CERTIFIED TRAINING CURRICULUM

for the TriCaster Professional Line

Video Notes
Training Curriculum Video Notes

for the TriCaster Professional Line

This is the Video Notes for the TriCaster Professional Line Training Curriculum. It contains an outline of the instructional videos, important notes from the video content, a selected list of keyboard shortcuts, and a list of acronyms used in the curriculum.

These notes are intended as a supplement to the instructional videos, not to stand on their own. They are not a complete textbook, but rather contain the ideas from the videos that call for special emphasis. The learner is encouraged to add their own notes based on what they find the most useful content from the videos.

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June 2014

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**Video Outline**

The Professional Line curriculum has 18 videos with a total of 206 subsections. The total running time of all videos is about 4:51. Each video lists its total running time with each subsection listing its start time within that video.

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1: Introduction

a) Introduction (0:05)

The TriCaster Professional Line consists of the 410, 460, 860, and 8000 models. These training videos are for all models. Where the models differ in functionality or operation, that is noted in the videos. Otherwise, all training material applies to all models.

Notes: ________________________________________________________________

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You can mix HD and SD video in both digital and analog formats. Be careful to correctly attach the input and output cables as this is likely to be difficult to change once your live production has started.

If the TriCaster is to be mounted in a rack style system, use the optional rack mount rails. Securing the unit in a rack using only the ears on the front panel with screws can damage the unit.

a) Media Drives

TriCaster Professional Line systems come with a solid-state system drive and an internally mounted 3 terabyte media drive. The TriCaster 410 has no removable drive bay but storage can be expanded using the external eSATA port to connect external eSATA drives. The 460 has a single removable drive bay and the 860 and 8000 have four removable drive bays.

An eSATA port on the back of the TriCaster allows an external drive to be connected for expanded storage.

Do not transport the TriCaster with the drives installed. This may damage the unit.

b) Control Surface

Make sure there is room for the control surface, keyboard, and mouse in your production area. Connect the USB cable to the control surface, then to the TriCaster using one of the available USB ports on the back of the system.
The TriCaster 8000’s Control Surface is powered by a separate power cord from the unit. Connect the power cable to the control surface, then plug it in to a reliable power source.

c) Attach Power (2:50)

Plug power cables into the back of the TriCaster, then to a reliable power source. Make sure the power supply switches are turned on. NewTek recommends you connect TriCaster’s with two power supplies to separate power sources.

A beeping sound when powering up the system indicates one of the power supplies is not functioning, is not on, or is not getting power. The alarm can be silenced by depressing the button next to the power cable input on the back of the TriCaster. The system can run on one supply, but it is best to always use both for those models that have two.

If you use an uninterruptable power supply or power conditioner, make sure it is a true sine wave power supply. This should be indicated in the power supply’s specifications.

d) Monitor Setup (3:55)

The TriCaster requires at least one monitor to use as the main user interface. The monitor must be able to display 1600 x 1050 or greater. Setting the main interface resolution to 1920 x 1080 allows for more screen area to accommodate the system controls. On 4U systems, it is attached to a DVI connection; on 2U systems, it is attached to an HDMI connection.

On all systems, a second monitor can be attached to a different DVI connector to use as a multiviewer. A second monitor is recommended, but not necessary, to run the TriCaster.

e) Keyboard and Mouse (5:00)

If you use USB extensions or long USB cables, use a powered USB hub as these devices are getting power from the USB cable.

Manage cables during a production to ensure they are out of the way and do not run across areas where people could walk and trip on them.

f) HD and SD Video Inputs (7:30)

Four-U TriCaster model have eight video inputs and 2U models have four. Each input can be a different video format and resolution. High definition video can only be brought in through a component or an SDI connection.

To connect SD SDI or HD SDI, attach the cable to the SDI row for the desired input. To connect composite video, use the Y row for the desired input. To attach Y/C video, use Pb for the Y cable and Pr for the C cable for the desired input. To attach
YUV component video, use the Y, Pb and Pr rows for the desired input. The Red cable attaches to the connection labeled Pr; the Green cable goes on the connection labeled Y; and the Blue cable goes on the connection labeled Pb.

You can mix and match any combination of HD and SD in both digital and analog formats for a live production. The TriCaster will successfully scale up an SD composite signal for an HD production, but the video may look a bit soft.

An SDI connection carries both audio and video.

g) Genlock (8:25)

The TriCaster works with both Bi-Level and Tri-Level genlock signals.

Genlocking is not required to use the TriCaster, but NewTek recommends it to keep latency from drifting.

h) Video Outputs (8:55)

Four-U TriCaster model have three video output connections and 2U models have two. Each connection has an SDI output and a set of analog video outputs. Both the digital and analog outputs for every row are "hot" during a production so you can hook more than one device to the same output row.

*Output 1* is locked to the session resolution, but *Outputs 2 and 3* are configurable by the operator.

*Output 4* is an HDMI connector, outputting audio and video on a single cable. It is configurable to follow *Output rows 1 or 2*, duplicating them in HDMI format.

*Output 5* is a display-only HDMI connector designed to drive a projector or an external display; it does not carry audio. It can be configured to follow *Outputs 1 or 2* or set up to display Network inputs, media players, or Frame Buffers making it perfect for second screen content such as computer presentations or support videos.

*Output 6* is a video only, VGA output also designed to drive projectors or displays. Its resolution is configurable.

i) Audio (10:55)

Audio can also be brought in and sent out via the SDI video signal. The TriCaster accepts the first four channels of audio on each SDI connection.

TriCaster 410 systems have two stereo inputs consisting of a pair of XLR inputs and two 1/4-inch inputs, and all are line level only. There are no mic pre-amps so you have to use a mixer if you bring mics in.
TriCaster 460 systems have four stereo inputs consisting of a pair of XLR inputs and six 1/4-inch inputs. There are mic pre-amps on these inputs so you don’t have to use a mixer if to bring mics in.

On TriCaster 860 and 8000 systems, there are eight audio analog stereo inputs along the top of the back plate. Each is a pair of inputs that can be used for each video input, but they can also be used as independent stereo audio inputs. There are also AES/EBU connectors for allowing four channels of digital audio per connector.

Four-U TriCaster models have four XLR output pairs. These can be configured to output any desired sources. Two-U models have one pair of XLR and 1/4-inch jacks for audio output.

All TriCaster’s have headphone jacks that have their own volume control in the Audio Mixer.

j)  Tally Light  

The pin-out for the tally lights is in the User Guide.

Notes:  ________________________________________________________________

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3: Registration and Administration

When you register the TriCaster, you’ll have a password protected NewTek account which you can visit periodically to get TriCaster updates and other information. It’s a good idea to write down the Windows product key, the TriCaster serial number, and TriCaster registration code. Keep these numbers in a safe place in case you need them in the future.

a) The Admin Page

The first time the TriCaster is operated it should be registered. Use the Icon Ring on the Home page and click the Shutdown icon, then click on Administrator Mode. A warning may appear if other software besides the TriCaster is installed on the system. If Restore is pressed at this warning, the TriCaster reverts to the factory defaults and removes any other software.

From this screen you have access to a web browser. This is not meant for casual web browsing. The TriCaster is a turn-key system, not a computer, so always use an external computer for anything that is not directly related to the TriCaster.

The Files button opens a standard windows explorer window for use in manually moving files on or off the TriCaster.
b) Registration

Next to the Admin button is the Register TriCaster option. Two things are needed to register. The serial number and the product ID. Click the Registration button to see the Registration panel. At the top is the product ID. Write it down along with the serial number and have it handy.

The easiest way to register is to have the TriCaster connected to an internet connection. Plug in an Ethernet cable with an active internet connection on it, then simply click the Register button and follow the prompts. At the end of the process you are given an unlock code. The unlock code is entered to complete the registration and remove the watermark from the output.

If the TriCaster does not have internet access, you can go to a computer that does and go to the Registration webpage and register. If you have no internet access at all, you can call support services with your serial number and product ID and talk to a support representative who can generate an unlock code for you over the phone. Remember web registration can happen 24/7, but support services is only open from 8:30 am to 7 pm Central Time and 10 am to 2 pm Saturday and Sunday.

c) Updating the TriCaster

Next to the Register option is the icon for updating the TriCaster from the internet. If you registered you are notified via email that an upgrade is available. Make sure the TriCaster is attached to an active internet connection and click the Update button to download and install an update.

Update are also available from the NewTek website under Support from the Updates And Downloads area. You should check for updates frequently and always immediately after doing a system restore.

Next is a button for defragging hard drives. As you record and delete files from a hard drive it becomes fragmented. This can slow down the drives access time making it lose performance and speed needed for multi-stream video playback. This feature allows for the defragmentation of any drive attached to the system.

d) Backup and Restore System

As the TriCaster is used, it is possible to add custom content such as LiveSets from Virtual Set Editor, transitions from Animation Store Creator or updates applied to the system over time. This information is all saved to the C drive which is the internal Solid State Drive. If your C drive has issues or becomes corrupt, you could lose all the custom content and updates that were applied. The TriCaster allows for periodic images of the C drive to be created with your additions and updates so you have a full backup of the system to restore if needed.

Performing a restore does not erase any content from any of the media drives. The back-up of the system drive is unique to each TriCaster. If you own more than one machine, you should make a separate back-up for each.
e) Make a Backup

To make a system back, go to the admin panel from the Shutdown icon from the menu ring. Select Backup or Restore system. Click on Backup or Restore from the requestor. The system enters DOS mode and you need to arrow down and select Restore. Then select Create User Backup Drive. You will see a lot of text scrolling. Then you get to System Backup – create a user drive. You must have a target drive attached to the system. Remove all other drives from the system. The target drive should be a media drive in an internal drive bay or an external eSATA drive for the sake of speed, but not a USB 2.0 drive. Make sure the target drive is at least as big as the original. This drive should be maintained as your backup drive and not used for any other purpose. All information on the target drive will be lost. Enter Yes to continue and acknowledge that all info on target drive will be lost. Then text will scroll. It will go through the process advising you on the time remaining. At the conclusion it will tell you to power off or reset to continue. Power off. Remove the target drive, label it and store it in a safe place. Then power on. You have successfully backed up your system drive.

f) Restore a System Backup

To restore a system drive, restart the operating system and select Restore To Factory Defaults. Then select Restore System Partition from user backup drive. Text will scroll. This brings you to the Restore System Partition from a User Backup Drive. Eject all removable hard drives except the one with the restore info on it. Enter to continue. It will ask you to confirm, type Yes. Text will scroll. Percent complete is displayed. When it says Finished you can power off and remove your backup drive. Restart the system. It will return you to the Admin page. Then click on Back to TriCaster. Click Continue on the third party info screen if it appears to enter the Home page.

There is also access to a command prompt for the system.

g) Setting up Windows Preferences

Next is the settings area. Several Windows control panels are accessible from here. Adjusting the Region and Language for the system only changes the text in any windows requestors, it does not change the interface text.

The keyboard variables are accessible here as well.

Setting the System Time and Date is important because when you record, if you are not using LTC time code, you will be stamping the recording with time of day and that should be accurate.

The Network button allows access to the Network Setup and Control panel.

Access to the display controls for setting up primary and secondary monitors and adjusting them are also available. To access these controls, click on the Display
button. You can set monitor resolution from here. Also from the main Administrator menu under System Utilities you can select Swap Primary Monitor and this will swap the main user interface and the multiviewer.

A Fonts button is present to allow for the loading fonts for use within the TriCaster character generator.

System Name allows the ability to give the system a unique name to be able to identify it on a network.

Finally you have the options to exit to Windows or go back to the TriCaster.

h) Virus Protection and 3rd Party Software (8:20)

Even though the TriCaster runs on Windows, you don’t want to treat it like a computer. It is a turn-key system made to do what it does. Don’t try to use it for other computer related tasks like casual web browsing, email, instant Messaging, etc. Only install software made for the TriCaster. Windows and some third-party software (such as Adobe® Flash Live Media Encoder) is pre-installed. Do not update these packages to newer versions manually. It is quite likely that doing so will have unintended results. NewTek includes these updates in TriCaster updates when needed.

Virus and malware protection applications can dramatically impact system performance. Always take sensible precautions to avoid introducing infected files into TriCaster by rigorously virus-checking media you plan to connect or import beforehand. Have a laptop handy with full protection on it and attach any USB drive or media you intend on attaching to the TriCaster to find problems before you connect. If you must install virus protection, switch all active scanning operations off. Then, only when you need to do so (perhaps on a daily or on a weekly schedule), perform a manual scan.

Regarding codecs, TriCaster supports the vast majority of popular image, audio and video formats. If a file does not play back well (or at all), convert it using TriCaster’s Import Media feature instead of installing other codecs onto the TriCaster system. Loading unknown codecs to the TriCaster can negatively impact system performance.
4: Understanding Sessions

Each production has its own session file. There are numerous session parameters to set up before a production, and the session file contains all of this information. Managing sessions carefully saves a lot of time and headaches. It remembers all input and output settings, all content and where it was loaded, streaming and recording settings and more.

Sessions allow you to easily transition from one show to the next with very little setup in between. Every TriCaster session starts on the Home page.

a) Starting the System

When you power up the TriCaster it lands on the Home page.

If any third party software or even drivers are installed, a warning appears. If the system is experiencing problems during live operation it may be due to 3rd party software. This warning dialog allows the operator to revert back to factory defaults or to a backed up version of the system drive that is known to function properly. If the third party software works without system impact, then just press Continue to go to the Home page.
b) The Home Page

The icon ring appears on the Home Page. The Home screen is the command center for the TriCaster where you access the different hard drives, previous sessions, and start new sessions. This is also where you find the add-on software, user guide, and a set of TriCaster utilities.

User guides are found under the Help icon. Do not print these from the TriCaster. Instead, go to the NewTek website, click on Support, then Documentation to find the user guide for your specific TriCaster.

The System section of the menu grants access to the License Agreement and the About box for the TriCaster. The About box contains info on the build number and may be needed if you are contacting NewTek for support. Find the build number here.

Clicking on About TriCaster under System will reveal the Build Number of the TriCaster, which may be needed if contacting NewTek for support.

The Add-Ons section contains the user guides for Animation Store Creator and Virtual Set Editor. The Add-Ons icon on the ring will launch Animation Store Creator and Virtual Set Editor Demo applications. To remove the watermark from Virtual Set Editor, the purchase the full version of the application.

c) Starting a New Session

Start a new session when doing a unique event; re-use an existing session for shows that have the same format, cameras, and media. To start a new session, click on the New icon on the ring. It's always a good idea to use meaningful file names for all your media, and the sessions you create as well. If you don't type a name for a new session, the current date becomes the name.

The Template option allows you to use an existing session as a template for a new session. It clones the template and creates the session using its settings. This allows you to create a morning show, for example, set up the production, and exit. Now suppose an evening show is shot in the same studio, but uses different content. By using the morning show as a template, most of the production is ready to go. Now, you can just change out content for the new show instead of setting it up from scratch.

d) Choose A Session Drive

The session drive stores all the session information including inputs setups, resolutions and formats, content loaded into layers, M/E setups and more. It is possible to select the D drive as the session drive and then record media to another drive during the show. All the drives used in a session are needed to restart that session. The media drives are removable during a live session. The TriCaster must have at least one media drive as the session drive during live
operation, but this can be the internal 3 terabyte drive. The session drive is not removable during live operation.

This TriCaster is available in standard and multi standard versions. A standard TriCaster only had NTSC as a selection. A multi-standard unit allows production in NTSC, NTSC-J or PAL. When setting a Video standard like NTSC, all inputs and outputs must match this standard. You cannot mix PAL and NTSC content within the same session. If it is an NTSC session then all inputs and outputs are NTSC. Select your appropriate standard. Next choose the resolution for the session. This is the resolution that is set for video Output 1 of the system. Choices include high definition resolutions or standard definition at 4:3 or 16:9 aspect ratios. This does not affect what resolutions can be brought into the session. Resolutions can be mixed on the inputs and the TriCaster up converts or down converts to match the resolution of the session on Output 1.

Once any sessions have been created, they can be opened from the Open icon. Left click on the name to launch it. You can also right click on a session name to rename it. This is also where you can restore a session to a particular drive when a session has been backed up. Deleting a session also deletes any media that is internal to that session.

The Shutdown icon also has a few selections. You can restart the TriCaster which causes the machine to reboot and return to the Home page. You can Shut Down the TriCaster which will power it down and off. You can also go to the Administrator mode.

e) The Sessions Page

Choosing the name of a session on the Home page takes you to the Session page for that session. On the Session page, the name and resolution of the session are displayed in the upper left corner. There are three icons on the menu ring: Manage, Graphics, and Open

f) Importing Media

The Manage icon is where you manage all the media for a live production. Proper media management is important because it ensures you have compatible media stored for easy access during a live production.

The TriCaster Manage Media page is where you manage the four playable types of media files: video clips, still images, title graphics, and audio files. LiveText project files are also managed from this page. Those project files are not playable in one of the TriCaster’s media players, but their output files (title graphics) are. The Import Media function is generally the best way to import media. To importing media from a USB drive, check it for viruses on an external computer and then plug it in.

If you import media from a USB drive, check it for viruses on an external computer before connecting it to the TriCaster.
To import clips for use during a live show, click on the *Import Media* button. Click on the *Add* button. From here navigate to any drive attached to the TriCaster. Navigate to the media to be imported, select it, and press *Open*.

The TriCaster can read many types of media formats and resolutions, but some clips may need to be transcoded before playback in the TriCaster.

When importing video clips, three things may happen:

1. The clip adds to the list, the *Transcode* button is off and ghosted. This means the clip will play with no conversions.
2. The clip loads and the *Transcode* button is on, but ghosted. This means the TriCaster knows the clip needs to be transcoded on the way in and will do so.
3. The clip loads and the *Transcode* button is off but not ghosted. This means the TriCaster thinks it can play the clip with no conversion. (You can import the clip with no conversion and test it in playback. If you have an issue, re-import the clip and transcode it for smooth playback).

When all your media is loaded into the import requester, press the *Import* button. Once everything is imported, the import requester is empty.

To check if all media has been imported, click on the media type (clips, stills, titles, etc.) in the *Browse* window and check the import folder.

The *Browse* button allows easy inspection of imported content. To look at any imported video clips for the currently loaded session, click on the *Clips* button. The clips folder for the session is displayed.

In this folder, there can be up to five folders: Import, Capture, Motion, Publish and Saves Streams. *Import* holds all imported clips, *Capture* has anything recorded by the TriCaster during the live show, and *Saved Streams* has any recorded stream files from the live show. The *Motion* directory has any motion CG pages saved out of LiveText. These are used in a DDR and downstream keyer to produce motion graphics over the live show and the publish folder will have any content you published during the show.

**g) The Directory Structure (10:10)**

The TriCaster has one internal system drive and one internal media drive. You should use the removable drive bays as your additional media drives. External drives can be used only if they are eSATA and attached via the eSATA ports. Don’t try to use a USB drive to record or playback from as it is not fast enough.

On the session drive, the TriCaster creates a media folder. Inside the media folder are the types of media available, including Clips, Sound and Music, Stills and Titles. In each of these folders are the sessions stored on that drive. If you click on the *Clips* folder you see folders for any created sessions. Go into a folder to see an
Import folder. Inside this folder are all the imported clips. The path is visible in the requestor. D:\media\clips\session name\import. So all imported audio clips will be in D:\media\Sounds and Music\session name\import and all stills will be in D:\media\stills\session name\import.

h) Configuring Publishing

Along the top of the Session page on the right side are a few icons for social media sites and more. Click on any part of the icons or the gear to launch the account configuration panel. Log into Facebook, Twitter or YouTube using your username and password. You can also choose to post as another page you are an admin for on Facebook such as your company page. Here you can set a local or network drive as a destination for any published media. Also log into a FTP site and upload published media here.

When working with Facebook, Twitter or YouTube, the option of applying a watermark is available which can be any image with alpha channel. This watermark then appears on any published media for these sites. When copying files to FTP or local drives, the option to Prepare for Web is available. This option takes the 100MBPS mpeg file wrapped as a QuickTime and converts it to a web format much smaller and easier to transport.

The Graphics icon launches the included character generator, called LiveText. This is discussed in its own video. To enter the Live Desktop, click on the Live button in the menu ring and click on Start Live Production.

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5: The Live Desktop and Input/Output

The Live Desktop is the main control room for your live production.

a) Live Desktop Overview

Depending on the model, there are slight differences in the interfaces and we will discuss them throughout the training.

The Live Desktop is the main control room for live production. The Interface is broken down in four sections.

1. The Dashboard
2. The Multiviewer
3. The Live Control Section
4. The Tabbed Interface

Holding down the 
*Shift* key and double-clicking on an adjustable parameter returns that parameter to its default value.
To change most button labels, right-click on the button, then choose Rename from the context menu.

Throughout the TriCaster interface, clicking a gear icon brings up a configuration panel for a control.

b) The Four Sections

The Dashboard across the top gives you access to many powerful features in the TriCaster. Just below that is the primary configurable Multiviewer. The live control section featuring the video mixer, the Down Stream Keyers (DSKs), and the M/E buses is in the center. Below that is the tabbed interface is along the bottom allowing access to the internal media players, the audio mixer, the PTZ control Area, and the Buffers tab.

c) The Dashboard

The Dashboard is a set of controls across the top of the Live Desktop. It's layout is the same on all Professional Line TriCasters.

d) The File Menu

The File menu allows access to the publish queue and the configuration of the publish destinations. Publish destinations must be configured prior to entering the Live Desktop. There is an option to eject removable drives and share media folder and buffers on the network. Sharing media folders and buffers will make these drives available on the network giving people external to the TriCaster access to some it its media during a show. There is also the exit option to exit the live Desktop take you back to the Session page.

e) The Options Menu 8000

Next is the Options menu. The contents of this menu is slightly different on the TriCaster 8000. Under the Tabs Follow directory, you find Tabs Follow Preview for all Inputs or M/E’s. There is a Systems and CS directory for using the mirroring feature only found in the 8000. This allows the pairing of a CS to any TriCaster 8000 on the same network or you can take over another TriCaster 8000 with your main interface. Then there is a directory for Hotspots allowing the user to disable them all or disable them when not on Program output. Then there are options for lock mouse to primary monitor and Enable Autoplay Out on M/E’s.

f) The Macros Menu

The next menu option is for macros. This allows the user to Stop All Macros or open the Macro Configuration panel.
g) Adjusting the Interface

Workspaces work slightly differently in an 8000 from the other systems. In an 8000, you have four configurable slots for the main interface and the secondary multiviewer. The user can decide the layout for each of these slots. You can also set the resolution of the second multiviewer.

On 410, 460 and 860 the menu presents you with names of presets that are available. There seem to be more options on this menu, but the layouts are not configurable like in the 8000, making the choices more limited.

The Help menu allows the user access to the online help. The online help selection shows QR codes that can be scanned with any smart device with a barcode scanner and this will load up the user guides or other customer service information in that device.

Next is the Message area. This is where important messages show up during a production. An example of this can be seen by pressing the Alt + b keys. This displays the TriCasters build number in the message area. Clicking the green box removes the message.

Next is the Switcher memory area showing how much memory is available for transitions and buffers. As you load transitions and buffers, this gauge rises and changes color. Don't let it get into the red as you are running low on memory. To reduce the load, unload some transitions or buffers.

Next are the Streaming button and its configuration gear. The gear allows access to the streaming panel for set up and the button itself will start and stop the streaming process.

Next are the Grab and Record sections and they work the same way with a main button to use the feature and a gear for setting it up.

The production clocks time is set by setting the windows clock from the Admin panel. There is also a gear for setting up the clock and its options including using external time code.

h) Configuring a Video Input

When you set up the session resolution on the Home page, that defines what the resolution of Output 1 will be.

As you mouse over any of the monitors a gear appears in the lower right corner. These gears appear all over the interface and they are used to configure whatever they are associated with. A gear next to an input monitor will bring up the configuration panel for that input. The gear attached to the output monitor will bring up output configurations. You can also double click in the monitor to bring up this panel. This is the same panel brought up if you right click on the monitor and select Configure.
From here you can use the Connection Type pop-up to choose the type of video coming in on each input independently.

i) Frame Sync

On an 8000, if input sources are synced or genlocked, you can turn off frame sync for that input. If you are not using genlock, leave frame sync turned on. This is not an option on the other models. Frame sync is always on for all inputs on a 410, 460 or 860. This means if the lowest latency possible is your goal, you will get the best results from a TriCaster 8000.

j) About Video Signals

You can bring in a wide variety of video formats and resolutions. High definition video can be brought in as HD-SDI or analog component. Standard definition video can be brought in as SD-SDI, component, composite or Y/C video. You can bring in a different format or resolution on each input, and the TriCaster will up or down convert whatever you feed it to whatever you set the session resolution to on the way out. There are also multiple physical video outputs which can be configured to display different video than Program output and at different resolutions and formats.

Also know that different formats represent different levels of quality. The best quality input for this TriCaster is a HD-SDI input. If working with standard definition the quality scale starts with the best which is SD-SDI, component, Y/C, then the lowest quality is composite. Conversely, a composite signal is one cable, Y/C is two and component is three.

So with analog signals, the more cables used for an input means better quality, but none of these formats include audio on those same cables. Audio is run separately when using analog video. Both HD-SDI and SD-SDI use only one cable and deliver the best quality video and embedded SDI audio can be sent on the same cable. This means one cable for the best audio and video making SDI the best choice at any resolution.

A good rule to remember is standard definition composite video is fine for a straight video feed, but if you are going to key the input for use in a virtual set or other M/E effect it would be best to feed it component or at least Y/C if you only have analog video available. This makes it easier to get a good looking key. SDI produces the best key in HD or SD.

k) Processor Amplifier (Proc Amp)

Each input also has controls for adjusting the video levels called a Processing Amplifier, or Proc Amp for short. The controls are brightness, contrast, hue and saturation.
Brightness is the overall brightness of the signal. Contrast allows you to control the white and black levels. More contrast means the whites get lighter and less means blacks get darker. The Hue control adjusts the colors themselves shifting them around the color wheel. Finally Saturation controls the amount of color in the signal. Set this to 0% and the image is in black and white. The effects of these controls can also be viewed on the waveform monitor and vector scopes.

l) Waveform Monitor and Vectorscope

There are workspace presets to show the scopes. Once displayed, the channel to be adjusted can be selected on preview. Then click the gear that appears when mousing over either scope to reveal the input controls for the input on preview. Now you can adjust the input while viewing the scopes. The channel to be adjusted can also be selected by right clicking on the scope itself and choosing the source. You can also choose the color of the reticles or overlay and the configure option opens the configuration panel for whatever source is selected by the scope.

The waveform is used when adjust brightness and contrast and the vectorscopes shows color information adjusted by the hue and saturation controls. For NTSC we want the bottom at 7.5 and the top at 235. Notice that adjusting the Hue rotates the colors and Saturation scales the graphic. For this scope, you want the points or corners of the lines in the small boxes.

m) Working with Cameras

Even though you can adjust the video signals as they come into the TriCaster, it is important to always feed the system the best quality video possible. The adjustments in the TriCaster should be used as tweaks not total controls.

If the input is too bright, try to iris down on the camera before using the Proc Amp. If the colors are not quite right, try manually white balance the camera and turn off Auto White Balance before the shoot. Turn off things like Auto Gain Control and Auto Focus and control these manually when possible. This stops the camera from trying to compensate when there are lighting changes and things move toward and away from the camera.

Refer to your camera manual to learn these controls on your camera. The general rule of thumb here is garbage in garbage out so always feed the TriCaster the best signal you can.

n) Cropping or Edge Control

The Edges control allows cropping with a hard line from the left, right, top and bottom. This is great for removing things from a shot that are not being keyed. This crop is done at the source meaning anywhere you use this source, the crop will already be applied.
On an 8000 there is an additional *Feather* control allowing for soft edges to be added to the crop.

o) The Multiviewers

The multiviewer in the main user interface allows you to see the internal and external channels available during a live production. A monitor can be configured to show any input or output of the TriCaster by right clicking on it. This brings up a selection menu for that monitor.

The default view is slightly different between 4 and 8 input systems. By default in 8 input systems, you have preview monitors set up to monitor all video inputs, two network inputs and internal media players including two digital disc recorders and two graphics players. Four inputs systems are the same, except they only have one graphics player and the eight input systems have two. Eight input systems also have an additional monitor showing a frame buffer.

p) Re-naming Inputs and Monitors

There are large Preview and Program monitors to see what’s going out live and what will go out live if a transition is performed. Each one of these monitors represents a channel in the switcher that can be configured in some way. You can rename any button, audio input, and any monitor on the interface to suit your production. Right click on any monitor title bar or any button on the switcher and select *Rename*. Setting the *Input Name* changes the label on the monitor and changing the *Button Label* changes what’s displayed on the button in the switcher. Remember there is not much room on the button so these names should be short. Renaming the audio will also rename that audio channel on the audio mixer. These audio channel names will also be used by the AVID Artist Mix control surface which is an option for the Professional Line. This can be done for Media Players, as well as live inputs.

q) Configuring the Multiviewer

For all models except the 8000, the default layouts for the main Multiviewer for each model shows you the external sources and many of the internal sources available for the live production. The layout of the monitors can be changed, but not what is displayed in them. There are several layouts for the main interface and the secondary monitor and between the two you can see all channels of the switcher and its buffers. For instance, to see the frame buffers on a 460, the user configures the secondary Multiviewer to show them. These menus are the same on a 410, 460 and 860, but slightly different on an 8000.

On an 8000, the operator can select what channel of the switcher within that monitor will be displayed. All of the selections down to the first separator line are the options to select what input to view and are not available on a 410, 460 or 860.
r) Configuring 8000 Multiviewer

The Multiviewer can be set up to show any live input, any network input, any media player, any framebuffer, any Mix Effect Bus, or any output. You can also load a custom image into that monitor, but this only displays that image in the Multiviewer’s monitor, not on output. You can also put the production clocks into a monitor. Once you change what is displayed on a monitor for that preset, it remembers that for that workspace.

Using this capability with the different monitor layouts available, you can set up custom Multiviewers which include any M/E or all eight M/E’s at once, any animation or still buffer and a variety of outputs including a clean feed, Preview, Program or either Output 1 or 2 directly. If you wish to return to the default display setting simply load one of the preset layouts back into that workspace and the displays reverts to the defaults.

s) Setting up M/E Monitors

The 8000 Multiviewers also have M/E Preview and M/E Follow allowing you to follow Preview or Program on the currently selected M/E, making it easier to mix a show within a show. M/E Preview displays what is on the Preview row of a selected or delegated M/E in Mixer mode. M/E Follow displays the Program row of a selected or delegated M/E in Mixer mode.

The options to choose what source to view in a Multiviewer monitor are not available in the 410, 460 or 860 models. These models do have a context menu when you right click on them, but on these models the menu starts with overlays.

t) The Multiviewer Overlays

The Overlays menu allows adding overlays to the Multiviewer monitor that do not affect output. These include a checkerboard for the background of a monitor that is displaying keyed content or content with an alpha channel. There is also an overlay for title safe showing you the area of the screen for titles to be visible at any resolution. There is a 4x3 overlay for standard definition productions and Hotspot Markers can be added. The VU meters can also be hidden or revealed. The monitor can be renamed and you can launch the configuration panel for the input.

u) 8000 Only Overlays

On an 8000 there are additional options under overlay:

- A center cross for alignment.
- Tracking Markers for using the real time tracker only available in the 8000.
- Show illegal to show video that is too hot or dark.
- Show alpha to see the alpha channel when setting up a key.
• And Flip Horizontal allowing the operator flip the video and use an output as a confidence monitor for the talent.

None of these overlays appear on Program Out.

v) M/E Overview

The Professional Line TriCasters also include Mix Effects buses, or M/E’s. The M/E Bus rows can be displayed or hidden on the main user interface. You can do this by holding down the Ctrl key on the control surface while pressing an M/E delegate button repeatedly.

There are eight Mix Effects buses on a TriCaster 860 and 8000 and four on a 410 and 460. Each M/E has its own colored tab and border to make it easier to identify which M/E is active. The T-Bar for the M/E’s on the control surface also changes colors when different M/E’s are selected or delegated. You can get to the setup controls for any M/E by clicking on its tab in the interface. In the Options menu, you can set the Tabs Follow Preview for All Sources, meaning whatever is selected on Preview also selects the corresponding inputs tab to display its setup controls. This works for media players as well as M/E’s. The definition of an M/E and use of this powerful feature are covered in the M/E section. If an M/E is selected on Preview, its tab is also selected, but it has no effect on other media players placed on Preview.

The TriCaster allows attaching a second monitor for use as a configurable Multiviewer. Because of this, you can move the mouse pointer over onto the second Multiviewer for configuration as described previously. Once the second Multiviewer is configured, you can lock the mouse pointer from being able to travel to the second monitor. There is also a selection for Enable Autoplay Out on M/E’s.

w) Adjusting the 8000 Workspace

The Multiviewer monitor layout in the main user interface of the TriCaster 8000 is adjustable.

From the Workspace pulldown menu in the Dashboard, you can select from four preset layouts A, B, C and D for either the main interface or the secondary multiviewer. Left click on a new workspace preset and the monitor layout changes to match that preset. Preset layouts can also be changed. Open the Workspace menu and select preset D. Now open workspace again and mouse over Load Default below preset D. Now you can select from any of these monitor layouts to be used in preset D. This can be done for any preset. Loading the scopes layout into preset D can be useful allowing access to the waveform monitor and vector scopes.

This same functionality is available on the secondary Multiviewer. To configure a monitor layout, use these presets from the workspace pulldown. Just like on the
main user interface, you can also move the mouse over to the secondary multiviewer, right-click on any monitor, and configure it to display any input or output. If the mouse will not travel to the second multiviewer, check the **Options** menu and make sure the **Lock Mouse to Primary Monitor** is not on. Once the multiviewer layout and displays are configured, it is best to turn on **Lock Mouse to Primary Monitor** during a live production. This makes it easier to select the presets for DDR 2 and GFX 2.

In the multiviewer, you have more options for monitor layouts for each preset, including a full screen option. You also have the ability to set the resolution of this secondary Multiview monitor output using a popup menu. If a second monitor is not connected, this option is ghosted.

x) 410, 460 and 860 Workspace  

On 410, 460 and 860 the workspace pulldown has text presets to select from which tell you what will be displayed in each layout.

You only have these layout available, and they cannot be changed. There are more presets available here than in the 8000, but they are locked down. You still have the ability to change the resolution on the secondary monitor using this option at the bottom of the menu.

y) Main Video Mixer Overview  

The main production switcher is comprised of two rows, a Program and a Preview row. Let’s start with program. Whatever is selected on this row is what is going out of outputs configured to show Program. This is also by default what is being streamed and being recorded, but these settings can also be configured.

You can directly select any input on this row and it will cut to that input on Program Out. The output of this row is displayed in the large monitor labeled Program which is highlighted red. By default, this is what we are broadcasting to the audience. Just below the Program row is the Preview row. This is what is switched to when the TriCaster does a cut or a transition. Whatever is selected on this row is shown in the large Preview monitor which is highlighted in Green. This is not being broadcast; it is just showing the operator what will go out live when a transition or cut is performed.

To the right of the program and preview rows is the Transition area. Here you find a T-Bar. Under the T-Bar, you find a **Take** and an **Auto** button. These equate to the main **Take** and **Auto** buttons on the Control Surface next to the physical T-Bar. When the **Take** button is pressed, Program Out cuts to whatever is on Preview, and whatever was on Program is now on Preview. They switch places.

Pressing the **Auto** button next to the **Take** button performs whatever transition is currently selected, which by default is a fade. This is known as mixing the background. The Background is the first layer in the TriCaster. It is whatever is on
Program and Preview and any transition effect. That is all considered the Background layer.

It is best to always look at a channel on Preview and then switch to it, as opposed to just directly selecting it on Program. Without previewing, you are not sure what you are switching to so previewing it helps avoid mistakes.

Notice that the interface is color coded. The controls for the main switcher bus rows are on the Control Surface. Notice the button selected on the Program bus is red in the main user interface. The input monitor for that selected source is also red, as is the button on the Control Surface. The selected source on Preview, its associated monitor, and its corresponding buttons on the Control Surface are green. This makes it easy to visually scan the multiviewer and see what is live and what is currently on Preview.

z) Video Output Configuration

The TriCaster Professional Line has a variety of outputs for broadcasting live productions. To open the Output Configuration panel, press the gear in the lower right corner of the Program Out monitor when the mouse is over that monitor, or just double click on the Program Out monitor. Depending on the model of TriCaster, this panel varies as to the number of outputs available. There are three rows of video outputs on the back of a 4U TriCaster and two video outs on a 2U TriCaster. They are represented on the Output Configuration panel.

aa) Configure Output Row 1

Output 1 is configurable to send out any input, internal media player, or M/E. It can also send out Preview to create an external hardware Preview monitor or program clean. A clean program feed is one with all down-stream overlays removed. The audio can be set for Master or Aux Audio as well as any incoming audio signals from the inputs. This adjusts the audio being sent out through the embedded SDI signal for that output’s SDI connector. This also selects which audio track will be recorded if this output is selected as the source to record in the ISOCorder.

There is no ISOCording in a TriCaster 410, just one channel of recording only.

The resolution of Output 1 is locked to the resolution set up in the session. There is also a popup for analog output settings. These are only used in a standard definition production where you need to define how the three BNC connectors for that output are being used. Component uses all three connectors where composite and Y/C use one or two of these connectors. In a high definition session, these controls are ghosted as high definition video is either HD-SDI or component.

Something to remember is that both SDI and analog connections are active at the same time. So, in a high definition session, Output row 1 has two outputs active. One SDI and one component.
bb) Configure Output Row 2

Output row 2 is also configurable in the same way with a few differences. You can adjust the output resolution of this row using this pulldown menu. This allows one TriCaster to output different resolutions at the same time. You can even output high definition and standard definition simultaneously.

Note: if you change this to standard definition, the Analog Output menu becomes active as these controls are only used with standard definition.

The TriCaster 410 and 460 are 2U rack mount units and only have two video output rows.

c) Configure Output Row 3 (860 and 8000 Only)

The TriCaster 860 and 8000 have an additional output row. Output row 3 is a little different. This row can be set to output a specific input, such as a camera, or it can be set up to follow Output 1 or 2. The audio can be setup to follow the SDI audio output happening on Output 1 or 2, and this will be the SDI audio used on Output 3. It does not adjust the analog main or aux audio outputs on the back of the TriCaster. You can also configure this output to serve as an alpha channel for Input 1. This creates key and fill video streams to send to another switcher or TriCaster for video with alpha channel.

dd) Configuring the HDMI Program Output

The 4th output is an HDMI port on the back of the machine, and this is available on all systems. This is found just to the right of the two video output rows on the 2U systems and just to the left of the video inputs on the 4U systems. On 4U systems, it is also labeled (4)HDMI. This is a configurable output. It can be set up to output a specific input such as a camera or follow the output happening on Output row 1 or 2.

The audio for this output is also configurable to output Master or Aux Audio or any audio from any video inputs. This only adjusts what audio is sent out on this HDMI signal. It does not adjust the Master or Aux audio outputs on the back of the TriCaster.

ee) Configuring Display Outputs

TriCaster 860 and 8000 have additional connectors not found on the 2U models. On the 860 these are not used. They are only usable on a TriCaster 8000.

The TriCaster 8000 features additional display Outputs 5 and 6. Output 5 is an HDMI connector and is a display output. That means it only sends video, not audio. It is configurable to send out individual inputs, but can also send out network inputs, media players, and frame buffers making it perfect for second screen content like additional video content or presentations from external computers. It
can also be set to follow the output happening on Output 1 or 2. You can also set the resolution of this output using the pulldown. This allows you to turn off the scaling in an external projector which can reduce video latency.

Output 6 is a VGA connector and it is another display output configurable in the same way as the HDMI display output. You also have the ability to configure the resolution of this output to match the resolution of a projector allowing you to turn off the scaler in the projector for better real-time performance.

ff) Configuring Network Output

Another output available on all TriCaster Professional Line models is the Ethernet port. It can send the program from one TriCaster to another and is configurable. You can send individual cameras, network inputs, media players, buffers, or follow Output 1 or 2. You can also de-interlace this output if needed. If two TriCasters are on the same network and you activate this output, it sends whatever it is configured to the output across the network. This can be brought into another TriCaster via its network inputs.

It can also be viewed by other media players, like the VLC player. Connect another computer to the same network and use the URL in the VLC player to view the network stream remotely. It can be configured in the same way as the display Output 5 and 6, but it also has audio configuration as it sends both audio and video across the network. This audio menu will choose the audio that is sent with the video across the network.

The Ethernet port is also where live streaming is output to the internet as well as content that gets pushed out to social media sites. It is configurable in the same way the network output is including audio as far as the live stream is concerned.

gg) Genlock and Failsafe

Under the Genlock and Failsafe tab are more options. The 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 found on the back plate on 4U and 460 systems. Genlock is not available on the TriCaster 410. TriCaster supports both Bi-level (Standard Def) and Tri-level (High Def) reference types.

The Center Frequency 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.

hh) Failsafe Always on Air

TriCaster’s multi-tiered “always on air” hardware and software failsafe systems provide confidence that, short of a complete power failure, the show will go on.
The failsafe option allows the audio and video from Input 8 on 4U systems and Input 4 on 2U systems to be routed to Output 1 in the case of a catastrophic event. This ensures that video and audio are always being output.

In some studio settings, however, more elaborate hardware failsafe systems may be in use. Typically, such systems take over broadcast duties whenever the output signal fails. In such cases, TriCaster’s failsafe video pass-through mechanism can actually prevent the external system from engaging. For this reason, a Failsafe section has been added to Output Configuration. It provides a switch to disable the A/V pass-through when necessary. By default, A/V pass-through is off.

ii) Time Code

There is a production clock available in the TriCaster. It is always displayed in the upper right corner. This time of day can be set from the Administrator panel and is used as time code if time code is not externally supplied. This time will be stamped onto any recording.

All TriCaster Professional line Models except the 410 also support LTC timecode. This timecode is brought in as an audio signal on Input 7a on 4U systems and 3a on 2U systems. Click on the gear to the right of the clock. Here you can select to use timecode and, if present, the clock display will use it and its time display will turn light blue indicating time code is in use.

jj) The Production Clocks

The clock runs in 24 hour mode, but this can cause an issue. 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. Using this control you can subtract 12 hours to avoid running past hour 24 and reverting back to hour 1 within the timecode.

You can also set up a production time clock by setting a start and end time to the production. Simply activate them with the buttons, then left click and drag on the numbers or double click to type in a number. It is important to make sure the time of day clock is set accurately from the Administrator mode. When set a second clock appears, this is a count-down to the start of the production; once it begins, it becomes a count-down to the end of the production.

kk) Setting up ISOCorder Recording

The TriCaster has the ability to record the full resolution program output to the internal media drive or drives attached to the system. TriCaster 460, 860 and 8000 also include ISOCorder technology allowing you to record up to 4 or 8 channels of high definition video with audio simultaneously on 4U systems and up to four channels on the 460. You can configure what you want to record on each channel
and how you want to record it. To configure the recording click on the gear next to the record button in the dashboard.

II) Configure ISOCorder

First you can give your recording a base name. The base name will default to the session name. If you start and stop the recording without changing the base name the recordings will be numbered sequentially along with the base name.

Next, choose what you wish to record. Using the popup for the source field, you can choose to record Output 1, Output 2, or any of the video inputs. The audio to be recorded with each input selected is chosen in the Video Output Configuration panel. If you are recording individual inputs, say Input 1, it records the resolution and aspect ratio coming into that input regardless of the session resolution. If you choose to record Output 2, it records the resolution you set up in the Video Output Configuration panel for Output 2.

Next, you can choose a format. This TriCaster defaults to NewTek’s own QuickTime format. This format is compatible with most nonlinear editors with no conversion. There is also MPEG-2 options, an AVI option, H.264 codec for web to create smaller easier to transfer files, and an MP3 audio only recording option.

Only one h.264 stream can be recorded during a production. Trying to set up a second one will cause an error to appear.

Next, you can select where to record the video. This must be one of the internal media drives or an eSATA drive connected to the eSATA ports in the back of the machine. Remember, USB 2.0 drives are not fast enough to support video recording or playback.

Only two streams of video should be recorded per media drive. 2TB media drive can hold approximately 50 hours of 1080i video. This means 25 hours if you’re recording two streams on one drive. If you try to record more than two streams to a single drive, you will get an warning message telling you this is not advised.

There are also external codecs available for both MAC’s and PC’s that allow any external application to import and export files from the TriCaster. You can even export clips with alpha channel for use as motion overlay graphics. These codecs are available on the Updates and Downloads section of the Support tab of the NewTek web site.

The Add to Playlist button causes the recorded clip to show up in the selected DDR when the recording process stops. Use the gear to choose the DDR.

You can also check the Add to Publish Queue button and when you stop the recording process, that clip will show up in the publish queue ready to be uploaded to your favorite social media site. Simply use the gear to choose where it will be uploaded. You can even set it up to auto upload clips as they are available. The
Publish feature must also be configured on the Session or Home page before being able to use these features.

To set up to record additional channels, turn on the Secondary Sources. To set up a new channel to record, press the Add Source button. Make sure that you are only recording a maximum of two channels per media drive. If you try to set up more than that you will get a warning. Secondary sources cannot automatically be sent to a DDR or a publish queue. You can delete secondary sources using the x to the left of the source.

Once you have some setup, secondary recordings can be enabled or disabled without affecting the setup for each channel. If you are setting up to record individual sources, if you rename the monitors the source is coming in on, the recording will be labeled with that name. This is very handy for organizing your clips for editing.

To start the recording, press the Record button on the user interface. To start the recording process from the Control Surface press the Record button. To stop recording from the Control Surface, press the Ctrl button along with the Record button. This qualifier key is added to prevent accidentally stopping the recording during a production.

mm) Setting up Still Image Grabber

While in a live production, you have the ability to grab still images from Program Out. To configure the grabber, click on the gear next to the Grab button in the Dashboard. Like the Record Panel, you can give the images a base name and they will be sequentially numbered along with the name. The images are saved as JPEGs.

You can also choose to de-interlace the image. If you are working in interlaced formats like 1080i or standard definition at 480i, the i stands for interlaced. That means each image is made up of two fields. If there is a lot of motion when the image is captured the resulting still can look jittery. To remove the jitter from these images use the De-Interlace function. This is not needed when working with progressive formats, like 720p.

You can set the Grab button up to grab a still from all eight live inputs at once. This is handy for creating a collection of stills to choose from for upload to social media or to be used in editing. You can also configure the grabber to ignore any inputs that are black. If you have Add to DDR selected and you have Capture Stills from All Inputs selected, only Program Out will show up in the media player, but the other stills were captured. They are available from the media browser when you add content to a media player. The Add to Playlist and Add to Publish Queue features work the same as they do in the recorder.
Backing Up and Restoring a Session

Once everything is configured for a session, you can exit the Live Desktop to save all the session parameters. Use the File pulldown in the upper left corner to exit. Click Exit to go to the Session page. From here, you can use the arrow to move to the Home page. Now you have access to all the sessions on the system.

A session can be renamed on the Home page by right clicking on it and selecting Rename. You also have the option to delete a session, but be careful as this also deletes any media associated with that session.

To back up a session, go to its Session page by selecting the session from the Open menu and once on the Session page, select Manage. Then select Backup Session. You have two options here. Backup Without Importing backs up the session and any of its imported content. If you want to back up everything including content you used from other sessions or sources during the live production that was not actually imported, choose Import and Backup. Because the backup is not real-time playback or recording, it can use slower USB drives.

Backing up the session produces two things. A zip file with the session name and a folder with the session name. Both of these are needed to restore the session. They need to be in the same folder or on the root of the same drive.

Once a session is backed up, it can be restored to any media drive. Under each drive on the Home page, there is the option to Restore Backup. Click on this and navigate to and select the zip file of session information for your backup. It is restored to that drive with all its content, as long as it was backed up with all its content.

If you back up a session that was created on the D drive and restore it to an E drive, the session will load properly and the content will be remapped and all show up correctly.

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6: PTZ Cameras

The Professional Line of TriCaster supports robotic PTZ cameras. From the TriCaster’s interface, you can pan, tilt, and zoom these cameras, and create preset shots that can quickly be recalled.

a) Connect the Camera (0:20)

Connect the camera’s output to the desired TriCaster input. On the corresponding Input Configuration panel, select the video type coming in.

b) Set Up Camera Control (0:45)

On the PTZ tab are eight presets to store camera positions and a speed control. At the bottom is the camera selection area where you select which camera to control. The Follow Preview control causes a PTZ camera control to be automatically selected whenever the corresponding camera input is placed on the Preview bus.

c) Connect the Robotic Control (1:15)

This control can be a USB connection using serial to USB adapter, or it can attach using the Ethernet port. The Device Manager in Windows shows which COM port the PTZ camera is using.

d) Configure the Camera (1:40)

On the Input Configuration panel, the PTZ tab has a check box which activates the camera controls. Select the camera type on the dropdown under the check box.
e) Set Up Camera Shots

Open the *Shot Configuration* panel by clicking the gear in the preset of the camera you wish to set up. Left-dragging pans the camera left to right; right-dragging or turning the mouse wheel zooms the camera. Once the shot is set up properly, press the *Update Icon* button to create a preset icon for that shot. Each camera can have up to eight preset shots. Clicking on any of the presets caused the PTZ camera to automatically move to match the preset position.

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The TriCaster Professional Line comes with several media players for media imported into the session, for external media from other sessions, or for media from external drives. The media players can play all the content loaded in the manage media area of the sessions page.

Different types of media players can play different types of media, including video clips, audio clips, stills and titles. The Digital Disk Recorders (DDRs) can playback all types of supported media, not just video clips. Graphics players can playback stills or title templates. There is also a sounds player for playing audio clips.

a) Loading the DDR

Each TriCaster in the Professional Line has two Digital Disc Recorders (DDRs) for playing video clips and other media. This media player works like a Blue Ray or DVD player. The TriCaster’s DDRs support any SD or HD video clip.

If the video clip is of an unsupported format, it must be imported and transcoded using the Media Importer, but resolution does not matter. Click on the Plus button
under the player or just double click in an unused portion of the players playlist to add media. This launches the media browser.

b) The Media Browser

The Media Browser give access to all media loaded on the TriCaster. This includes any media from other sessions and the default media. Notice on the left side of the requestor are media types, including clips, stills, titles, and audio.

In each media type, there are session names. Clicking on a session name will reveal all the media of that type loaded for that session. You can use media from any loaded session in any session, so there is no need to double load content if you are using it in more than one production.

The DDR can play high definition and standard definition clips in the same session. Just import the clips with the Media Importer on the Session page before entering the live desktop and you know they will work.

c) Loading the Graphics Players

The TriCaster Professional Line also features graphics players. In the 410 and 460 there is one, and it is called GFX. In the 860 and 8000 there are two, and there are called GFX 1 and 2. A graphics player cannot play a video clip.

There are fewer media types listed in the Media Browser for a Graphics player than for the DDR. The Media Browser is smart enough to know what type of player you are loading and what types of media it can accept. It only shows media that can be played in that type of media player.

You can multi-select things for import in several ways. Windows keyboard qualifiers work. Click on a clip, then hold shift and click on another clip, and everything in between is selected. You can hold down Ctrl and click on individual clips to select them. If you hold Ctrl and select a few items, all media players remember the order in which you clicked them and load them into the player in that order.

You can also browse for content that has not been loaded into a session. Press the Add button and press Add New Media Location. Now, you can navigate to the directory of content and add it to the browser. Let’s say you have a folder of video clips on one of the media drives or on an external eSATA drive. They are on a media drive so it is OK to playback from them. Simply navigate to the folder and click OK. This folder is now available in the media browser to any session even though none of the content was actually imported into the session you are using.

Some clips might not play without conversion. If loaded clips have issues playing, you may need to import them using the media importer. To load a file that has not been imported, browse to it. Click Browse and go find the file.
It is possible to look at content from external USB drives. Do not try to load and play video clips from external USB drives. It will not be fast enough and video playback will with stutter.

d) Importing a Clip During a Show

If you forgot to load a clip or the content was not available until after the show started, there are workarounds.

One way is to share your media drives on the network. This feature is activated from the *File* pulldown menu. Once you share media drives and buffers, all folders containing media or buffers will be available when clicking on that TriCaster on the network. Now, media can be added to a folder during a show.

This media can then be loaded and used by the operator, but don’t overtax the drives. If you are already recording two streams and playing back two streams from a drive, copying more media to it can cause performance issues. Try to copy media onto drives that are not being accessed, if possible.

You also have an eSATA port on the back, allowing new content to be added during a show. Know that plugging in a drive during a live show can cause dropped frames. It is best to attach a drive during a still if possible when dropped frames will not be seen.

You can also add media from external drives to a media drive on the TriCaster. Press *Add* and browse to a USB drive with a video clip you want to use. Right click on the clip and choose *Copy*. Navigate to your media drive and paste the clip.

If no content has been imported, there is no import folder. Make one by right clicking and choosing *New/Folder*. It should be named *Import*. Then, paste the clip into this folder. After the copy is complete, select the clip and press *Open*. The clip appears in the DDR. This clip is also now available through the *Media Browser* in the clip’s *Session Name* area and it has the drive speed it needs to play. Accessing clips this way is a work around and should be avoided if possible.

Attaching a USB drive during a live production can cause frames to be dropped from the main production, so be aware and be careful when attaching drives. Importing media this way allows clips that might not playback properly to be loaded. These clips would have been transcoded on import through the *Media Importer*. Make sure if you are ever going to load a clip this way that you have tested the file format and resolution and you know it will playback correctly.

e) Configuring Title Templates

The TriCaster comes with a wide variety of title templates. These are professional graphics you can easily modify to use in your productions.

One way to quickly find templates is to use the Filter. At the top of the requestor, there is a filter text string. If you type *Helix* in the filter text string, for example,
only the graphics with the word Helix in the title show up. This is a great way for you to organize and quickly find any graphics, title or video clip.

To customize titles in the TriCaster, mouse over the template you wish to edit. Click on the gear in the lower right corner of the icon to open the Edit panel. This panel can be sized and positioned. Click on the text to start editing. Replace the stand-in text with your text.

You can select a font and size the text interactively by dragging on the side. You can also stylize the text with bold, italic, underline and all caps. There is a Restore Defaults button to undo any changes you made, and there are previous and next buttons to get you to the previous or next template in that media player.

If there is a stand in image, this can be replaced by clicking on it and selecting a new image. The image should be of the same aspect ratio as the stand in. There are some modifications that can be made by right clicking the image, but for best results, try to replace images with images of the same aspect ratio or proportions.

When the template is ready to use, you can either close the Edit panel, or, if you want to continue to make new graphics in the same style, there is a Save And Duplicate button. This saves your changes and makes a new copy to start modifying for the next graphic.

f) Organizing the Content

Once you have all your clips, stills, and titles loaded, you can organize them. Left click on any clip and drag it to where you want it to be in the playlist. You can multi-select here too. You can drag out a box to select every clip inside its boundaries. You can also drag media from one player to another. If the player supports that media type, it is ready for use in the new player.

For example, if you drag a still from GFX 1 into a DDR, that will work fine. If that player does not support that media type, such as dragging a video clip from the DDR into the GFX player, that clip becomes ghosted and is not available in that player. You can also right click on a clip and copy it, then paste it to another player but the same rules apply.

g) Presets

Each media player has a selection of presets available. These are a great way to organize content. Presets are accessed on the left or right side of the media player. Left side media player’s presets are on the left and right side are on the right. Select a new preset and you get a whole new bin to populate.

Each media player has 12 presets that act like instant playlists allowing you to change out all of the media in a player in one click. If you have problems selecting the presets for right side media players because the mouse is travelling to the
secondary multiviewer, you can lock the mouse to the primary monitor to stop this problem. This is found in the Options Menu.

It is possible to play out of one preset while working on another. Play a clip in DDR 1 and loop it. Now go to the next preset. Notice the Play symbol is visible on preset 1 telling you there is content playing out of the preset currently. In preset 2, you can load and arrange clips without effecting the playout on preset 1. If you double click on a piece of content in the currently selected preset, it takes over the channel and begins to play.

h) Cueing clips in a Player

When working with the DDR, a clip outlined in white is selected. When a clip is queued up for playback, it has a blue highlight on its title. It is possible to select a clip in a bin while another is playing. This could be to move it or delete it while the other clip is playing. When you click on a clip, it gets a white outline and then a blue highlight. The clip is not actually cued until the blue highlight appears.

i) Loading Animated Buffers

The Professional Line of TriCasters includes a new type of media player called the Animated Buffer. This type of frame buffer is only available in the TriCaster 460, 860 and 8000, not in the 410.

The buffers now have a tab like other media players. Different TriCasters have different numbers of Animated Buffers. The 460 and 860 both have five and the 8000 has ten. Animated frame buffers can hold anim buffer files, stills and title templates. An anim buffer file is a video clip or sequence of images merged into a file for the Frame buffer animation using Animation Store Creator.

To load content into a buffer, mouse over a buffer and left click. This opens the buffer palette for that buffer. Each buffer has nine presets to fill with whatever you want. Each preset has a small plus in the upper right corner when the mouse is over it. Click the Plus to open the load requestor.

Animated buffers allow you to load Frame Buffer Animations, Stills and Title Templates. Still buffers only allow Stills and Title Templates. Then, that content can quickly be accessed within that buffer using the palette. Once loaded, buffers can be used in any DSK, Keyer, or on any video mixer directly. Their use in live production is discussed in a different video in this series.

j) Switcher Memory

Each Animated buffer and full color transition you load takes up switcher memory. This can be monitored on the dashboard. As you approach the limit, an indicator line will turn yellow, and finally red. Stay out of the red zone. To reduce the amount of switcher memory currently used, unload some unused buffers by
selecting a blank preset or unload full color effects from any of the switchers, DSK’s or the M/E’s keyers.

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You must leave the live production environment to create new LiveText projects and Title pages, so you'll want to have all the Title pages ready before your live event begins.

It is possible to run LiveText on a networked computer and bring Title pages in to the TriCaster via a Network input. This method gives you much more flexibility with what page elements can be edited during a live production.

a) Types of Graphics (0:20)
   1. Pre-made Background Element
   2. Credit Roll
   3. Lower Third with a Graphic Separator and Image

b) Creating Graphics (0:50)

   On the Session page icon ring, click on the Graphics button.
Creating texts, titles and graphics with this LiveText version must be done outside of the Live Desktop. It cannot be used during a live show. Another version of LiveText is available as a stand-alone add-on that runs on an external PC. This method can be used during a live production. The difference between the two is the external version has a *Live Output* window in the upper right hand corner of the interface.

LiveText projects that are created are associated with the current session and get backed up with the session. They are available if the session is restored to another drive.

Always give a LiveText project a name so it’s easily identifiable for later use.

c) **LiveText Interface**

The five basic areas of the LiveText Interface:

1. Text and Drawing Tools
2. Main Edit Window
3. Project Pages
4. Motion Controls
5. Bottom Tabs

d) **Text and Drawing** Tabs

A specific True-Type font style can be loaded or added into Windows and made available in LiveText.

The *Text and Drawing* tab allows locking the aspect ratio which maintains the text sizes on both the X and Y axis. During scrolling or crawling pages, text items can be selected and made to hold during motion to lock them. Holding down *Ctrl* and dragging out a line creates a perfectly straight line.

e) **Style** Tab

The *Styles* tabs contains pre-made looks that be applies to lines, texts or any shapes. Custom styles can be created and added to the *Styles* bin.

f) **Color** Tab

The *Color* tab contains options such as Color or Gradient.

g) **Filebin** Tab

The *Filebin* allows access to images on the drives. Access the image through the *Filebin* and drag it into the *Edit* window. Images can be brought in with alpha to be used as a pre-made background.
h) **Layers Tab** (6:50)

The *Layers* window allows adjustment of the elements in the *Edit* window. The arrow keys can be used for precise adjustment of elements in the *Edit* window.

i) **Alignment Tools** (8:10)

The *Alignment* tool allows for positioning of elements. The *Grouping* tool allows for easier manipulation of several layers at one time.

j) **Pages Area** (8:35)

The *Pages* area allows for working with several graphics within a project. Access to the Title Templates is found here.

k) **Adding Text Files** (9:10)

Create a text file outside of the TriCaster and save it to a USB drive. Attach the USB drive to the TriCaster. Go to the *File* pull down menu at the top left of the screen. Click on *Add Files*. Navigate to and select the text file. In the *File Type* requester box, change to all files (*.*). Choose text alignment and click *OK*. Once imported the size and style the text can be altered.

Click on the desired arrow and speed under *Motion Type* to give the text movement.

l) **Saving LiveText Projects** (12:15)

Saving project as a *.cgxml* allows for modification during a live production.

Add all text that you want to be editable in LiveText. Text brought in with a background image will not be editable.

Saving a project as a *.cgxml* allows a page to be loaded back into any other LiveText project.

Save projects frequently in case of power outages.

Pages can be sent separately or all together to the Live Desktop. When sending pages to the live desktop, you usually want to choose the *Title Page* option, rather than *Still Image* so that you can edit the pages in the live environment.

Once exported, the still graphics will be available as title templates in the *Media Browser* under titles with that session name.

If the image does not highlight when moused-over (there should be a red line around the image) within the *Title Template* Editor, try *Shift*-clicking on it to make it editable (the red lines turns green).

Notes: _____________________________________________
9: Network Inputs

The TriCaster Professional Line features network inputs. These inputs bring in a variety of video sources across the network. The Professional Line also adds the ability to bring in network video sources, like IP cameras or video streamed from the web. Network inputs can also be used with 3rd party to add 2D and 3D broadcast motion graphics to the TriCaster as well as other functionality.

a) Attaching to a Network

Make sure the TriCaster and the external computer are on the same network. A gigabit network is recommended and is considered mandatory in an HD session. If you need to add your TriCaster to a specific network or to a specific domain, go to the Administration page to access the windows networking controls from the Network button.

The easiest way to connect a laptop to the TriCaster is to just plug a standard Ethernet cable into the laptop and directly into the TriCaster. This will form a network connection between these two systems. You could also take a wireless hub with an internet connection, attach it to the TriCaster with a wire and then log other devices onto the wireless network. This is how the TriCaster can use iDevices with Apple airplay.
b) What is iVGA

The TriCaster comes with some client software called iVGA. This allows the display of an external computer to be brought in to the TriCaster’s video mixer via a network input. Standard iVGA is available in a Windows version. There are two Mac versions, one for Mac OS 10.5 or before and one for Mac OS 10.6 or later.

The iVGA software is available on the TriCaster itself. Go to the admin page, click on Files on Disk; this opens a Windows explorer. Then go to C:/TriCaster/Extras/iVGA. This software is also available on the NewTek website under the Support tab in the Updates and Downloads section. These online versions may be more up to date than what ships on the TriCaster. You can run iVGA right from a thumb drive on an external Windows computer without installing anything.

c) iVGA on a MAC

On a Mac, decompress the zip file and drag iVGA into the applications folder. Also, put iVGA on the dock. To start iVGA, click on its icon in the dock. A message appears on the Mac that iVGA is ready and listening.

Now, on the TriCaster, open a network input source list directly under a network input and select the Mac from the list. Pay attention to the names of the computers on the network to know what is what. Also make sure things have unique names so there are no conflicts. The Mac interface now shows up and is ready for use in the network input.

Right clicking on the iVGA icon in the dock causes some options to appear. Privacy Mode puts a graphic in place of the Mac’s display allowing the Mac to do things unseen by the TriCaster. Returning to Normal mode brings back the computers display. If there are two displays connected to the Mac, you can choose which display to send to the TriCaster. There are some options for launching on login and where you can find the iVGA icon either on the dock or in the finder. Quitting iVGA on the Mac will stop the display from being sent.

d) Using iVGA with Windows

The Windows-based machines have a more powerful version of iVGA available called iVGA Pro. To start iVGA or iVGA Pro, click on its icon. A security warning may appear. You can permanently disable this warning by unchecking the Always Ask Before Opening This File option, if you choose. Click Run. The screen will flash and a menu and a marquee appear.

On a Windows-based computer, a setup requestor appears. You can choose what TriCaster on the network and which of its network inputs to send your screen to. When the TriCaster operator then selects the feed, you are prompted on the external computer as to whether or not to send the screen. Once sending, any time
you click on the antenna icon in the tray, the iVGA setup requestor appears and you can stop sending.

When set to Region, a marquee is used to define an area. Grab the border on the marquee to size it. To position it, use the crosshairs in the center of the marquee. The marquee only indicates what region is visible to the TriCaster. The area outside the marquee is still functional. When set to Window, you can use the gadget to select a specific window to send and record. If the window is resized, the network input updates to show it.

You can choose between primary or, if available, secondary displays to send the entire display to the Network input. You can then choose the audio source. There are options to show the marquee and hide the mouse cursor when sending and recording the display.

When all is configured, press Send. A small antenna icon appears in the icon tray in the lower right corner of the windows desktop. You can right click on this icon to get some options.

e) Recording on the Local Machine

There is a Record Selection option allowing you to start recording manually, even if iVGA is not sending anything out to a TriCaster. This is great for screen capture of software for training.

Pushing the Record button opens the Save As requestor. From here, you can navigate to the destination for your recording, and choose what type of file to save. Recordings can be saved as AVI, MPEG-2, or Quicktime files. As soon as you click the Save button, recording begins. To stop the recording, bring up the iVGA Pro panel by clicking on the antenna icon, and pressing Stop.

The next menu item on the right-click menu is Privacy. This prohibits the TriCaster from seeing your screen. Then there is an About box and an Exit command which shuts down iVGA Pro.

f) External LiveText

There is an external version of LiveText which can be purchased separately and runs on an external Windows-based machine. If this is running and attached to the same network as the TriCaster, you can send its output into the network input with transparency. This means you can create and modify titles and graphics on the fly externally from the TriCaster, but feed it live.

LiveText allows for full page graphics, overlay graphics and motion graphics like scrolls and crawls. The main difference between the internal and external versions is that the external version has the Live window. Whatever is displayed in this live window is what is being sent to the TriCaster’s network input.
To populate the Live window, select a CG page and click the *Live* button. If the page selected is a motion page, transport controls to play, pause, and stop appear under the Live window. There are also buttons to get to the next and previous pages of the current CG project.

g) Data Link (9:35)

The external version also includes DataLink allowing you to update your graphics from an external source. Attach your graphics to scoreboard systems for real-time score and time updates. You can connect your graphics to SQL databases or even text files to dynamically update the graphics. Even bring in an RSS feed of data from the internet in real-time.

h) Seeing Other NewTek Systems (10:10)

Network inputs can also be used as a way to see the output of other NewTek systems. 3Play, the NewTek Instant Replay and Slow Motion system, and all Professional Line TriCaster systems can send the output of that system across the Network to another TriCaster.

If there is another TriCaster or 3Play system connected to the same network as this TriCaster, they can send their output with audio to one of the network inputs. This output is configurable in the *Output Configuration* panel. This allows the set up of a secondary production, say an interview area away from the main stage, and feed it to the main production.

To turn this feature on, go to the *Output Configuration* panel. Clicking the *Network* box starts the output, and it can be configured as to what is going out.

i) Using Network Video Sources (10:55)

The Professional Line of TriCasters also allows network video sources and protocols such as RTSP, RTMP, IP cameras, and live streams on the web or files from an FTP to be viewed across the web. To use this type of source, add it to the network input using the *Add Network Video* option. This reveals a requestor.

Here you can type in an address for your content. You can also give this connection a name. Once established, this connection remains in the source list and can be used at anytime.

Notice that mousing over the name in the source list reveals some gadgets. The gear opens the configuration panel for that stream and the *X* removes it from the list.

Viewing the network output externally from a TriCaster is also possible. In the *Output Configuration* panel next to the network output is an address. This address can be used in VLC Player on a computer on the same network.
Use LiveMatte to remove a background color from a video source and an M/E to layer this key within other layers or merge it into a virtual set.

a) What is a Key? (0:40)

Keying an input removes a background color and replaces it with another video source. The TriCaster does this with LiveMatte, and every input on the switcher has its own LiveMatte with independent controls. Removing the background for replacement is referred to as “pulling a key”.

b) The Best Video for Keying (1:10)

Make sure to use the best video resolution and format from the camera you can. High definition will always look better and pull a better key than standard definition. Many cameras will output several formats including composite in standard definition and component video in standard and high definition. For this TriCaster the best video format is SDI, then component, then Y/C and then composite. Manually white balance the camera. Turn off Auto White Balance (AWB), Auto Gain Control (AGC), and Auto Focus (AF) and control these things manually if possible.

c) The Environment (1:50)

Make sure the on-camera talent is not wearing the background color. Even eye color can be an issue.
LiveMatte can key any color. The most common colors to use are chroma green or chroma blue. These colors are used because they are the farthest away from skin tones.

Backgrounds can be painted walls, colored cloth hung on a rack, or a popup color screen. Wrinkles, creases and folds can all cause shadows on the backdrop and this is not desirable. There is also chroma paint available for a wall in your studio. It is recommended you use “Chroma Paint,” not just any green or blue. Chroma paint has more saturated color and works better.

Pop up green screens are available at most photography stores. If you are using a green screen, then make sure the talent is not wearing any green of any shade.

d) Lighting the Key

Lighting is important when trying to pull a good key. The trick here is even light on the backdrop. Even light is better than bright light. You want soft light on the backdrop to avoid hotspots. The best situation is to light the backdrop separately from the talent.

Move the talent away from the backdrop to avoid shadows from the lights on the talent. Light the talent avoiding shadows on the backdrop.

In some situations, you have to light the backdrop and the talent with the same lights. The same rules apply. Shine even light on backdrop and the talent. Try to avoid shadows.

e) Pull a Key

To access Live Matte, open the Input Configuration panel for the input you are using as the source. Click on the LiveMatte tab. Here you see controls for Live Matte on the top and Hotspot controls on the bottom.

Pick the color you wish to remove. Left click on the eye dropper and hold the mouse button down. Now, drag the cursor over the background. Notice you can see the color swatch changing as you drag over colors on the interface. When you are over the green let go to select it. The LiveMatte will turn itself on and the green will disappear.

By default the input has a black background and this may not be the best for setting up a key, especially if the talent is wearing black. Right click on the monitor for the green screen source, mouse over the overlay area of the menu, and select Checkerboard. Now as the green is removed, you see a checkerboard pattern behind the talent. This makes it easier to see transparency and edges on the object being keyed.

To see a bigger version of the video, change the preview monitor to the green screen source. Notice the monitor is now labeled as the source input. Right click again and turn on Checkerboard. This gives you a larger version of the source.
being keyed. You can also right click and use additional overlay options. *Show Alpha* shows the black and white alpha channel making it easier to pull a clean key.

f) Adjusting the Key

Go back to the LiveMatte controls for the source input by clicking the gear on its monitor. The two controls under the color picker allow you to adjust the key.

Tolerance adjusts the range of the color picked to be removed. More tolerance removes a wider range of green hues. Smoothing tries to smooth the edges of the key.

Start out by setting both *Tolerance* and *Smoothing* to 0. Start with *Tolerance* and remove the background. Now bring up *Smoothing* to smooth the edges of the talent. This may bring back some of the background. Add more *Tolerance*. Go back and forth with these to controls and dial in the key. Also have the talent move and turn left and right as these moves might change the lighting and affect the key.

g) Using Edges

There may be times where the entire background is not filled with the key color or maybe there are other items in the shot that need to be removed. Each input configuration panel also includes an Edges control area.

The *Edges* controls are found under the *Inputs Settings* tab. The *Edges* controls draw a hard line in from left, right, top, or bottom and remove anything from the input outside of the edge line. This is a great feature if you are working in confined spaces or with small green screens.

Once an input has been keyed, you can see this right on the interface. Notice the input monitor has a green line under it. This indicates LiveMatte is in use. A blue line indicates edges is in use. There is also a yellow line indicating that the proc amp is active.

The 8000 has an additional edge control labeled *Feather*. This adds a softness to the edge line.
What is a Mix Effect bus or M/E? It can be used as one of two things. Either as a second production switcher or as a multi-layered effect, like a virtual set. All Professional Line TriCasters include M/E’s.

a) Setup Tabs

The M/Es setup tabs can be hidden or revealed using the control on the user interface. The setup area for each M/E is revealed by clicking the tabs for each M/E. Clicking on these tabs reveals the setup area for that M/E. Each is color coded with a border around the M/E controls separating them from the main switcher controls.

The 2U systems have four M/E’s; 4U systems have eight M/E’s.

b) Delegating on the CS

The Control Surfaces have areas above the main switcher controls designed to use with the M/E’s. On the Control Surface, you can delegate which M/E you are controlling. Delegation buttons are labeled M/E. Delegate an M/E on the Control Surface and those controls are controlling that M/E, regardless of what is displayed on the interface.

c) M/E Tab Options

In the Options menu are options for Tabs Follow Preview for M/Es. With this item checked, any M/E selected on the Preview bus, either on the user interface or on the Control Surface, reveals the tab and displays the set-up area for that M/E.

This does not affect what M/E is delegated on the Control Surface. Meaning, you can select an M/E on preview, its tab will open, but the Control Surface can still be delegated to control another M/E.
The button on the Control Surface labeled *Follow PVW* causes an M/E to become the currently delegated M/E on the Control Surface when that M/E is selected on the Preview row of the main switcher. This means if I put an M/E on Preview and want to make a change, the M/E controls on the Control Surface match what is on Preview.

On the Options menu, is the *Tabs Follow All Delegates* option. This has to do with the Control Surface. This option is only visible when a Control Surface is attached. If *Tabs Follow All Delegates* is on, then any delegate selected on the Control Surface opens the corresponding tab in the user interface.

This works if you delegate media players, too. This is a great way to always know you are adjusting the right M/E. You can also hide and reveal the M/E setup tabs by holding *Ctrl* and pressing any M/E delegate button.

d) **Use as a Mixer**

One way to use a Mix/Effects bus is to use it as a mixer. This is just like the production switcher and has all of the same capabilities. It can be sent out its own independent output. Configuring an M/E to be a mixer is selected within the M/E’s setup tab at the end of the switcher rows.

When using the 8000, an M/E’s output can be re-entered into another M/E. This is why all M/E’s show up as channels on the bus rows on any M/E on an 8000. It is a switcher inside of the switcher allowing for the production of two separate shows.

When the operator presses the *Auto* button on the main switcher the transition shows on Program Out. Press the *Auto* button on the M/E’s switcher and the transition shows on the output of M/E 1’s monitor.

The hundred series TriCasters have one keyer attached to every M/E, and the 8000 has 4 keyers per M/E. The source for the M/E keyer is set with a drop down. The overlay is attached to the M/E and does not appear on any other switcher channel. The keyer also has a Positioner to scale and position the overlay.

e) **Use as an Effect**

An M/E can be used as an effect, such as a multi-layered video composition or a virtual set. All TriCasters support two-layer effects, except the 8000 which supports four. The layers are labeled *A* and *B* (and *C* and *D* the 8000). *A* is the foreground and *B* is the background.

Any layer in any M/E has the ability to be positioned, scaled, cropped or rotated. At the left end of each bus row is a positioner icon. Click this icon for *Layer A* to set *Layer A*’s position, scale, or crop.
Shotbox presets can be setup to create camera motion just like in the virtual sets. You may want to start out close and zoom out to a wide shot to introduce the shot.

The keyer is still available in the effect mode allowing for an overlay that is locked to the effect. This also has a positioner for manipulating the overlay. The keyer is not affected by the zooming of the virtual camera within the effect.

f) Single Angle of a Virtual Set

The TriCaster comes with a variety of sets available for immediate use. To load a virtual set or effect, click on the plus sign next to the title of the current effect. Navigate to the set you want to load and click OK.

Choose the source you want for each layer on the A and B rows. To selected the C and D rows on an 8000 Control Surface, use the row delegation buttons at the right end of each row. When using the Default A Over B set, the source in row A is over the source in row B.

g) Shotbox

You have the ability to setup virtual camera positions and transition between them using the Shotbox. Shotbox presets are visible in the M/E setup area on 2U systems and on 4U systems they are accessed using the palette. Click on the presets to see their effect. You can change the speed of the camera move using a preset speed or scrub in a custom speed. Setting the speed to Cut removes the transition time.

You can create your own custom camera presets in the Shotbox. To open the Shotbox editor, click on the gear in the upper right corner of any preset. The editor shows a large preview and all of the available presets to be set up. Clicking on the presets snaps to those presets, but has no effect on output. Click on the Preview button. Now, presets are shown in real-time on output and clicking from one preset to another shows the transition. This makes it much easier to setup.

To set up a preset, mouse over the preview window. Right click and hold and push the mouse forward to zoom in. Left click and drag to position. Using a system like this to set up your shotbox makes it easy to navigate any set with the virtual camera. Now click on the presets you made to see them in action.

You don’t have to let one transition be complete before selecting another preset. This can create some interesting camera moves. Start zooming on your talent close up shot and then halfway through select a different shot for a simulated jib shot.

There are four or eight shotbox preset buttons to use depending on your Control Surface. If you have only four buttons, you can access presets 5 through 8 using the Shift key as a qualifier.
h) Multiple Camera Angles

Many of the virtual sets that come with the TriCaster have multiple camera angles to work with. Each camera angle requires its own camera input from the appropriate angle.

During a production you may want to keep what’s on the on-set monitor consistent. This can be done using color grouping. Each layer had a color selection available. Make a layer a color from the dropdown menu. Set other layers of other M/Es to the same group. Now, changing the input on any layer in the color group changes all color-grouped layers.

i) Presets

Each M/E has five presets available. This is like five M/E’s in one. Each preset can have its own effect.

j) Holographic Sets

Holographic sets are different in that they are created from a panoramic image. You can rotate and zoom all throughout this photoreal environment.

Use the shotbox preset editor in the same way as regular virtual sets. Turn on Preview and drag around in the editor to see the set from all angles on output. Set up preset camera positions by zooming and rotating the camera. Right click and push or pull to zoom; left click and drag to move.

The TriCaster comes with two holographic set pre-made, and you can make your own with Virtual Set Editor. This add-on allows you to create all types of custom TriCaster sets and effects using your branding and artwork. These types of sets also support masking images allowing the talent to be behind object and even walk out from behind them.

k) Picture in Picture Effects

Another type of effect available is a double box effect. There are many layouts available including simple split screens. There are also some utility effect available.

l) 8000 Advantages

M/E’s in an 8000 support up to four layers as do the virtual sets. The Metropolis LiveSet supports three live talent shots from three separate cameras and the fourth layer is the background motion graphics. The shotbox can be configured to travel throughout the set.

We know color groups can keep the content on the on-set monitors the same, but in an 8000 there is another way. You can use an M/E as a mixer and re enter its output into another M/E. Notice the bus rows in the M/E. They include all the
M/E’s as source selections. This is not so on other professional Line TriCasters as re-entry in this fashion is only available on the 8000.

Each M/E in an 8000 has four keyers for layering graphics on that M/E’s output. You can use transitions for the mixer or any of the M/E by using the palette to select or load whatever you want.

One last workflow enhancement possible on an 8000 is to use the configurable Multiview monitors to set up Preview and Program monitors for the M/E mixer. Right click on a monitor and select Output/ M/E Follow. This is now Program Out of the currently delegated M/E. Go to another monitor, right click, and select Output/ M/E Preview to create a preview monitor. Now you see exactly what will happen on the on-set monitor when the M/E is used as a mixer.

Double box effects are great for two-layer effects but with four layers, you can do more. Zooming on the M/E in the small box allows for positioning in this effect. Go to a close-up on M/E 1, 2 and 3. The background has a default still if using an empty input but any input can be used for full motion background. And, you still have the four keyers.

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The TriCaster Professional Line allows you to record a sequence of events while using the system and then play that series of events back in real time or at different speeds.

a) The Macro menu

The Macro menu is located in the dashboard. Switcher Reset is a system macro that comes pre-loaded on the machine. This takes the switcher back to the default state. There is an option to Stop All Macros. There is also an option to Configure Macros. Clicking on this launches the Macro Configuration editor.

b) The Macro Configuration Panel

This panel breaks down into four areas:

1. The macro creation, folder creation, and edit tools
2. The Macro list
3. The shortcut linker
4. The speed/transport controls

There is always a System Macros folder in the Macros list.
Any folder of macros can be turned on or off using the check marks. Open it with the small arrow. Now, you can scroll through the macros and view their keyboard shortcuts. These are the default keyboard shortcuts for the system and you can edit them.

Any Macro can be turned on and off with the check marks. Close the system macros folder by clicking the small arrow to hide them.

c) Making Folders and Macros

A new Macro always needs to be created in a new folder. To do this, press the +folder button. Type in a name for the folder. Create a new macro in the folder by pressing the +Macro button and give the macro a name. When a new macro is created, the shortcut and transport controls become active.

d) Recording a Macro

Before you start recording a macro, make sure you know exactly what it is you want it to do. When creating more complex macros you should write down the steps you need before trying to record them. Position the panel so you can see the auto buttons you need to push.

When you’re ready to record the specific actions you want in the macro, press the Record button, then actuate the controls to be recorded. When you’re done, press the Stop button for the macro.

Pressing the Play button in the macro editor now executes this macro in real time. You should see the actions you recorded happening in the TriCaster.

e) Adjusting Playback Speed

You can adjust the speed at which a macro runs. Macros can be slowed down or sped up from real-time. To make a macro run as quickly as possible, set the Speed control to Snapshot. This runs all events in a sequence at one time.

Notice the Loop control is ghosted when the speed is set to Snapshot. When running any speed other than Snapshot, the Loop option becomes available. Press Play in the macro editor to see the effect.

f) Setting up a Shortcut

Setting up keyboard shortcuts for macros can be done on the keyboard, on the control surface, or on an external MIDI device.

To create the shortcut, click in the Shortcut field. The panel is now listening for key strokes. Press the desired key or key with qualifier (Ctrl, Alt, Shift) on the keyboard. Now, by pressing the selected key, the recorded macro executes no matter what the state of the user interface or Control Surface.
Sometimes when the mouse is still in the Macro Configuration editor, a keyboard shortcut may not trigger a macro. Try clicking outside of the macros panel and trying the key shortcut again.

g) Fixing Shortcut Conflicts (8:50)

If you try to set a keyboard shortcut that is already in use, a conflict occurs. When a key is already in use by another macro, it is listed in red. There are a few things you can do to resolve this conflict. You could just pick another unused shortcut key. Or you can find the macro conflicting with yours and turn it off. This removes the conflict but also removes that system macro, so be careful.

Because system macros represent the keyboard shortcuts available on the system, this means you can modify any keyboard shortcut anyway you would like.

h) Mapping a Macro to the CS (10:05)

To map a macro shortcut to the Control surface, click on the macro and click on the Shortcut area to start listening. Hold down the Macro button on the Control Surface and all the lights go out. Continue holding the Macro button and press the desired key on the Control Surface. Then release the Macro button.

The Macro button must be used when setting up or executing macros to be triggered by the Control Surface. Now to execute the macro, hold down the Macro button on the Control Surface and all lights go out except buttons with macro mapped to them. Notice the button chosen for the shortcut is lit. Continue holding the Macro button press the shortcut button to execute the macro.

i) Mapping to a MIDI Device (11:20)

The Professional Line of TriCasters can use external MIDI devices to trigger macros. This external device could be a USB connected MIDI pad or even a wireless tablet running a MIDI app. The MIDI support only works for button pushes, not sliders or knobs.

To map a macro to a connected MIDI controller, select the macro and click in the Shortcut field. The system is listening. Now, press a button on the MIDI device. Now, press it again and the macro runs. This gives you a whole new keypad to set your macros up on.

An iPad can be used with a MIDI application called Touch OSC. For more on connecting your iPad to the same network as the TriCaster refer to the Network Input training video. Touch OSC allows you to create interfaces for the iPad on the PC, then export them to the iPad for configuration with macros. You can even use multiple devices wired or wireless on the same machine expanding your production team.
j) Recording a Sequence of Steps (13:10)

A sequence of events can also be set up to run in real time. This is useful when you want certain states of the machine (such as a lower third being visible on Program) to last a specific length of time, then change. The speed at which the macro can be adjusted using the speed control menu.

k) Editing a Macro (17:05)

Click on the macro to be edited and click the Edit button. The macro is displayed as a spreadsheet. The left column shows the delay between steps and the actions are shown to the right.

To remove dead space in a macro, remove any delays by changing the Delay value to 0. The delays are displayed in milliseconds, so 1000 is 1 sec. Simply select numbers and delete them or enter 0. Then press Apply and close the edit panel. Now the macro ignores any delay that occurred before pressing the desired action.

l) Setting Up Content (19:05)

Macros can also be used to set up content in media players and source selection in the DSKs. For example, you can put a specific video clip in a DDR and set a DSK to use it with one keystroke. A macro can select the DDR 1 tab, then select a specific preset for that DDR with a motion graphic in it. The same macro can set up the DSK to use that DDR as its source and the effect is ready.

m) Creating a Favorites List (22:25)

There is a star next to each shortcut on the Macros list. Clicking on this star adds this macro to the Favorites list. Click on the stars next to a few macros. Now, close the Macro panel and click on the Macro menu to open it. The checked macros are listed here and you can click on them to run them. This is also a great way to quickly review the keyboard shortcuts without having to enter the Macro Configuration Editor.

n) Running a Macro inside Macro (23:20)

Macros are super powerful and can become quite complex. You can even call a macro from within a macro. To do this, start recording a macro and record a few actions. Now, press the keyboard shortcut for another macro. This macro’s actions are now part of the macro you are currently recording. Stop recording.

Now, when you run the new macro, you are running a macro within a macro. You can see the progress of the macros as they run.

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Hotspots are an interactive way for the on-camera talent to be able to trigger macros. They work based on changes to the alpha channel of the selected source, so you must use a keyed source for hotspots to work.

a) Interface Set-up for Hotspots

Setting up hotspots is easier if you make the monitor for that source as big as possible. On hundred series TriCasters, you can use the workspace pulldown to select a layout that gives the biggest view of the hotspot source.

On an 8000, you can change the large preview monitor into a monitor for the source using hotspots. Now right click on that window and select Overlay—>Hotspot Markers.

b) Setting up Hotspots

Double click on the hotspot source monitor to launch its configuration panel. Go to the LiveMatte tab. Turn on LiveMatte and key out most of the background of the source.

At the bottom of the Configuration panel is the Hotspots area. All Hotspots can be turned on and off with the button next to the number. When you turn on a Hotspot by clicking it, it highlights in the source monitor. If anything passes in front of that hotspot now, the alpha channel will be affected, and this triggers any macro assigned to that Hotspot.

It is usually necessary to size and position the Hotspots. To do this, open the Hotspot panel and use the Arrow icon to move it around the screen. Use the Magnifying Glass icon to scale the Hotspot. Position it in a place convenient for the on-screen talent to pass in front of it. Now, when the talent does this, the Hotspot changes from an outline to solid. This tells you it is working.
c) Setting Up Event Triggers

Now you can attach a macro to the Hotspot using the E (for Event) button next to the Hotspot controls. Open the Configuration panel for the Hotspot source. Click on the E button for the Hotspot you’ve set up.

You can apply two macros to each movement. On Screen macros are triggered when the Hotspot is covered. Off Screen macros run when the Hotspot is uncovered or the talent is removed.

Use the On Screen popup and mouse over system commands. Now scroll down. Find DDR 2 Play and select it. Then close the Event requestor. Make sure Single is on, Loop is on and Autoplay is off for DDR 2. Click on the DDR 2 Stop button twice to make sure the clip is reset. Now have the talent move their hand over the active Hotspot. When they do, the video in DDR 2 starts playing.

d) Hotspot Menu Options

There are two important options relating to Hotspots.

In the Options menu, there is an option to Disable All Hotspots. If this is on, they don’t work. There is also an option for Disable Hotspots for Sources Not On Output. This means if the on camera talent that is using the Hotspots is switched away from and is no long on Program Out, then the Hotspots for that input are disabled until that source is used on Program Out in some way.

e) 8000 Enhancements

It can be helpful to show the on screen talent where the Hotspots are in the frame. On a 8000 only, you can set up any monitor to show any input or output. You could set up the secondary multiviewer as a single monitor. Go to the Dashboard, go to Workspace, go to D under Multiview. Open Workspace and go to Load Default for the Multiview and choose Fullscreen.

The mouse can be moved to the second multiviewer as long as it is not locked to the primary monitor. Right click on the full-screen monitor and select the source with Hotspots turned on. Now, right click and select Overlay—>Hotspot Markers.

This view can be very useful for the on camera talent to know where the Hotspots are, but it will appear backwards to them. To solve this issue, right click on this monitor again and choose Overlays—>Flip Horizontally. Now, it’s easy for the on camera talent to see the Hotspots and interact with them. You can leave this setup on preset D and use the workspace to change this back to a multiviewer at anytime.

f) Importing and Exporting Macros

You can also import and export macros for use in other systems. Open the Macro Configuration panel. Right click on the folder to be exported. Choose Export and
give it a name. Click the Save button. This saves to the local hard drive. Now right click on your folder and choose Delete and confirm the deletion. It disappears. Now, right click in an unused area and choose Import. Choose the file you saved, and the macros are back. These macros could also be saved to a thumb drive and loaded onto a different TriCaster, but all the content needs to be in the same directory structure on the external TriCaster for the macros to work correctly.

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Audio is an often overlooked, yet critical part of a live production. It's a good idea to plan out your audio workflow before the production starts so you have a good idea of how you want to set up and operate the audio mixer.

To get a better look at the audio mixer, hide the M/E setup tabs. You can also scale the interface using the mouse on this line between the multiviewer and the switcher to get more room.

a) Audio Types

There are two basic types of audio used when doing a live production. Audio from an external source, like a mic, or from an internal source, like a media player.

External inputs includes four or eight stereo pairs of XLR jacks for analog audio. You can also bring in AES/EBU digital audio using the jacks on the back of the machine or bring in embedded SDI audio through a video input. You can also bring external audio in across the network using Apple airplay and other sources with the network input. Internally, the DDR can play video clips with audio and the sound player can play audio files.

The audio mixer has faders for four or eight stereo audio inputs, depending on the system, in either analog or digital. It has controls for the internal DDR’s, the Network inputs, the Sounds player, and the effects or transition audio.

b) Configuring an Audio Input

There are four or eight audio input groupings that can be used for the four or eight live inputs. Each audio input can support up to four channels of audio labeled A, B, C, and D. All stereo inputs are configurable. Click on the gear under the label for each input to configure that input.
Setup the type of audio input on the *Input Settings* tab. If using embedded SDI audio, the mixer inputs match up to the video inputs. The TriCaster uses the first four channels of the SDI audio signal.

c) Delay  
An audio delay is used to add delay when the audio arrives at the output.

d) Follow Program Video  
The internal audio mixer also features audio *Follow Program video*. This means the audio can automatically follow the video production. The Professional Line of TriCasters allows you to configure *Follow* using multiple sources. Use the gear and put a checkmark by every channel you want that audio input to follow. Then, if any of those sources are brought to Program Out, that audio channel becomes active. This can be set up independently on every audio channel.

When *Follow* is turned on for an input, when that input is switched to, its audio fades up with the transition. When that input is switched away from, its audio fades out. The VU meters are grey when audio is not passing through to Master Out due to *Follow* being on.

e) Panning  
Next you have a panning control allowing you to pan audio to the left or right.

f) Routing  
Next you have the audio routing section for this channel. There are audio outputs arranged in pairs. On 4U systems, there are two pairs for the master and two pairs for the Aux on the back plate. On 2U systems there is one pair for master and one pair for Aux. Each of these outputs can incorporate any channels routed to them combining them into an output. A two channel signal only has $A$ and $B$ to work with. A four channel signal also has $C$ and $D$.

The ISOCorder can also choose what audio to record with that video. You can set it to record the game twice, once in English (Master) and once in Spanish (Aux) at the same time.

g) Mic and Gain Controls  
When *Mic 1&2* is selected as the input type, two separate faders—one for each jack associated with the audio Input—are available. When set to Mic, the audio controls have a *Gain* controls.

h) Setting Levels on Mics  
The best way to set a mic up is to plug it in and set the fader to 0. Now, adjust the *Gain* control to get a level. Then use the fader for adjustments. The VU meters
should peak at the top of the yellow portion of the scale, just touching the red portion may be ok, but best practice is to keep it in the yellow portion.

Each Line input has a *Balance* control which adjusts the volume being output to the left and right channels of main audio out. A Mic input has a pan control. This actually moves or pan the audio between the left and right channels on output.

Every input also has a fader for adjusting overall volume of that input. Notice the DDR, network and graphics channels have 4 VU meters. This TriCaster will support clips with up to 4 channels of audio in these players. That includes bringing in the first four channels of embedded SDI audio per SDI video signal.

i) *Processing* Tab (6:00)

Under the *Processing* tab is a seven band EQ and a *Compressor/Limiter*. Each can be turned on and off independently. The equalizer allows you to adjust the different frequency bands for more highs or lows in the audio. The *Compressor/Limiter* compresses the signal and limits the amount of signal reducing unwanted peaks resulting in distortion.

j) *Output Controls* (6:30)

There is a fader labeled *Record* for setting the audio level that is being recorded by the ISOCorder. This adjusts the house audio without changing the recording level and vice versa.

There is a fader labeled *Stream* for setting the audio level that is being sent out on the internet stream. This adjusts the house audio without changing the streaming level and vice versa.

The last four faders at the right of the audio mixer are the *Aux 1* and *2* and the *Main 1* and *2* output controls. On 2U systems there are no analog outputs for the *C* and *D* channels, but there are for AES/EBU or SDI embedded. Each also has EQ and *Compressor/Limiter* controls and can be independently muted.

The *Stream* fader controls the output level on the internet stream. Its output matches *Main* audio out. It also has independent EQ, *Compressor/Limiter*, and *Mute* controls. The *Master* controls the level of the audio output on the main audio output. It also has independent EQ, *Compressor/Limiter*, and *Mute* controls. There is also a headphone volume control and it sets the level for the headphone jack.

k) *Muting Inputs* (7:10)

Any input can be muted by clicking on its speaker icon. In Mic mode, there are two mute controls.
l) Talk Over (7:15)

The Mic input has a feature none of the other inputs have called Talk. Talk is designed to let someone plug in a mic to the TriCaster and talk over all other audio. When Talk is turned on, all other audio levels are dipped to allow the mic to be dominant.

m) Solo (7:30)

All inputs have the ability to Solo. Any channel or group of channels with Solo turned on will be isolated out the Headphone jack and removed from Main audio output. This allows the operator to monitor and check live audio in the headphones before sending it out live.

n) Metering Types (7:50)

You can also adjust the type of metering you are using with the popup control. Select from DBVU, DBFS or DBU.

o) Presets (8:00)

There are also presets in the Audio Mixer allowing you to have several different mixer presets and instantly get to them.

p) iPad App (8:25)

A free iPad app is available called TCXD Audio Mixer.

To use it, log your iPad onto the same network as the TriCaster, then launch the app. Make sure one of the network inputs is set to Receive. Select your TriCaster from the list on the iPad. You now have control over the mixer right from your iPad. Control Level, Mono, Follow and use presets. Swipe to get to more inputs. The outputs are always visible. You can also see VU meters and access any of the configured presets right within the app.

q) Avid Artist Mix (8:55)

This TriCaster also supports the AVID Artist Mix control surface for audio mixing. Make sure the control surface is plugged into the same network as the TriCaster before launching the Live Desktop. Make sure to read the control surface manual to figure out how to configure all the controls. Once the live desktop is launched, the control surface come to life. It has motorized faders and they follow or control exactly what is happening in the TriCasters audio mixer. You can control every feature of the mixer from this control surface.

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Live streaming is an important part of any media delivery system. The TriCaster is the industry standard for streaming high quality, network-style productions on the web.

Make sure the TriCaster is connected with a network that has an internet connection.

a) Streaming Configuration Panel

To open the streaming configuration panel, click on the gear next to the Streaming button. The panel opens showing some controls along the top and a large web browser window.

b) CDNs

Using the popup menu in the upper left, you can see some default internet streaming providers that can help you stream your production to the world. These streaming providers are also known as CDNs (Content Distribution Networks). The TriCaster will work with any streaming provider, these are here as a starting point.

c) RTMP Flash Stream

The most common type of streaming is RTMP Flash Streaming. With a Flash Stream, you “push” the data to a CDN. When users access the stream, they access it from the CDN. The CDN provides the bandwidth to make this possible. Depending on what type of service you buy, the CDN can scale from a few users to hundreds and even thousands.
d) CDN Advantages

It is possible to set up your own streaming server and buy your own bandwidth, but then all the tech support and trouble shooting is on you. With a streaming provider, you have another resource to help you get the stream going.

Streaming providers also supply other services like live chat, archiving and re-encoding to other formats for mobile devices or bit rates for different connection speeds. This is all transparent to you when you use a provider.

e) Ustream

Ustream is a provider that helps you to start streaming right away for free. These streams will be embedded with their ads, but it is free and a great way to test the stream and see what it looks and sounds like.

In order to use any provider, you need to sign up for an account. Again, this can be free or you can pay for your bandwidth and remove all the ads.

Once you have set up an account you can log in. Use the pop up in the upper left hand corner of the panel and select USTREAM. Click the **Sign Up** button. Set up your streaming channel by following the instructions on the Ustream page.

Make sure to create a channel. You must have a channel to stream on Ustream. If the browser window does not display the Ustream page, you most likely have an issue with internet access.

f) Streaming Methods

Once you have an account there are three ways to stream. Browser based, with an encoder, or using a plug-in.

Browser based allows the TriCaster to be seen as a webcam to the streaming provider. This makes it very easy to setup as there is no selection of resolutions or bit rates, but the quality of the stream is not as good as it is when you go through the set up process.

With an encoder, you configure the TriCaster to do an RTMP stream. It requires a bit more set up, but provides a much higher quality stream with resolution and bitrate options. Most CDNs support this type of connection.

Plug-in based is the best of both worlds. It allows for quick set up and the ability to configure your stream. The plug-ins are written by the CDNs, and popular services like Ustream and LiveStream both have TriCaster plug-ins.

Also, YouTube has begun offering live streaming at no cost to users, so this is another option to check out.
g) Plug-In Set Up
Click on *Configure Plug-in*. This plug-in allows you to log in from the TriCaster, pick the channel and quality of the stream, and choose from a few options. Click *Save* and you’re ready to stream.

h) Bit Rate
The bit rate is amount of data transferred per second and this affects the size of the files. The larger the number, the better the quality. You only need enough bandwidth to get your stream to the server. A general rule of thumb is you want 1.5 times the bandwidth of the bit rate you are trying to stream.

So, if you choose 800kpbs as the bit rate, you need 1200kbps, or kilobits per second, to transmit to the server. Check with your internet provider or your system administrator to see what your bandwidth is.

Record on the USTREAM web site by checking the check box. Once you’ve configured the plug-in click *Save*.

i) Start Streaming
Now you’re ready to start streaming, click the *Stream* button and close the *Streaming* panel. When the *Stream* button is blue, you see the time code, you’re streaming live.

Now on another computer go to *Ustream.com* and search for your channel name. Here you can see the stream and hear the audio from the internet. If this page was already loaded and you’re not seeing the TriCaster stream, click *Refresh* on the external computer’s browser.

Remember that this is free so you will see their ads from time to time. To remove the ads, sign up for a paid account.

You could also embed their player in your webpage so you can send people to your page to watch the stream. When the production is finished, press the *Stream* button again to stop streaming.

j) Encoder-Based Streaming
For an encoder based stream, we need to log into your USTREAM account and find the XML file. This file contains all the information the TriCaster needs to stream to this channel. Click on the gear to open the streaming panel.

This will be slightly different on other streaming provider pages, but essentially it is the same process. On the USTREAM site, once you are logged in, go to the pop-up menu on the upper right corner and select *Dashboard*. Select the channel you will be streaming to.
At the bottom is a link to a remote page with the XML file you need. Click on the link and then find the link to *Download the Flash Media Encoder XML file* for this channel. Download it and save it to a media drive.

When using an encoded based stream, the web browser is here, so you can test your stream. Typically, you would go to the site where your video is embedded.

Now go to the top of the streaming configuration panel and click *New*. The XML is for Flash Media encoder, so choose *Flash*. This reveals some more controls at the top of the panel.

On the right side of the menu, there is a button for *Import Settings*, click it, navigate to the XML you downloaded, select it, and click *Open*. This will populate the Stream ID and URL fields with your channel information. Add your user name and log in.

Then, in the TriCaster *Streaming* panel, make sure the *Archive Stream* button is turned on to save a copy of the stream for later use as video on demand.

You can pick a resolution to stream at from the pull down menu. You will see resolutions and bit rates. Choose the bit rate you want, but remember the bandwidth limitations.

The TriCaster is also able to do multi-bitrate streaming which requires more bandwidth for the upload. These options are labeled *MBR*.

To start streaming, click the *Stream* button on the Dashboard. You can check the stream on another computer and navigate to your Ustream channel.

**k) Stop Streaming**

When the production is finished, press the *Stream* button to stop streaming. If you chose to archive the stream, the archive can be accessed at

D:/media/clips/session name/saved streams. The file is saved in the same format as was streamed.

**l) Windows Media Pull**

You can also stream in Windows media Push or Pull. Windows Media pull means the people watching are pulling the stream from your TriCaster. This may be OK for two or three people on a local network, but it will breakdown if too many people pull on it at the same time because you don’t have enough bandwidth. That’s what the internet streaming providers give you, lots of bandwidth for as many people to watch as possible.

You can see that when we set up a windows media pull you are given the address for people to watch the stream. Click *New*, select *Windows Media Pull*, and click *OK*. You can see the address here that people will need to go to see the stream. The stream can be viewed in Windows media player or LAN VLC.
m) Windows Media Push

Windows media push is used to push the stream to a server to deliver much in the same way described above. You can see with a push you need to tell it an address to push to and this would be the server. Click New, choose Windows Media Push, and click OK. Here you see the field to enter the server URL, username, and password.

It’s up to you what you use, but encoder based Flash streams seem to be the most popular with TriCaster users.

There are separate audio control for the stream audio. This allows you to adjust the stream audio separately from the house audio.

n) Streaming Tips

As a rule of thumb it is always good to start streaming before the show starts. Put up a slate or motion graphic with some music. This way viewers can log on, make sure they can see and hear the stream, and you can test the stream on a laptop.

If you decide to start your stream an hour before the show starts, the TriCaster is now live an hour before your show actually starts. Also, remember to mute any mics until the production begins.

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Today’s media delivery methods are quite different than they were even just a few years ago. Now, you need to engage your audiences with interactive real time content on the web. The Professional Line of TriCasters bring a whole new feature set to the live production system with media publishing, allowing you to upload content to social media sites during the live show.

In this video, we cover setting up destinations for your social media and the ways to upload your video and image content during and after the show.

a) Set Up Destinations

The first step to social media publishing with the TriCaster is to set up your destinations. This is covered in more detail in the Understanding Sessions video. Setting up publish destinations is considered another form of output. You need to be able to log in to social media sites like Facebook, Twitter and YouTube. You can also publish to ftp sites and networked storage locations.

On the File menu, select Publish Destinations. This shows which destinations have been configured. If a destination is not configured, do not try to use it.

b) Video

Once destinations have been configured, you can put a check by all destinations you wish to send video to. Then, when a video clip is sent to the Publish Queue, there will be a copy of the clip ready to be sent to each checked destination.

There is also an option to Auto Upload. If you select this, as soon as you send the clips to the Publish Queue, the clips will start uploading to the destinations. If Auto Upload is not selected, then these clips and images will simply be added to the Publish Queue to be manually sent to the social media sites at a later time.

c) Still Options

There are two options for uploading content to social media, Auto upload and manual upload. When setting up recordings in the ISOCorder panel or images in the Grab area, you have the option to Auto Add to Publish Queue.
To configure what destinations this media goes to, use the gear. Put a check mark next to the media destinations you want the media sent to. Then, this media is automatically added to the Publish Queue once it’s finished being recorded or grabbed.

d) Manual Upload 2:55

The other option is to add clips to the Publish Queue manually. Right click on a clip in a DDR and go to Add to Publish Queue. A copy of the clip is added to the Publish Queue for each destination configured.

e) Modifying Clips in the Queue 3:10

You can modify clips in the Publish Queue by opening the Publish Queue from the File menu. These clips must be recorded in the default Quicktime format. Then you can set In and Out points or create a still from video.

To do this, click on the gear. Use the handles on the scrub bar under the video to set In and Out points. Or, click on Still Frame and pick the frame to be sent as a still image. Close the panel and click Upload to send them off. You can also multi-select clips and upload them all with one click.

f) Upload the Recording Clip 3:55

There is an Add button to add clips from the Publish Queue. Start recording a clip, then go back to the Publish Queue. Click the Add button and navigate to the currently recording clip. The clip is found under Clips in the current session. You can set the In and Out points on the video recorded so far, and upload that to any destination without stopping the recording process.

g) Other Options 4:35

Once in the Publish Queue, clips can be duplicated and then destinations can be modified to send the same clip to multiple destinations. You can also remove media from the Queue. You can add comments and change the title of the media before uploading.

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This section covers basic switching techniques, using transitions, using the Downstream Keyers, Fade to Black, delegating the T-Bar, use of the M/E’s, and recording.

a) Interface Layout

Along the top of the interface you have a multiviewer showing the external video feeds and the internal media players. It also shows a big Preview and Program monitor. Program is what is being broadcast, streamed, and recorded by default. This is what the audience sees. The Preview monitor shows what is currently selected on the Preview bus and this is what goes out live if you do a cut, fade, or transition.

b) Live Control Area

Below the multiviewer is the live control area. This consists of the Program row, Preview row, the T-Bar and transition controls, the effects presets, and controls for the background layer transitions, the main switcher T-Bar and the down steam
keyers or DSK’s. All Professional Line TriCasters have two Downstream Keyers except the 8000 which has four.

You can show and hide the Mix Effects rows using a button. These controls are all also available on the Control Surface. You can also hide and show the M/E tabs by pressing the currently selected M/E delegate again. Below that is the tabbed interface for access to the media players, PTZ controls, the buffers, and the Audio Mixer.

c) The Video Mixer (2:15)

The two rows of buttons on the switcher are called buses. The Program bus is most important as whatever is selected on this bus is what is going out live. It is possible to directly select channels on the Program bus and cut to them. Even though this is possible, it can be risky. For instance, switching directly to an M/E without seeing it first might cause a bad shot to go out on air.

Once selected on the Preview bus, the input is visible on the Preview monitor in the multiviewer. Now you can see it before transitioning to it. You can also set up workspace presets to change the multiviewer and Preview all the M/E’s at once.

To cut to what is on the Preview bus, press the Take button in the Background area. Notice that Program and Preview have switched places. Now select the next input on Preview and Take to that. The basis of all switching is previewing inputs and transitioning to them with a cut, fade, or transition.

There are a few ways to put something on Preview. You can click on the input on the Preview bus with the mouse or select it on the Control Surface. Notice the green highlight denoting Preview. This is on the input monitor, the bus row buttons, on the Control Surface, and under the Preview monitor. Notice the red highlight denoting Program.

d) Using Transitions (4:10)

To the right side of the bus rows is the transition area. The background layer is whatever is happening on Preview and Program and any transitions being used to go between them. It is considered the bottom layer under the Downstream Keyers.

Select an input on Preview. Click on the Fade icon to select it. On an 8000, click on the transition icon first to open the transition palette, then select Fade. Now press the Auto button in the background area. Program fades to Preview. This is the background layer. Everything happening on Program including transitions from Preview.

Now choose a different transition and press Auto. Preview replaces Program using the transition you selected. There are default transitions, but many more are included with the TriCaster that can be loaded into any of these positions, except the Fade. Fade is always the first transition.
To change an effect, mouse over any transition except *Fade*. Find the plus sign in the upper right corner and click on it. This opens the Media Browser and you find a selection of categories with transitions inside them. Click on the category to see the transitions. Click on one to select it, and press *OK* to load it into that preset. Load other transitions into the other presets to have instant access to them.

These *Take* and *Auto* buttons only affect the background layer. You can control the speed of the transition using the dropdown menu. You can use the preset speeds or left click on the speed number and either scrub or type for a custom speed. You can also set the transition to *Ping Pong* or run in *Reverse* from the pulldown. *Ping Pong* means it changes direction each time it runs. This is done automatically for any transition in a DSK or keyer. These setting are per effect so each transition can have its own settings.

You can also select the effects loaded into the presets by using the *Select* knob on the Control Surface. Pressing this knob like a button toggles the *Reverse* mode. Speed is dialed in by using the *Rate* knob and pushing it like a button cycles through the preset speeds. Changing the speed of an Animation Store Transition may give undesirable results as the audio does not change speed. If you are creating your own effects with audio, always create them at the default speed you intend to use.

e) **T-Bar Delegation**

The T-Bar works for manually running transitions but can also be delegated to run DSK’s at the same time or independently. You select what is controlled by the main T-Bar by using the buttons above the layers controls. If Background is selected, it does a transition. If a DSK is delegated to the T-Bar, the T-Bar or *Auto* button executes the DSK only and doesn’t affect the background.

You can delegate more than one item on the interface by holding the *Ctrl* key while selecting. You can also delegate the T-Bar from the Control Surface using the buttons just to the left of the main T-Bar. Multi-selection by holding down the first selection while adding more. The T-Bar can do background transitions, fade to black, and any of the downstream keyers.

f) **Downstream Keyers**

To the right of the background transition controls are the downstream keyers. These DSK’s create overlays on top of the background. As you look at the interface, Background is on the bottom, DSK 1 is on top of that, DSK two is on top of that, and so on.

g) **Loading Buffers into DSK’s**

You know a graphic has alpha if the checkerboard background shows through it once loaded into a buffer. The frame buffers are also available on the network so
people outside of the TriCaster can change what is in the frame buffers across the network. To do that, make sure Share Frame Buffers is checked in the File menu. You can also share your media folders across the network in the same way.

Each DSK can use any input coming into the TriCaster, any internal media player, either network input, or any frame buffer as a source. Use the popup under the DSK transition icon to select the source for a DSK.

h) DSK Positioners

Make sure the Positioner is off by opening it with the cross hair icon and clicking the position button so it is not illuminated. There should be no blue highlight on the cross hair icon, denoting the positioner is off. If the Positioner is on, this icon is highlighted blue.

Each DSK has a transition palette. You can use any transition available in the switcher in the DSK’s. Each DSK has a Take and Auto button. These are also available on the Control Surface in the transition area to the right of the T-Bar. When you press Take on a DSK the Take button is blue and there is a blue line just above the Take button telling you it is in use. It also lights up now on the Control Surface.

You have the ability to scale and position all DSK’s. Press Take on both DSK’s to turn them off. When you click on the Positioner cross hairs for a DSK the graphic appears on Preview. This happens even if the DSK is not active. By clicking and dragging on the magnifying glass, you can scale the DSK. By clicking and dragging on the crosshairs, you can position it.

Scale is locked as scaling on one axis would distort the image, but you can unlock this constraint. You can also click and drag on just x or y in the positioner for moving just left and right or just up and down. Close the positioner and the DSK on Preview disappears. Bring the DSK up on Program and the graphic shows up right where you placed it on Preview. Being able to set up graphics on Preview before you take them live allows you to Preview the final shot while you are live and not affect the Program output.

i) DSK Transitions

Choose a transition in the DSK and press Auto. Press Auto again. It automatically ping pongs, running one direction the first time and the opposite direction the next time. The DSKs always ping pong; this cannot be changed.

j) Positioning DSK’s on the CS

Positioning the graphics from the Control Surface is also possible. In the Positioner area, delegate a DSK. Select Position and Scale, now bump the joystick to adjust that DSK. The graphic appears on Preview. Twisting the joystick scales the DSK, moving the joystick positions it.
Now select Rotation. Twisting the joystick rotates the DSK on one axis, moving it rotates it on the others. Press the Reset button to reset the rotations. The Reset button only resets the currently selected modifier. Notice it only reset the rotation, not the position.

The Control Surface has individual Take and Auto buttons for each DSK. Try bringing the overlays on and off screen using these controls. You can even push the Auto buttons for multiple DSKs at the same time.

Another technique is to use one effect to bring on the DSK and the opposite effect to take it off. Use one effect to fly it on and then change effects before flying it off. There are also a variety of soft edge transitions that work well with DSKs. You need to play around with them and figure out what works best for your production.

k) Motion Graphic with a DSK

Select a DDR as the source for a DSK. That can be done from the pull down menu on each DSK. Load a video clip with an alpha channel or transparency into the DDR. Make sure the DDR is not in Loop mode. Make sure Single and Autoplay are on. This can be done from the interface in the DDR tab or on the Control Surface under media players.

Single sets the DDR to only play the selected clip. Autoplay automatically starts the DDR when it is displayed on Program Out or when it is used in a DSK or keyer and that DSK or keyer is activated. Press take on the DSK and the full motion graphics is superimposed on the background. You could use a transition in the DSK to fly it off screen.
l) Animated Buffers

Motion graphics can also be added to your production using animated buffers. Loading the anim buffers is covered in the Live Desktop training.

The TriCaster comes with animated buffers, but you can also create your own using the included Animation Store Creator on the Home page under add-ons. When creating the anim buffers, they can be setup to run once and stop, or loop. Animated buffers can also be positioned as well as used as motion backgrounds for titles and graphics.

m) Switcher Presets

Select a new preset in the switcher. This is like a whole new switcher setup. Be careful when switching these presets as they can change what is on Program Out. They also change the DSK sources and transitions and the state of the DSK. Using switcher presets is one way to set up content and the status of the DSK’s.
n) Working with Media Players

Each media player has a set of controls to help you get the most out of the player during a live show. Media players can be delegated and controlled on the Control Surface.

At the bottom of the DDR interface are Stop and Play buttons. The buttons on either side of these are the Go To Previous and Go To Next clip buttons. These can be used to select a clip in a playlist. This changes the output of the DDR to whatever clip is selected, so don’t do this while the DDR is on live output.

Next there is a Loop control. If the Single button is on, this loops the selected clip only. If the Single button is off, it loops the whole playlist. If Loop is turned off, with the Single button on, the DDR plays only the selected clip and stops on the last frame of that clip. If Single is turned off, the DDR plays through all clips in the list starting with the currently selected clip.

Autoplay automates the process of using the DDR or any media player. If Autoplay is off and you transition to the DDR, a still frame of the first frame of the selected video clip is shown. If Autoplay and Single are on and you transition to a DDR, it starts playing before it is on Program Out. If you let it continue to play, at the end of the clip it transitions back to whatever is on Preview with whatever transition is selected and then selects the next clip in the DDR for playback. To play the next, clip simply transition back to the DDR. If Autoplay is on and Single is off, it pre-rolls and plays all the clips in the list starting with the currently selected clip.

There is also a speed control. The DDR can be set to playback from 0 to 400% of full speed.

o) Editing Clips in a DDR

You can also edit the In and Out point of a clip. Each clip has handles on the left and right sides of the scrub bar. Moving these handles sets the In and Out points. The video scrubs as you set the handles so you can see where you are in the clip as you trim it. On the 8000 Control Surface only there are also Mark In and Mark Out buttons allowing you to trim the clip from the Control Surface. This allows for large clips to be brought in and chopped into smaller clips right in the DDR.

p) Scrubbing in a DDR

You can scrub the clip using the scrub bar. During playback, the scrub bar by default changes color. It is blue when there is more than 10 seconds of video left, it turns yellow when there is less than 10 seconds left, and turns red when there is less than 5 seconds left. This is a nice visual cue that your clip is ending.

The counter by default is set to countdown. When a clip is selected, you see the duration. As the clip plays, this number counts down to zero at the end of the clip. This also holds true for the entire playlist if Single is turned off. With Single on the
duration of each clip is displayed. With *Single* off the duration of the entire playlist is displayed when starting from the selected clip. By right clicking on the numbers, you can make it a count up instead of a countdown, turn off the warning colors on the scrub bar, or turn off playlist duration so you only ever see clip duration.

q) Context Menu Controls in a DDR

There are also controls available for each clip by right clicking on them in the DDR. These controls include *Cut*, *Copy*, *Paste*, *Remove*, and *Clone*. There is a *Display Name* option which changes the name displayed in the DDR only, it does not affect the clip name on the hard drive.

There is also a control for a clip’s audio level including *Mute*. This is very handy as you can set audio levels on a clip by clip basis, meaning less audio mixing during the show. You can also remove a clip from the DDR by selecting it and pressing the *Delete* key on the keyboard. This only removes the clip from the DDR, it does not affect the clip on the hard drive. The same goes for the *Remove* option on the context menu.

r) DDR Usage in a Live Show

Suppose in a live production the operator wants to play one clip and come back to a live talent. Go to the DDR and select the clip. Turn on *Single* to play only that clip and *Autoplay* to automatically start playback when the DDR is brought to Program. Make sure *Loop* is off and speed is 100 percent.

With the live talent on Program, select the DDR on Preview. Choose a background transition and press *Auto*. The clip plays. When the clip is done, it transitions back to whatever was on Preview with whatever transition is selected. While it is playing, you can select a new input on Preview and a new transition for the background. When the clip finishes the TriCaster transitions to the new input with the new transition.

s) Controlling Media Player Tabs

During a live production you may not want the tabs to follow what is selected on Preview as this may switch you away from the DDR during playback. To turn this behavior off, go to the options menu and uncheck *Tabs Follow Preview for All Inputs* and *Tabs Follow Preview for M/E’s*. This stops the tabs from switching to what is on Preview.

One option convenient to leave on is *Tabs Follow All Delegates*. This means any M/E or any media player delegated on the Control Surface will have its associated tab displayed. In this mode, you need to manually select an M/E setup tab or delegate it on the Control Surface to modify that M/E during a production.
t) Stills in the Graphics Players  

The Autoplay, Single, and Loop controls work the same for the graphics players. Autoplay with Single can play a still for a select duration or with Single turned off, you can play slideshows. Right clicking on a still or title template also gives options, including Cut, Copy, Paste, Remove, Clone, Display Name, and Duration.

You can also set the duration of multiple images at once. Multi-select some stills by left clicking and dragging a box around a few of them. Now right click on one of them and select Set Duration. The default duration for stills is 5 seconds. The time is displayed as hours, minutes, seconds, and frames. Type in 10.00 and press Enter. This is input as seconds and frames. Notice all selected clips are now 10 seconds.

u) Autoplay and M/E’s

Let’s say you are on M/E 2 using a virtual set. On that virtual set you have DDR 2 set on the layer B row for the on screen monitor. The DDR is not playing yet so it is a still of the first frame of the video clip. Autoplay is on for the DDR. Put DDR 2 on Preview. Press Auto to transition to it. When you switch to the DDR it will not play because it was already on screen within the virtual set. Switching to it, kept it on Program Out so no change occurred as far as Autoplay is concerned.

On the other hand, suppose I am on Graphic 1 on Program and M/E 2 on Preview. Load a full screen graphic for the Graphics player. M/E 2 with a virtual set with the DDR feeding the on screen monitor is displayed. When you transition to M/E 2, the DDR within the virtual set plays. So, whether you are switching to the DDR itself or an M/E with a DDR used within it, it’s the same to Autoplay. If the player is on the screen as part of any input, it is considered to already be on Program Out and Autoplay works accordingly.

v) Autoplay Out on M/E’s

When this feature is on, it determines if an M/E is used as a mixer and is transitioning away from a media player. If so, Autoplay does not work.

w) T-Bar Delegation

The main T-Bar in the switcher can be delegated to perform different tasks. Put M/E 1 on Program and M/E 2 on Preview. The delegation on the interface is done by clicking the labels which are buttons. There are buttons for the background, Fade to Black, or FTB, and for each of the DSK’s.

Delegation on the Control Surface is done by using the buttons. It is possible to delegate the background or any DSK by themselves. Select Background and look at Preview. It shows you what will happen when a transition is performed. Only the background layer will change from Program to Preview. Pressing the main Auto button or using the main T-Bar now does a background transition.
Assign Buffer 12 as the source to DSK 1 and Buffer 13 for DSK 2. Delegate DSK 1. Notice that Preview changed. This is a true look ahead Preview. It always shows what the end result will be when pressing Auto or pulling the T-Bar. With only DSK 1 delegated, the background video will not change. Only the DSK will be brought on and that’s what you see on Preview. Press the main Auto button. Now delegate background and DSK 1. You can hold Ctrl and click on both buttons on the interface or on the Control Surface press and hold Background while pressing DSK 1 to add it to the delegation.

Now on the Preview monitor, you only see the background because you get a background transition and remove the DSK with one operation. Press the Auto button. You can delegate Background and all of the DSK’s at one time. This same delegation technique works for the mixer in an M/E using the M/E controls on the interface or on the Control Surface.

x) Fade To Black on 100’s Series

To use this as Fade To Black, hold Shift and press FTB and everything fades. Hold Shift and press it again to fade back up and remove the black.

y) Fade To Black on the 8000 CS

In the 8000, there is a delegation button in the interface and on the Control Surface labeled FTB. This stands for Fade to Black. Clicking this button delegates Fade To Black to the T-Bar. Pressing Auto executes this and all audio and video fades. You must remove this before resuming normal production. If you delegate Fade To Black and Auto, everything goes black. If you now choose Background, notice Preview is still black. Performing an Auto does nothing, but the FTB button blinks. This is a visual cue telling you Fade To Black is active. To get back to normal operation, delegate Fade To Black again, and Auto again to remove it. Now delegate Background and you are back live.

z) Record, Grab, and Stream Buttons

During a production, to start recording press the Record button. It highlights and the time code numbers starts to roll. You can also press the Record button on the Control Surface. The same works for streaming and the Stream button on the Control Surface. Images can be grabbed with the Grab button on the interface or the Control Surface. Setups for all these features are accessed with the gear next to the button.

Recorded media ends up on its designated drive in a structure as follows:

- **Video clips end up in media drive letter** (D):/media/clips/session name/capture.
- **Stills end up in media drive letter** (D):/media/Stills/session name/capture.
- Archived streams end up in media drive letter
  (D):/media/clips/session name/SavedStreams.

From the Session page, this media can easily be accessed using the interface to
get to clips, still and so forth for that session. You can also backup the session from
here. Remember to Import and Backup to make sure all media external to the
session is imported to that session before it is backed up.

Notes: ____________________________________________

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Appendix A: Selected Keyboard Shortcuts

The complete set of keyboard shortcuts is found in Appendix D of the TriCaster Professional Line User Guide.

Program Row, Inputs 1 to Input 24  F1 – F12 and Shift + F1-12
Preview Row, Inputs 1 to Input 24  1 – 0, -, = and Shift + 1-0, -, =

Take                  Return Key
Transition – Go/Pause  Spacebar
Transition – Slow/Medium/Fast  z/x/c

Record on/off         r/ Shift + r
Grab (still image)    p

Select All            Ctrl + a
Cut                   Ctrl + x
Copy                   Ctrl + c
Paste                  Ctrl + v
Delete                 Delete Key
First/Last Item       Home/End
Navigate through Playlist items  Up/Down/Left/Right Arrows
### Appendix B: Acronyms Used in the Training Curriculum

(note: file format abbreviations, such as PDF, JPG, WAV, etc., are not listed)

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>AC/DC</td>
<td>Alternating Current/Direct Current</td>
</tr>
<tr>
<td>AES/EBU</td>
<td>Audio Engineering Society/European Broadcasting Union</td>
</tr>
<tr>
<td>BKGD</td>
<td>Background</td>
</tr>
<tr>
<td>BNC</td>
<td>Bayonet Neill-Concelman</td>
</tr>
<tr>
<td>CDN</td>
<td>Content Delivery Network</td>
</tr>
<tr>
<td>CS</td>
<td>Control Surface</td>
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<tr>
<td>DSR</td>
<td>Digital Disk Recorder</td>
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<tr>
<td>DSK</td>
<td>Down Stream Key</td>
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<tr>
<td>DV</td>
<td>Digital Video</td>
</tr>
<tr>
<td>DVD</td>
<td>Digital Video Disc</td>
</tr>
<tr>
<td>DVI</td>
<td>Digital Visual Interface</td>
</tr>
<tr>
<td>FAQ</td>
<td>Frequently Asked Questions</td>
</tr>
<tr>
<td>FAT32</td>
<td>File Allocation Table (32-bit)</td>
</tr>
<tr>
<td>FTB</td>
<td>Fade To Black</td>
</tr>
<tr>
<td>FX</td>
<td>Effects</td>
</tr>
<tr>
<td>HD/SD</td>
<td>High Definition/Standard Definition</td>
</tr>
<tr>
<td>HDMI</td>
<td>High Definition Multimedia Interface</td>
</tr>
<tr>
<td>ID</td>
<td>Identification</td>
</tr>
<tr>
<td>IMAG</td>
<td>Image Magnification (projector)</td>
</tr>
<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>IRE</td>
<td>Institute of Radio Engineers</td>
</tr>
<tr>
<td>iVGA</td>
<td>Internet Video Graphics Array</td>
</tr>
<tr>
<td>LAN</td>
<td>Local Area Network</td>
</tr>
<tr>
<td>LC-11</td>
<td>Live Control (Control Surface)</td>
</tr>
<tr>
<td>Mbps</td>
<td>Megabits Per Second</td>
</tr>
<tr>
<td>NTSC</td>
<td>National Television Standards Committee</td>
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<tr>
<td>NTFS</td>
<td>New Technology File System</td>
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<tr>
<td>PAL</td>
<td>Phase Alternating Line</td>
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<tr>
<td>QR Code</td>
<td>Quick Response Code</td>
</tr>
<tr>
<td>RCA</td>
<td>Radio Corporation of America</td>
</tr>
<tr>
<td>RGB</td>
<td>Red, Green, Blue</td>
</tr>
<tr>
<td>SDI</td>
<td>Serial Digital Interface</td>
</tr>
<tr>
<td>S/PDF</td>
<td>Sony/Philips Digital Interconnect Format</td>
</tr>
<tr>
<td>UPS</td>
<td>Universal Power Source</td>
</tr>
<tr>
<td>USB</td>
<td>Universal Serial Bus</td>
</tr>
<tr>
<td>VGA (XGA, SXGA, WXGA)</td>
<td>Variants of the Video Graphics Array standard</td>
</tr>
<tr>
<td>VPN</td>
<td>Virtual Private Network</td>
</tr>
<tr>
<td>VU</td>
<td>Volume Unit</td>
</tr>
<tr>
<td>Y/C</td>
<td>Another name for the S-video standard</td>
</tr>
<tr>
<td>YUV</td>
<td>Another name for the YCbCr color space</td>
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