™, and click the *Open* icon on the *Home Page* of the *Startup Screen*.

9. Click the *Eject* gadget at upper right on the screen, and select the hard drive you wish to safely disconnect (see Section 5.2.2).

   or…

10. Click the *Eject* button in the titlebar of the *Live Desktop* (see Section 6.5.2).

A.1.10 CONNECT TALLY LIGHTS?

External tally light devices and their connections vary widely. Please refer to Section 3.8.1 for details on TriCaster's tally light jack implementation.

A.1.11 CONNECT TO A NETWORK?

Please refer to Section 3.17 and Chapter 14.

A.1.12 CONNECT TO AN AIRPLAY® SOURCE?

The local network (the same network you connect TriCaster™ to) is the means of transmission for AirPlay®, and a wireless connection from the player to the network is perfectly acceptable.

1. Select the AirPlay entry in the *Source* menu for *Net 1* or *Net 2* (just as you would select an iVGA or LiveText source).
2. TriCaster™ identifies itself as a potential client device to the AirPlay source.
3. One or more TriCaster™ devices will be listed as potential output devices for the AirPlay device. Select one and you are done.

Note: A limitation of the current iTunes release prevents it from properly addressing the second AirPlay® connection it detects. Instead, it attempts to use the first connection. If the first connection is already committed to another source, this attempt will fail.

SUPPLEMENTARY QUESTIONS:

Q2: *Why doesn't my AirPlay® device list TriCaster™ as a target?*

A2.1: The first time you connect to a network with the TriCaster™, you must choose a network location. This is a standard Windows® process that automatically configures appropriate firewall and security settings for the type of network that you connect to. You will be presented with 3 options: Home, Work, and Public. If TriCaster's active network has inadvertently been set to 'Public', AirPlay® will not connect. Be sure this is set to either *Home* or *Work*.

A2.2: By default, the Windows® firewall is disabled on TriCaster™. If your AirPlay device does not recognize TriCaster™ after enabling AirPlay for *Net 1* or *Net 2*, it may be that someone has enabled it, and it is preventing connection. You can either disable it, or (if you really must have it) adjust its settings as follows:

1. *Exit to Windows* from the *Shutdown* menu in TriCaster's Home Page.
2. Open the Windows® Firewall interface by clicking the *Start* button, and then clicking the *Control Panel* link. (Alternatively, type "firewall" without quotes into the *Search* box and press *Enter*; then click *Windows Firewall*).
3. In the left pane, click *Advanced Settings*. (If prompted for an administrator password or confirmation, type the password or provide confirmation).
4. In the *Windows Firewall with Advanced Security* dialog box, click *Inbound Rules* in the left pane, and then click *New Rule* in the right pane.
5. Follow the instructions in the *New Inbound Rule* wizard.
6. Ensure that the following ports are open:

Port	*Protocol*	*Name*
80	TCP	HTTP
443	TCP	HTTPS

554	TCP/UDP	RTSP
3689	TCP	DAAP
5353	UDP	mDNS (Bonjour)

A.2.3: Make sure you are connected to the correct network, especially for Wi-Fi. iOS® connects to known networks by default. If multiple Wi-Fi connections are available, it may connect automatically to a previously known network. For a wireless AirPlay® source such as iPad™, follow these steps:

1. Tap *Settings* > *Wi-Fi*. If *Wi-Fi* is off, turn it on by tapping the on/off icon.
2. Available Wi-Fi networks appear under *Choose a Network*...
3. Locate and tap the Wi-Fi network that TriCaster™ is connected to.

A.2.4: Wi-Fi uses radio frequency technology to connect hardware and software applications so that they can communicate. However, RF interference can be a major problem, especially in an environment such as a trade-show or conference that might entail numerous competing signals. Other devices contributing to RF clutter include microwave ovens, cordless phones, Bluetooth devices, wireless video cameras, outdoor microwave links, wireless game controllers, fluorescent lights, and so on. These sources can cause significant interference and signal degradation. Where possible, try to eliminate or minimize the potential interference in your installation design.

A.2.5: Consider the following suggestions when many conflicting wireless sources are in the immediate area:

- Set the wireless network SSID to any unique name. Choose a name that is unique to your network and is not shared by other nearby networks or other networks you are likely to encounter to avoid connection failures, or unintentionally connecting to other networks sharing the same SSID.
- Make sure that the network is not set to 'hidden.' iOS® devices may interpret this as a closed network and fail to connect.
- If using security, make sure that it is set to WPA2 Personal (AES). Use of WEP is not recommended for compatibility, reliability, performance, and security reasons.
- If possible, configure 2.4 GHz Radio mode to 802.11b/g/n.

- If the router supports 5 GHz Radio mode, set it to 802.11a/n.
- Channel Settings should be set to 1, 6 or 11 (11 is the most common choice, since it is the starting channel, making 1 or 6 a good choice).
- Channel width should be set to 20 MHz or "Narrow Band" in 2.4 GHz mode.
- Channel width should be set to both 20 MHz and 40 MHz in 5 GHz mode.
- Ensure that only one DHCP server is active on the network.

Q2: *Why do some clips not play properly across an AirPlay® connection?*

A: There are several possibilities: First, TriCaster™ cannot play media governed under Digital Rights Management (DRM) schemes. This is a common limitation of commercial content. Otherwise, If an iOS® device loses its connection with the network for any reason, it does not refresh its AirPlay® destination list for about one hour. It may seem as though the TriCaster™ is detected even though the connection has been lost. One way to flush the AirPlay list is to enable and disable 'Airplane mode' in the device settings. Finally, make sure you are connected to the correct Wifi network (etc.)

A.1.13 ENABLE TERMINATION FOR VIDEO INPUTS?

TriCaster™ has full-time video termination. If you need to loop through (or t-off from) other video devices (such as an external monitor) prior to TriCaster™ in your video pipeline, you should ensure termination is OFF for earlier devices.

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 AN SD SESSION?

1. Connect your SD sources to TriCaster's input connectors (see Section 3.4)

2. Connect your SD monitors to TriCaster's output connectors (see Section 3.7.1)

3. Select the *New* icon in the *Home Page* of the *Startup Screen*.

4. Click the *Enter Session Name* link (under Session Name at right) and supply a name for the new session.

5. Select a *Volume* (hard drive) for the new session.

6. TriCaster™ Multi-standard only: choose your local *Video Standard* (NTSC, NTSC-J or PAL)

7. Choose either *SD 4:3* or *SD 16:9* (widescreen) for *Resolution*

8. Click the *Start Session* link (lower-right).

   (See also Sections 3.9 and 5.1.)

A.2.2 START AN HD SESSION?

1. Follow steps 1-6 in the preceding section.

2. Select either *720p* or *1080i* for *Resolution*.

3. Click the *Start Session* link (lower-right).

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 quite noticeably better quality.

A.2.3 WORK ON A STORED SESSION?

1. Click the *Open* icon in the *Home Page* of the *Startup Screen*.

2. Click the name of the session you want to re-open.

A.2.4 BACKUP A SESSION?

1. *Open* the TriCaster™ session you wish to backup.

2. Click the *Manage* icon in the Startup Screen's Session Page.

3. Click the *Backup Session* button (below the *Browse* list).

4. If the session has external files in its playlists, choose one of the options from the dialog that opens next.

5. 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 Backup Session under Section 5.3 for more detail.)

A.2.5 RESTORE A SESSION?

1. Click the *Open* icon 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.2.6 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 and SpeedEDIT projects (external data that has not been imported will not be deleted). See Section 5.2.2 for more information.

A.2.7 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* icon 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.2.8 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.2.9 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 – see Section A.2.4.

2. *Rename* the current session – see Section A.2.8.

3. *Restore* the backed up session – see Section A.2.5.

A.3 LIVE PRODUCTION

A.3.1 MAKE CUSTOM TRANSITIONS AND LIVESETS?

The *Animation Store Creator* application is included with TriCaster 850 EXTREME. Its documentation can be accessed from the *Help* menu on the *Home Page* in *Startup*.

As well, an optional, user-friendly, tool called TriCaster Virtual Set Editor™ is available. This tool makes it easy to modify LiveSets to suit your specific needs. Other powerful tools are available in the LiveSet Creation SDK, a command-line tool provided for serious LiveSet developers. Send email to liveset@newtek.com to inquire about this product.

A.3.2 RESTORE THE DEFAULT LIVESET?

1. Click the *ellipsis* button [...] to the right of the current LiveSet name to open the *LiveSet Browser*.

2. Click the *NewTek* heading beneath the *LiveSets* heading in the *locations list* at left.

3. Click *A over B* in the *Default* group in the *file pane* at right. (See Section 12.4.1.)

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

As you may know, TriCaster™ LiveSets support two primary video inputs, along with a third source dedicated to its Overlay channel. The 'Nightly Show A' LiveSet is special in that it *appears* to show many different video sources simultaneously (see Figure 249), even including a moving 'news ticker'.

Figure 249

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 250).

Figure 250

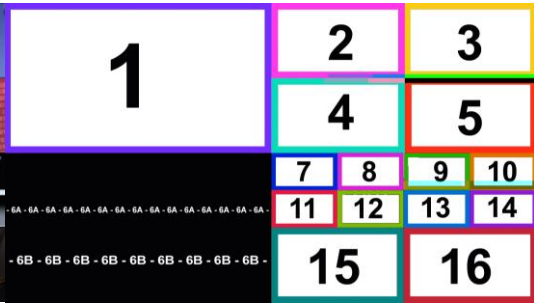


Figure 251

Hint: Several sample montage clips are supplied in the Clips>NewTek folders, and there is also a template clip (Figure 251) you can use as a guide to prepare similar clips that reference your own custom content with the software of your choice.

To configure the effect:

1. Assign your talent shot to *Input A* in the *Virtual Input* tab
2. Put the looping montage clip in a *DDR*, and select that DDR as *Input B*.

A.3.4 INITIATE STREAMING?

1. Connect TriCaster™ to the Internet (see Section 3.16).

2. *Open* (or create) a TriCaster™ session (see Section 3.9).

3. Click the *Configure* (gear) button next to *Stream* (under the *Program* monitor)

4. Supply *Connection* parameters in this panel as required (passwords, username, etc. See Chapter 15, Streaming.)

5. Close the panel, and – when ready – click the *Stream* button.
   (See Section 4.12 and Chapter 15 for full details.)

A.3.5 FIND MY CAPTURED STREAM 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* icon 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.3.6 RECORD MY PROGRAM?

1. Open (or create) a TriCaster™ session (see Section 3.9).

2. Click the *Configure* (gear) button next to *Record* (under the *Program* monitor)

3. Choose your recording options (see Section 4.7.1 and Chapter 16) and enter a *Base Name* for the file(s).

4. Close the panel, and – when ready – click the *Record* button. (See Chapter 16 for full details.)

A.3.7 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* icon 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.3.8 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 10.2.5 for more.

A.3.9 DEAL WITH DDR (MEDIA PLAYER) CLIPS THAT SEEM BLURRY?

When paused or stopped, TriCasters *DDR*s 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.3.10 GET STUBBORN CLIPS TO PLAY IN THE DDR?

First, note that TriCaster™ has a two minute warm-up period during which system software initializes. During this period, frames may be dropped during playback (see Section 6.5.1).

QUICKTIME™

At the time of writing, a 64bit version of Quicktime™ for Microsoft Windows™ is not available. TriCaster™ 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, we recommend converting it to a friendlier format.

Final Cut™ users might consider M-JPEG, MPEG2, DVCPRO HD, or the DV Quicktime codec (for SD clips only, of course) as intermediate formats. In some cases you might be successful using SpeedEDIT to convert QuickTime files that fail in the DDR (SpeedEDIT's Quicktime codec support is more extensive).

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 TriCaster™. 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, click Record, play the clip, and stop recording. With a little trimming of the recorded clip you'll have a very usable file.

Or, you can use SpeedEDIT – its *Convert to SpeedHQ* feature (found in the *Filebin's* context menu) can easily convert a number of clips in a single operation.

FLASH (F4V)

At the time of writing, 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"*

TriCaster™ automatically performs this conversion in the background on exiting a session. However, unconverted F4V files imported *while the session is running* (or in other rare cases) will not play in the DDR. To make such files playable, you can download 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.3.11 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.3.12 GET LIVE TITLE PAGES (.CGXML) TO RESPECT ALL LIVETEXT FONT ATTRIBUTES?

TriCaster'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.3.13 PREPARE A MATCHED GROUP OF VIRTUAL INPUTS?

Suppose you want to assign matching shots from one theme group of LiveSets to different Virtual Inputs (or Presets). You might, for example, want everything to be the same except that one shot is centered on a virtual monitor in the LiveSet, while another is centered on the set itself.

1. Prepare the first *Virtual Input* – click its tab, and use the controls to select a LiveSet, assign and position an *Overlay* source, even click a *Zoom Preset* to be the default.

2. Right-click on the *Preset* icon in the bin at left, and select *Export*.

3. Supply a filename for the *Preset*.

4. Click the second *Virtual Input* 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 Virtual Input* 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.3.14 IMPROVE THE QUALITY OF MULTIVIEW OUTPUT?

TriCaster's *Multiview* video output is very high quality, but it is possible for you to manually choose certain settings that will have a negative effect on it. Avoiding these mistakes will ensure the best possible result.

Specifically, disabling Windows Aero® may cause video 'tearing'. Also, for best quality, be sure that the *VGA Output Resolution* you choose corresponds to that of the monitor connected (see Section 7.1.5).

NOTE: Changing Output Resolution can cause frames to be dropped briefly. Thus we do not recommend changing this setting during live production.

A.3.15 VIEW MEDIA PLAYER TIME DATA ON MULTIVIEW OUT WHEN SET TO 'ALL SOURCES'?

Space limitations prevent TriCaster™ from displaying timecode fields beneath monitors on *Multiview* output when *VGA Output Resolution* is set to 720x480.

A.4 FILES

A.4.1 MANAGE FILES?

Please refer to the item (How do I) Manage Selected Content inside a Session? (Section A.2.7).

A.4.2 CHANGE THE MPEG-2 RECORDING QUALITY?

TriCaster™ has two optional quality settings for recording live video as MPEG-2, *Normal Profile (Compatibility Mode)* and *High Profile*. Both of these alternatives record 'I-frame only' MPEG2 files at a rate of approximately 100mbps for HD video (or half that for SD sessions).

The *Normal* setting produces a 'standard profile' MPEG2 with 4:2:0 encoding, and has best compatibility with third-party products. *High* quality files comply with the MPEG2 'high profile' standard, resulting in 4:2:2 encoding at the expense of slightly less cross-product compatibility.

To change the setting:

1. Open a TriCaster™ session.

2. Access *Record Configuration*, by clicking the 'gear' icon just right of the *Record* button (beneath the *Program* monitor).

3. Use the *Encoding* menu to select the *Quality* setting you wish to use.

A.4.3 IMPORT MEDIA FILES?

Importing files implies copying them into the TriCaster™ session folders, making them *local* (rather than *external*). To import media files:

1. Open (or create) a TriCaster™ session.

2. Click the *Manage* icon in the Startup Screen's *Session Page*.

3. Click the *Import Media* button (below the *Browse* list).

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 media content, making it wise to use Import instead whenever possible.

A.4.4 PREPARE CLIPS WITH EMBEDDED ALPHA CHANNEL?

Probably the best format to use for files with embedded alpha channel for use in TriCaster™ 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. (As a registered NewTek customer, you can download the NewTek Multi-Codec Pack from your personal Downloads page on the NewTek website.)

Apple® computer users have several 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 PREPARE CLIPS FOR TRICASTER™ PLAYBACK USING APPLE® FINAL CUT PRO?

We are often asked what format to use for export from Final Cut for best compatibility in TriCaster™, especially for HD clips. Here are recommended steps:

1. Click on Final Cut's *File* menu and choose *Send To > Compressor* (Compressor will open automatically).

2. Select your encoder setting as follows:

    a. Inside *Compressor*, click on the *Settings* tab (in the bottom left panel).
    b. Find the *Program Stream* setting from the *Apple/Formats/Mpeg-2* folder.
    c. Drag this setting and drop it onto your *Sequence*.

3. Set your destination setting as follows:
    a. Click on the *Destinations* tab (in the bottom left panel).
    b. Drag the destination of your choice onto your *job item*.

4. Click *Submit*.

A.4.6 ADD AN EXTERNAL FILE LOCATION TO THE FILE BROWSER?

1. *Open* (or create) a TriCaster™ 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 TriCaster's *File Browser*, and click *OK*.

(See Add Media Location in Section 10.2.2)

A.4.7 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 Context Menus in Section 10.2.2)

A.4.8 EXPORT FILES TO AN EXTERNAL DRIVE?

There are several approaches to exporting media files from within TriCaster™ sessions. By far the simplest is to use the *Export Media* feature – see the sub-heading by that title in Section 5.3.4.

A.4.9 EXPORT FILES FROM TRICASTER™ FOR USE IN APPLE® FINAL CUT PRO?

At the time of writing, importing MPEG-2 files recorded by TriCaster™ into Final Cut requires a few extra steps. There are several approaches – pick the one that suits your need best.

METHOD 1

1. In the Startup Screen's *Home Page*, *Open* the session containing the recorded files you are interested in.

2. Click the *Manage* icon in the Startup Screen's *Session Page*.

3. Click the *Export Media* button at lower right, and then click *Add* to open a *Media Browser*.

4. *Add* the files(s) you wish to export to the *Export Media* file list.

5. Use the *Format* drop-down to select *MJPEG High Quality (.mov)* for the files you add.

6. Click the selection gadget (triangle) and choose a target location for the output file(s).

7. Click the *Export* button in the panel to commence transcoding. Please see the sub-heading entitled Export Media, in Section 5.3.4 for more on TriCaster's Export feature.

METHOD 2

1. Record your files with *Quality* set to *Normal Profile (Compatibility Mode)* – for more information, see the sub-heading entitled Compatibility Considerations in Section 16.1.1.

8. Click the *Manage* icon in the Startup Screen's *Session Page*.

9. Click the *Export Media* button at lower right, and then click *Add* to open a *Media Browser*.

10. *Add* the files(s) you wish to export to the *Export Media* file list.

11. Choose *Quicktime* for the Target, then select *Renderless conversion (.mov)* as the *Format* for the files you add.

12. Click the selection gadget (triangle) and choose a target location for the output file(s).

13. Click the *Export* button in the panel to commence transcoding. Please see the sub-heading entitled Export Media, in Section 5.3.4 for more on TriCaster's Export feature.

METHOD 3

1. Record your files with *Quality* set to *Normal Profile (Compatibility Mode)* – for more information, see the sub-heading entitled Compatibility Considerations in Section 16.1.1.

2. Export the files from TriCaster™ *without* format conversion.

3. Import the files into Final Cut. A red bar will indicate these clips need to be rendered within the editor. After rendering, they should be available for editing like any other clip.

SUPPLEMENTARY QUESTION:

Q: *Why does 'Renderless' Quicktime export only work properly with 'Normal Profile' MPEG2 files?*

A: The "Renderless" export preset in Export Media (Startup > Session Page) re-wraps TriCaster's MPEG2 files as Quicktime a/v files without re-compression. Quicktime does not currently decode High Profile MPEG2 files (even when wrapped as Quicktime files). Some applications with internal MPEG2 support play 'High Profile' .mov exports, but – for programs relying on Quicktime for decoding – please use TriCaster's 'Normal Profile (Compatibility Mode)' recording option.

A.4.10 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 TriCaster™ over a network connection).

A.4.11 AVOID THE ERROR "…COPY THIS FILE WITHOUT ITS PROPERTIES?"

Windows shows this error message when you export a media file from TriCaster™ 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.4.10). The files will copy just fine regardless.

TriCaster™ 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 with TriCaster™ again later, so its loss poses no issue.

A.4.12 FREE UP SPACE BY DELETING THE DEMO CLIPS?

1. Go to TriCaster's *Startup Screen*.
2. Open a session (it doesn't matter which one).
3. Click *Manage* on the icon ring.
4. Click the *Clips* link at right.
5. Use the system *File Explorer* that opens to navigate up one level in the folder hierarchy, to D:\Media\Clips.
6. 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 *Utilities* icon on the *Home Page* of the *Startup Screen*.
2. Click the *Defragment Hard Drive* link at right (see Section 5.2.4), and follow further directions provided. 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.5.7.

A.5.3 UPDATE TRICASTER?

1. Connect TriCaster™ to a valid Internet connection

2. Click the *Utilities* icon on the Home Page of the *Startup Screen*.

3. Click *Update TriCaster™,* and follow directions provided (see Section 5.2.4).

A.5.4 UPDATE THE FLASH™ AND/OR WINDOWS MEDIA ENCODER?

TriCaster™ is not designed to be user-upgradeable. For certain features to work correctly, specific versions of third-party utilities must be present. These applications are upgraded in timely fashion in official TriCaster™ updates. It is quite likely that any attempt to update these manually will have unintended results, and you are strongly cautioned against doing so.

A.5.5 INSTALL VIRUS PROTECTION?

Virus and malware protection applications can dramatically impact system performance (this is true even for Windows Defender™, which is deliberately disabled for this reason). In general, once additional software or services are enabled on TriCaster™, real-time performance cannot be guaranteed.

In a perfect world, we'd love to recommend that you do not install virus and/or malware protection software on TriCaster™. Certainly you should *always* take sensible precautions to avoid introducing infected files into TriCaster™ by rigorously virus-checking media you plan to connect or import beforehand – ideally, do so on a laptop or other system *before* connecting to TriCaster™.

Realistically though, in some settings you may feel the need for protection outweighs the risk. If you really feel you *must* install virus protection, switch all of its 'active scanning' operations off so that nothing can occur in the background while TriCaster's *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 TriCaster's Restore TriCaster™ function to completely rehabilitate your system.)

A.5.6 INSTALL MY FAVORITE SOFTWARE (OR CODEC)?

TriCaster™ is not a 'general purpose' computer. The installed software suite is finely tuned to provide reliable performance and amazing features. Anything you install apart from official TriCaster™ updates places these important goals at risk. Doing so is strongly discouraged.

Regarding codecs, TriCaster™ 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 TriCaster™ should support it, please submit the details as a feature request. (Please also see Section A.3.10 above.)

SUPPLEMENTARY QUESTION:

Q: *Can I install the MainConcept AAC Encoder - Plug-In for Adobe® Flash® Media Live Encoder?*

A: Yes, you can, as follows:

1. From TriCaster's Startup Screen Home Page, click Shutdown, and then click the Exit to Windows link (confirm the exit decision in the pop-up warning dialog)

2. Follow the installation instructions provided by MainConcept GmbH.

3. Following installation, you must create a new Streaming Profile, to appear in TriCaster's streaming configuration options. This process is described in a bit later in this chapter, in Section A.7.3, under the heading "For Flash"

4. Note that at step 7 (modifying the settings for the profile in Flash Media Live Encoder), you must change "Audio Format" to "AAC", before continuing.

A.5.7 RESTORE TRICASTER™ TO ORIGINAL 'AS-SHIPPED' CONDITION?

We firmly expect you will never need it, but isn't it good to know that a complete *TriCaster Restore* function is available in the event of an unforeseen problem? You can use one of two methods to restore your system, depending on your situation.

To restore your TriCaster™ system software *after the system launches normally*:

1. Click the *Utilities* icon on the *Home* screen in the TriCaster *Startup* screen.

2. Select the link labeled *Restore TriCaster™,* and follow prompts.

If TriCaster™ should ever fail to boot up properly, you may need to try a different approach to restoring your TriCaster™ system software, as follows:

1. Select the menu item labeled *Reset to Factory Defaults* from the black boot screen that appears shortly after powering TriCaster™ 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.) Follow prompts to complete the process.

Note: Following a TriCaster Restore operation, the Windows™ system software must be re-activated. To do this, you will need the operating system serial number, which you will find on a sticker affixed to the exterior of your TriCaster™.

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 TriCaster™ software updates (possibly including optional TriCaster™ expansion packs) will be overwritten – so use this function only if you truly find it necessary (a call to NewTek's excellent *Tech Support* first may often be fruitful – see Section A.6.2). When you do restore, remember to update the TriCaster™ software afterward.

A.6 REGISTRATION AND TECH SUPPORT

A.6.1 REGISTER TRICASTER?

1. Read and accept the *License Agreement* shown when TriCaster™ launches.

2. Select and copy (Ctrl + c) the characters in the *Product ID* field in *Step 1* of the registration dialog that appears next.

3. If you have connected TriCaster™ to the internet, click the button in *Step 2* of the registration dialog.

4. Follow the directions on the Registration *webpage* (in the Customer Care section of the NewTek website) to obtain your *registration code*

5. If TriCaster™ does not have internet access, call (or email) Customer Service with the *Product ID*:

   (US) 1-800-862-7837
   (Outside US) +1-210-370-8000

6. http://www.newtek.com/faq/index.php?contact=service

7. Enter the *Registration Code* provided into the Registration dialog at Step 3 (Please see Section 3.3 for more detail.)

A.6.2 CONTACT TECHNICAL SUPPORT?

Visit the NewTek Website, at www.newtek.com and select *Technical Support* from the main *Customer Care* menu at the top of the page. This page always contains the latest support information for your NewTek products, including *FAQs* for all products. It also lists the Technical Support Department's hours of operation and contact details.

A.6.3 FIND TRICASTER'S HARDWARE/FIRMWARE REVISION NUMBERS?

Click the *About* icon in the Startup Screen's *Home Page*. Doing this opens an information panel that lists significant version numbers (at the bottom).

A.7 MISCELLANEOUS

A.7.1 ACCESS WINDOWS™?

1. If necessary, close the *Live Desktop* by clicking the [x] button at the right-hand end of the titlebar.

2. Click the *Shutdown* icon on the *Home Page* of the *Startup Screen*.

3. Click the *Exit to Windows* link at right (and confirm this desire in the warning dialog).

A.7.2 RETURN TO TRICASTER™ FROM THE WINDOWS™ DESKTOP

Double-click the *TriCaster* icon on the Windows™ desktop to return to the TriCaster *Startup Screen*.

A.7.3 ADD A CUSTOM STREAMING PROFILE TO THE CONFIGURE STREAM CONNECTION PANEL?

The streaming profiles shown in the drop-down *Resolution* menu in the *Configure Stream Connection* panel are drawn from the folder *C:\TriCaster\Streaming Profiles*. These files are organized according to whether they are WMV or Flash profiles, again into NTSC or PAL versions (Multi-standard models only), and then finally sub-divided into folders labeled *4x3*, *16x9* (the latter two being Standard Definition profiles), and *HD*. (Note that profiles in the various sub-folders only appear in the *Stream Type* List for the *corresponding session type*.)

The easiest method of creating a custom profile is to modify an existing profile and then store it using a new name. The procedure differs depending on whether you are working with a Flash or Windows Media profile.

***Note**: It is possible to create streaming profiles that place very high demands on system resources, or are impractical for streaming over most networks.*

The default profiles are suitable for most purposes, and should not interfere with other operations. Attention to these considerations when creating custom profiles is vital to ensure reliable performance, and we encourage you to perform real world testing beforehand.

IMPORTING A CUSTOM PROFILE USING 'BROWSE'

Flash Media Encoder profiles are XML files, while Windows Media Encoder uses a .prx file extension for its profiles. If you already have a prepared custom profile and wish to import it, follow these steps:

1. Open the *Configure Stream Connection* panel, by clicking the *Configure* button (gear) next to the Stream button on the Live Desktop.

2. Click *New* (Connection)

3. Select the option appropriate to the profile you wish to import in the popup *Choose Connection Type* panel.

4. Click the *Resolution* drop down menu, and slide the pointer all the way down to the bottom to select *Browse*.

5. Navigate to the custom profile, select it and click *Open*.

CREATING A CUSTOM WINDOWS MEDIA PROFILE

1. From TriCaster's *Startup Screen*, click the *Shutdown* icon, and select *Exit to Windows*.

2. Click the *Exit to Windows* button in the confirmation dialog that pops up.

3. Double-click the *My Computer* icon, and navigate to *C:\TriCaster\Streaming Profiles\WMVPRofiles.*

4. Identify a profile (.prx file) similar to the one you wish to create inside the appropriate sub-folder at that location.

5. Copy the file, and paste the copy in at the same location.

6. Double-click the new profile to open it in the Windows Media Profile Editor.

7. Make such changes to the settings as you see fit, then click the *Save and Close* button.

8. Rename the modified profile to differentiate it from the others in the same folder.

9. Close the folder, and re-launch TriCaster™.

CREATING A CUSTOM FLASH STREAMING PROFILE

1. From TriCaster's *Startup Screen*, click the *Shutdown* icon, and select *Exit to Windows*.

2. Click the *Exit to Windows* button in the confirmation dialog that pops up.

3. Launch Adobe Flash Media Live Encoder from the Windows Start menu.

4. Select *Open Profile* from the File menu in the encoder application.

5. Navigate to C:\TriCaster\Streaming Profiles\FlashProfiles\.

6. Continue to identify a profile (.xml file) similar to the one you wish to create inside the appropriate sub-folder at that location, and click the *Open* button in the file explorer.

7. In *Adobe Flash Media Live Encoder,* modify the settings for the profile to suit your need.

8. Select *Save Profile* from the *File* menu.

9. Navigate (again) to the appropriate sub-folder inside the main *C:\TriCaster\Streaming Profiles\FlashProfile directory,* supply a suitable name for the new profile, and click the *Save* button.

10. Exit Adobe Flash Media Live Encoder, and re-launch TriCaster™.

SUPPLEMENTARY QUESTION:

Q: *Does TriCaster™ support multi-bitrate streaming profiles?*

A: Yes it does, but there are a few things you should consider. Multi-bitrate encoding places higher demands on system resources than usual. It is entirely possible to create a custom multi-bitrate profile that is impractical, either because its bandwidth expectations are unrealistic, or because the encoding requires so many cpu cycles that it can intrude into other important live functionality. For this reason, we encourage you to use the profiles supplied with your system whenever possible, and if you do opt to use a custom profile – especially a multi-bitrate one – do perform *meaningful* testing in advance, to ensure everything goes as planned.

Note: The Stream ID (text string) for multi-bitrate profiles must contain the character combination "%i", without the quotation marks. (The exact position of the character combination does not matter, and spaces are permitted – though the latter may pose issues for some CDNs.)

A multi-bitrate profile without "%i" in the Stream ID will produce a Flash Media Encoder™ error on attempting to stream. Also, the filename for multi-bitrate streaming recordings TriCaster™ saves will automatically include the requisite "%i" (because the originating stream ID contains it).

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 an a/v stream. Each device in the video chain introduces some limited (transmission) delay.

TriCaster's latency is very minimal (as little as 1.5 frames), but you can take measures to keep it to a minimum – first and foremost, by genlocking your video devices – see Section 7.1.6.

In a *seemingly* related matter, note that audio and video passing through TriCaster™ 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.3, IMAG and Latency.

SUPPLEMENTARY QUESTION:

Q: *Why does latency seem higher for certain video formats (i.e. 24p, 25p, or 30p*)?

A: TriCaster™ 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 IS MY POWER SUPPLY BEEPING?

TriCaster™ 850 and 850 EXTREME™ systems provide redundant, replaceable power supply units. When you i) disconnect or ii) power down just one of the modules, or iii), if a PSU should fail, a beep is sounded to alert you. If you wish, you can mute the alert by pressing the green button on the back of the unit.

Figure 252 – TriCaster™ 850

SUPPLEMENTARY QUESTION:

Q: *Where can I obtain replacement or spare Power Supply modules?*

A: Contact NewTek Sales for purchase information for spare TriCaster™ components.

A.8.3 WHY DO SOME THUMBNAIL ICONS LOOK WRONG?

Some file formats (notably AVI) do not provide embedded aspect ratio information. As a result, certain files (such as 1440x1080 files intended to be displayed as 16:9) the 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

Your TriCaster™ has been carefully designed to faithfully execute its duties under any reasonable circumstances. Still, your production environment – especially in remote locations – may impose limitations that you are wise to consider.

This chapter discusses a few matters that may help you get optimal performance in less than ideal settings.

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 IVGA AND PERFORMANCE

Although iVGA is highly efficient, it does require *significant* system resources – taxing the CPU, GPU (and even the AGP or PCIe bus) of client systems, especially when a large portion of the display is refreshed. This is not normally problematic as – for iVGA purposes – the client system is not required to perform other concurrent tasks. Its entire duties involve providing a video source for the (downstream) TriCaster™ via the iVGA client software. However, it is *very* unwise to install and run the iVGA client software directly on a TriCaster™ itself.

TriCaster's live video processing requires unhindered CPU and GPU access. Adding the resource demands of the iVGA client to TriCaster™ would almost certainly cause frames to be dropped on output, and should simply never be done. The same warning applies to other 'screen-sharing' or 'remote desktop' applications, which would actually be as bad or worse.

Of course iVGA benefits from the fastest possible network connections between remote clients and TriCaster™ even when "used as directed". This is especially true if you intend to stream high resolution motion graphics to TriCaster™ using iVGA.

B.3 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.3.1 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 (as otherwise, the carefully timed delays the audio engineers induced would ensure a mismatch between video and late arriving audio). Viewed in this light, a certain amount of latency is actually "A Good Thing!"

Still waiting for the promised mention of 'relativity'? OK, here it is then: $E=MC^2$

B.3.2 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.3.3 LATENCY AND YOUR TRICASTER

TriCaster™ is a wonderful tool in the IMAG arsenal, but inevitably it is only 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.

TriCaster's portion of the total latency sum is well within acceptable standards for devices of this sort – roughly between 1.5 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 TriCaster's inputs 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 TriCaster™ section of the IMAG chain? One trick is to 'Genlock' your cameras to the TriCaster™ output (see Sections 3.5, 3.15 and 7.1.6). This allows TriCaster™ to bypass its input time-base correctors, ensuring latency is consistent during switching operations.

Hint: you can actually assess the latency of your TriCaster™ installation fairly easily. Run timecode directly to 1) a monitor and at the same time 2) through the TriCaster™ to a second (identical) monitor. Take a photograph that encompasses both monitors, and compare the timecode shown!

B.3.4 OTHER SOURCES OF LATENCY

More often than not, significant latency is added by other devices in the IMAG chain that come *after* the TriCaster™. 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 TriCaster™ to the projector -- if at all possible, match the resolution sent from the TriCaster™ 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.

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 repeal 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 TriCaster's Proc Amp settings to improve previously recorded video played from a DVD player, or a networked 'video chat' system.

In both cases above, the *Waveform* and *Vectorscope* monitors in TriCaster's *Preview Scopes* tab 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 (from TriCaster) 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.

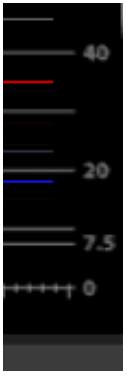
C.2.1 SETTING BLACK AND WHITE

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



For video engineering purposes, the scale between black and white is defined in *IRE* units (IRE being an acronym for "Institute of Radio Engineers"). White is pegged at *100 IRE*. For PAL (and NTSC-J) countries, black is defined as *0 IRE*. For NTSC lands, black properly sits at *7.5 IRE*.

Using TriCaster's *Waveform* monitor (in the Live Desktop's *Preview Scopes* tab), you can actually see the IRE values for your video sources graphed on a vertical scale (select the source on the Switcher's *Preview* row).

Figure 253

Confirming that the black and white levels your camera is sending TriCaster™ are correct is as simple as sending first black, and then white, and reading the value from the scale.

Connect your camera to the correct TriCaster™ input, block the lens so it receives no illumination, and check the level shown in the Waveform monitor. For NTSC, it should be 7.5 IRE, for all others, 0 IRE.

To check white, use a standard white card or even a sheet of white paper. Ensure that it is evenly illuminated with *the same lighting your main subject will receive*, move or zoom to fill the viewfinder with it, and confirm that the Waveform monitor is showing 100 IRE.

If not, 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* TriCaster™ provides 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 TriCaster's *Vectorscope*, and perform an initial test of the camera's color balance.

A vectorscope (Figure 254) can be likened to the familiar 'color wheel' (Figure 255) 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 254

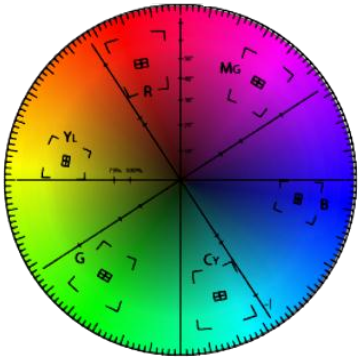


Figure 255

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 *U Offset* and *V Offset* controls in TriCaster's *Proc Amp* 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 cameras color signal. Let's see how it can assist you to ensure your colors are accurate.

USING COLOR BARS

You'll no doubt have seen the familiar color bars used as a standard reference for video signal calibration. Two examples are shown here. Figure 256 is an example of the color bars used in NTSC countries, while Figure 257 is a PAL example, common throughout European nations.

Figure 256 (NTSC)

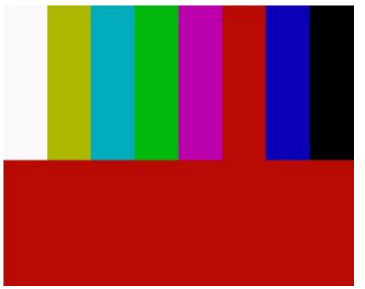


Figure 257 (PAL)

You can use color bars in conjunction with TriCaster's *Waveform* and *Vectorscope* to make sure the video supplied to the Switcher 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.

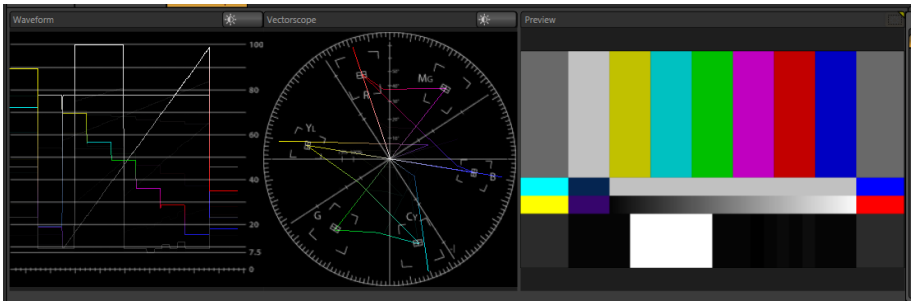


Figure 258

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 259).

Figure 259

If the trace vectors do not line up as they should even after performing a white balance at the camera, you can use TriCaster's *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 TriCaster's controls – the so-called 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 TriCaster's 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 TriCaster's media players for this purpose.

C.3.3 SETTING BLACK AND WHITE

As mentioned earlier, NTSC and PAL (and NTSC-J) regions use different black levels, so it's no surprise that they take different approaches to setting black and white levels, and that their respective color bar displays vary from one another. Likewise, we'll treat calibrating for NTSC and PAL separately.

NTSC

NTSC color bars have a special group of grayscale bars designated as the "PLUGE" (the acronym stands for Picture Line-Up Generation Equipment) in the lower-right area.

Figure 260

(The images in this section have been adjusted slightly to accentuate the subtle differences in the black bars making up this region.)

Figure 261

The large blocks at left and right in the PLUGE represent 'NTSC black' - 7.5 IRE. Between these larger blocks are three smaller bars – one at left that is slightly *darker* than NTSC black (3.5 IRE), one at right that is slightly *lighter* (10.5 IRE). These are separated by another equal-sized 7.5 IRE bar.

Our criteria for adjusting black level takes advantage of the fact that nothing in NTSC should ever be 'blacker' than 7.5 IRE. This means that when the monitor's black level is too bright, both the 7.5 IRE and 3.5 IRE bars will be distinct. Set properly, it will be impossible to distinguish them from one another. Conversely, if the monitor's black level was too dark, it would be impossible to distinguish between the (lighter-than NTSC black) 10.5 IRE bar and its darker neighbors.

Here are steps you can follow:

1. Having warmed the monitor up as described earlier, start by enabling the monochrome switch, if your monitor is so equipped (otherwise, turn the *Color* or *Saturation* knob all the way down).

2. Set the monitor's *Contrast* knob to its center detent.

3. Play with the *Brightness* knob until you can clearly discern the bars for all three black levels in the *PLUGE*.

4. Gently turn *Brightness* down until the 3.5 IRE and 7.5 IRE bars merge, becoming indistinguishable from one another.

5. You should be able to just notice the difference between the 7.5 IRE bars and the brighter 10.5 IRE bar.

6. Raise the *Contrast* level, brightening the 10.5 IRE bar quite a bit. You may notice that the large white bar second from the left at the bottom (Super White) becomes overblown, showing blooming into its neighboring color bars.

7. Dial *Contrast* back down until the Super White bar is just white, not blazingly so, and does not bleed into the other bars. The 10.5 IRE bar in the PLUGE should be just distinct from the 7.5 IRE bars again at this point.

PAL

1. Warm up the monitor as previously mentioned.

2. Set the monitor's *Color (or Saturation)*, *Contrast* and *Brightness* to their lowest settings.

3. Slowly raise *Brightness* until the black bar just begins to lighten.

4. Adjust the *Contrast* until the bars seem to be evenly graduated (ignore the white bar).

5. Tweak the *Contrast* watching the white bar carefully. When it stops getting brighter in response, pull it back slightly to the point where it just starts to have a dimming effect again.

C.3.4 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 262).

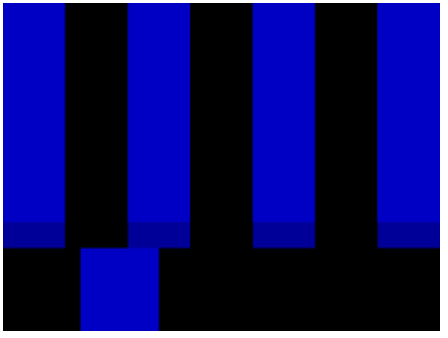


Figure 262

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.

D KEYSTROKE SHORTCUTS

D.1 SWITCHER…

Utility Row, Inputs 1 to Input x (model limit)	Alt + (1 – 0, -, =) plus Alt + Shift + (1-4)
Send Preview to AUX Out	Alt + Shift + 5
Send Program to AUX Out	Alt + Shift + 6
Send Program (Clean) to AUX Out	Alt + Shift + 7
Send FX to AUX Out	Alt + Shift + 8
Program Row, Inputs 1 to Input x (model limit)	F1 – F12 plus [Shift + F1-12]
Preview Row, Inputs 1 to Input x (model limit)	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 FTB	Backspace
Transition Delegate – multi-select FTB	Shift + Backspace
Select FTB Delegate and perform Fade	Ctrl + b
Utility Delegate – select FX	Alt + [
Utility Delegate – multi-select FX	Shift + Alt + [
Utility Delegate – select AUX OUT	Alt +]
Utility Delegate – multi-select AUX OUT	Shift + Alt +]
Utility Delegate – select DSK 1	Alt + \
Utility Delegate – multi-select DSK 1	Shift + Alt + \
Utility Delegate – select DSK 2	Alt + Backspace
Utility Delegate – multi-select DSK 2	Shift + Alt + Backspace
Transition Overlay 1 On/Off	f
Transition Overlay 2 On/Off	Shift + f
Take Overlay 1 On/Off	d
Take Overlay 2 On/Off	Shift + d
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 Alt)
Halfway T-Bar… Take	h

D.3 VIRTUAL INPUTS

Activate Zoom Preset 1 for Virtual Input selected on Program	Alt + F1
Activate Zoom Preset 2 for Virtual Input selected on Program	Alt + F2
Activate Zoom Preset 3 for Virtual Input selected on Program	Alt + F3
Activate Zoom Preset 4 for Virtual Input selected on Program	Alt + F4
Activate Zoom Preset 1 for Virtual Input selected on Preview	Alt + F5
Activate Zoom Preset 2 for Virtual Input selected on Preview	Alt + F6
Activate Zoom Preset 3 for Virtual Input selected on Preview	Alt + F7
Activate Zoom Preset 4 for Virtual Input selected on Preview	Alt + F8

D.4 RECORD AND GRAB

Record on/off	r/ Shift + r
Grab (still image)	p

D.5 TABS

Show DDR 1 tab	Ctrl + F1
Show V1-Vx tab	Ctrl + F2-F9
Show External Audio tab	Ctrl + F10
Show DDR 2 tab	Ctrl + Shift + F1
Show Still tab	Ctrl + Shift + F2
Show Title (or Graphics) tab	Ctrl + Shift + F3
Show Sounds tab	Ctrl + Shift + F4
Show Internal Audio tab	Ctrl + Shift + F10

D.6 DDR 1

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

D.7 DDR 2

Stop	Alt + k
Play	Alt + l (lower case L)
Go to previous playlist item	Alt + j
Go to next playlist item	Alt +; (semi colon)
Autoplay On/Off	Alt + u
Loop On/Off	Alt + ‘ (apostrophe)
Single On/Off	Alt + q
Navigate through Playlist items	Up/Down/Left/Right Arrows

Set In Point for current Playlist Item (Clip or Audio file)	Alt + i
Set Out Point for current Playlist Item (Clip or Audio file)	Alt + o

D.8 STILL

Stop	Shift + k
Play	Shift + l (L)
Go to previous playlist item	Shift + j (J)
Go to next playlist item	Shift + ; (:, colon)
Autoplay On/Off	Shift + u (U)
Loop On/Off	Shift + ‘ (“, quotation)
Single On/Off	Shift + 1 (Q)

D.9 TITLE (OR GRAPHICS)

Stop	Ctrl + k
Play	Ctrl + l (lower case L)
Go to previous playlist item	Ctrl + j
Go to next playlist item	Ctrl +; (semi colon)
Autoplay On/Off	Ctrl + u
Loop On/Off	Ctrl + ‘ (apostrophe)
Single On/Off	Ctrl + q

D.10 SOUNDS

Stop	Ctrl + Shift + k
Play	Ctrl + Shift + l (lower case L)
Go to previous playlist item	Ctrl + Shift + j
Go to next playlist item	Ctrl + Shift + ; (semi colon)
Loop On/Off	Ctrl + Shift + ‘ (apostrophe)
Single On/Off	Ctrl + Shift + q
Set In Point for current Playlist Item	Ctrl + Shift + i
Set Out Point for current Playlist Item	Ctrl + Shift + o

D.11 GENERAL

D.11.1 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.11.2 MISC.

Cut	Ctrl + x
Copy	Ctrl + c
Paste	Ctrl + v
Delete	Delete Key

E 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 TriCaster™ 850, 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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CREDITS

Acknowledgments: Tim Jenison, Jim Plant
Engineering: Andrew Cross, Kevin Rouviere, Nathan Kovner, James Killian, Kirk Morger, Brian Brice, Kevin Nations, Jeremy Wiseman, Masaaki Konno, John Perkins, Michael Watkins, Bennie Pierce, Cary Tetrick, Alvaro Suarez, Steve Bowie, Charles Steinkuehler, Menghua Wang, Shawn Wisniewski, Bob Peene, Greg Heine, Dan Fletcher, Anthony Louviere, Jan Uribe, Jeremy Brosius, Michael Joiner, Jarrod Davis, Ryan Hansberger, Naveen Jayakumar, Todd Bryant, Karen Zipper, Mike Murphy, Mahdi Mohajer

Design Consultants: Kris Gurrad
Additional thanks to:

- NewTek Marketing and Sales
- NewTek Customer Support
- NewTek Business Development

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- FreeImage library http://freeimage.sourceforge.net/
- LAME library http://lame.sourceforge.net/
- FFMPEG library http://ffmpeg.org/

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