NewTek™

NewTek™ Connect User Guide

NDI®

Revised – June 11, 2018

Trademarks: NewTek, NewTek VMC1, NewTek VMC1 IN, NewTek VMC1 OUT, NewTek VMC1 STREAM, TriCaster, TriCaster Advanced Edition, TriCaster XD, TriCaster 8000, TriCaster TCXD8000, TCXD8000, TriCaster 860, TriCaster TCXD860, TCXD860, TriCaster 460, TriCaster TCXD460, TCXD460, TriCaster 410, TriCaster TCXD410, TCXD410, TriCaster Mini SDI, TriCaster Mini, TriCaster 40, TriCaster TCXD40, TCXD40, TriCaster 855, TriCaster TCXD855, TCXD855, TriCaster 455, TriCaster TCXD455, TCXD455, TriCaster EXTREME, TriCaster 850 EXTREME, TriCaster TCXD850 EXTREME, TCXD850 EXTREME, TriCaster 450 EXTREME, TriCaster TCXD450 EXTREME, TCXD450 EXTREME, TriCaster 850, TriCaster TCXD850, TCXD850, TriCaster 450, TriCaster TCXD450, TCXD450, TriCaster 300, TriCaster TCXD300, TCXD300, TriCaster PRO, TriCaster STUDIO, TriCaster BROADCAST, TriCaster DUO, MediaDS, MDS1, 3PLAY, 3Play, 3Play 4800, 3PXD4800, 3Play 440, 3PXD440, 3Play Mini, 3Play 820, 3PXD820, 3Play 425, 3PXD425 3Play 330, 3PXD330, TalkShow, TalkShow VS 4000, TalkShow VS100, Network Device Interface, NDI, NewTek Connect, NewTek IsoCorder, ProTek, ProTek Care, ProTek Elite, iVGA, SpeedEDIT, IsoCorder, LiveText, DataLink, LiveSet, TriCaster Virtual Set Editor, Virtual Set Editor Advanced Edition, TriCaster VSE, TriCaster VSE Advanced Edition, LiveMatte, TimeWarp, VT, VT[3], VT[4], V[T5], Video Toaster, Toaster, Inspire 3D, 3D Arsenal, Aura, LightWave, LightWave 3D and LightWave CORE are trademarks, service marks, and registered trademarks of NewTek. All other brand names, product names, or trademarks belong to their respective holders.

CONTENTS

CHAPTER 1 GETTING STARTED 1

Section 1.1 Introduction 1
Section 1.2 System Requirements/Installation 1
1.2.1 System Requirements 1
1.2.2 Installation 2
1.2.3 Registration 3

CHAPTER 2 NEWTEK™ CONNECT CONFIGURATION 5

Section 2.1 Display 5
Section 2.2 Overlay 5
Section 2.3 Setup 6
2.3.1 Input config 7
2.3.2 Output config 9
2.3.3 Color controls (Pro Only) 10
2.3.4 Grab (Pro Only) 11
2.3.5 Headphone and titlebar tools (including web and webserver links) 12
Section 2.4 Fullscreen 13

CHAPTER 3 NEWTEK™ CONNECT WEBSERVER 15

APPENDIX A HELP 17

Section A.1 Connections 17
A.1.1 Connect does not see external NDI sources? 17
Section A.2 Debugging Failed Connections 18
Section A.3 Does my product support NDI? 18
A.1.2 NewTek iVGA Pro 18
A.1.3 NewTek LiveText 18
A.1.4 NewTek TriCaster Mini, Mini SDI, 410, 460, 860, 8000 18
A.1.5 NewTek TriCaster Advanced Edition 18
A.1.6 Other TriCaster Models 18
A.1.7 NewTek TalkShow 19
A.1.8 NewTek 3Play 19
Section A.4 Applications created prior to March 2016 by other vendors that support Network Inputs using AirSend 19
Section A.5 NDI and Your network 19
Section A.6 Routers and Firewalls 21

INDEX 22

CREDITS 23

CHAPTER 1 GETTING STARTED

SECTION 1.1 INTRODUCTION

Thank you for choosing NewTek™ Connect. For some, the first question may be "What is NDI?" In a nutshell, NewTek's Network Device Interface (NDI) technology is a new open standard for live production IP workflows over Ethernet networks. NDI allows systems and devices to identify and communicate with each other, and to encode, transmit, and receive high quality, low latency, frame-accurate video and audio over IP in real time.

NDI enabled-devices and software have the potential to greatly enhance your video production pipeline, by making video input and output available anywhere your network runs. Devices such as NewTek's TriCaster® and a growing number of third party systems provide direct support for NDI, both for ingest and output – but, at times, you may want to connect a source that is not natively NDI-enabled; or you may wish to supply an NDI output to a traditional downstream device or display. NewTek Connect provides the means to handle i/o requirements of this type and more.

This application comes in two flavors – a two-channel version available from wwww.NDI.NewTek.com, and the full, feature-packed commercial version, designated "NewTek Connect Pro".

- Both versions support third-party hardware i/o cards, such as those from Blackmagic Design, Deltacast, and AJA), and webcams.
- NewTek Connect Pro also supports media file playback, four independent channels (and eight-channel audio), and key-fill workflows on supporting hardware.
- Onscreen previews are provided, and the Pro version supports dual monitor layouts plus an additional NDI program return display, and tally.
- NewTek Connect Pro also includes per-channel proc amp and white balance controls, Auto Color, and waveform/vectorscope display.
- Optional overlays include VUs, title and 4:3 safe areas, checkerboard background (for 32 bit sources) and center cross.

SECTION 1.2 SYSTEM REQUIREMENTS/INSTALLATION

1.2.1 SYSTEM REQUIREMENTS

Minimum system requirements:

- 32-bit or 64-bit Microsoft® Windows Vista® operating system or better
- Minimum Intel i3 Sandy Bridge CPU (2008 or later), better strongly encouraged.
- Gigabit LAN connection for signal transmission over IP via NDI™ Technology

1.2.2 INSTALLATION

The installation process is the same for both Standard and Pro editions:

1. Begin by double clicking the Installation file to begin the set up process. The first page you will see is the *Welcome* page- click "Next" at the bottom.
2. The *License Agreement* is shown after the *Welcome* page. Please read this, select a switch in the footer to indicate whether you accept the agreement, and click "Next".

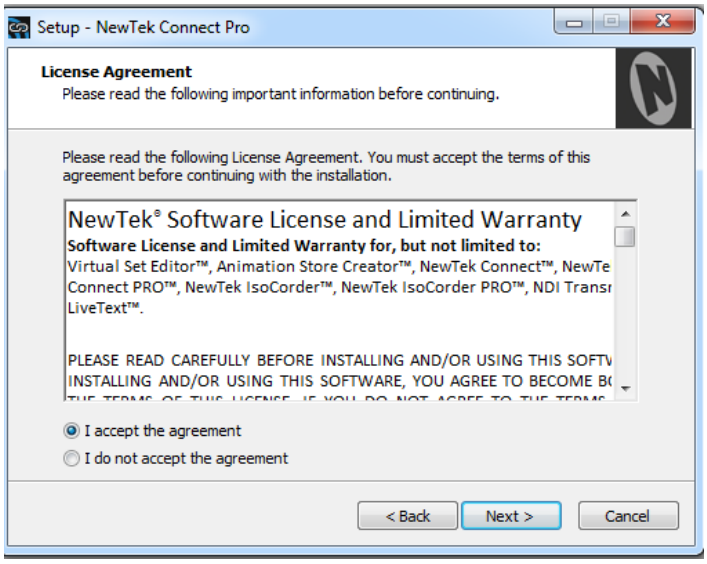


FIGURE 1-1

3. The next few pages establish where the software will be installed and where Start Menu shortcuts will be placed. The defaults should be just fine, so you can click "Next" on these two pages.

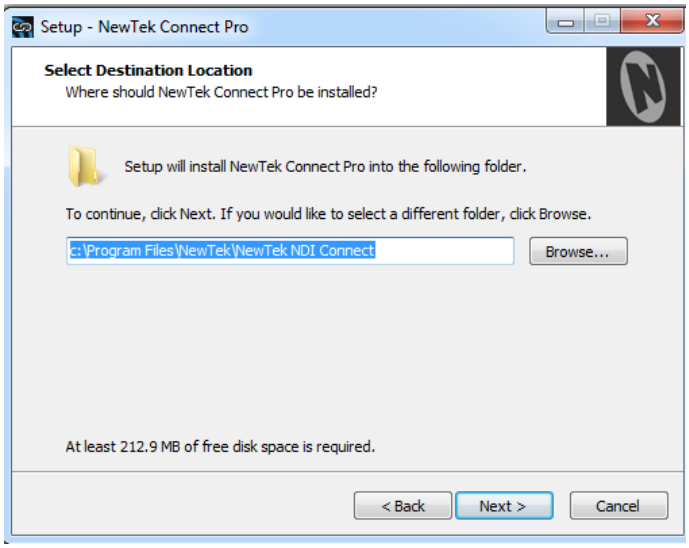


FIGURE 1-2

4. The *Select Additional Tasks* page will only appear when you install the Pro version. If you see this page make your choice and click "Next".

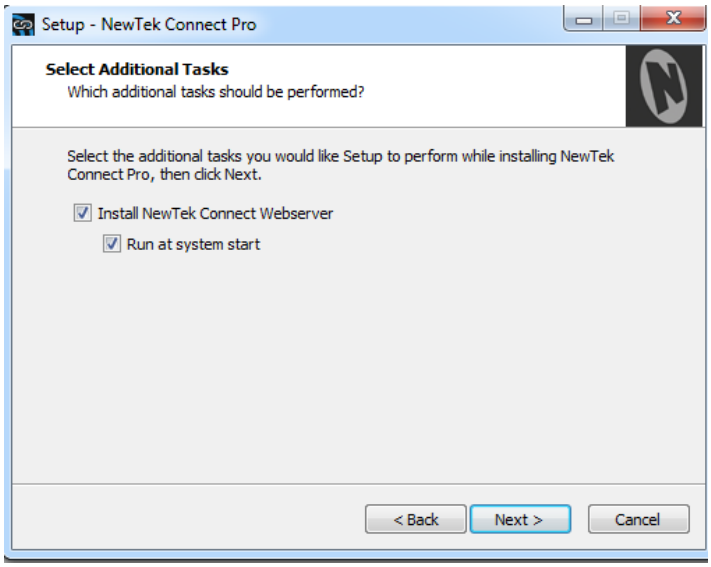


FIGURE 1-3

5. If you did not install the "Pro" edition you will see a menu verifying where the files will be installed. A confirmation page follows a successful installation and asks whether you wish to *Launch NewTek Connect*.

1.2.3 REGISTRATION

If you installed the "Pro" edition of the NewTek Connect software you will be greeted by the following *Register NewTek Connect* window. This computer will need to be online to proceed with activation and use.

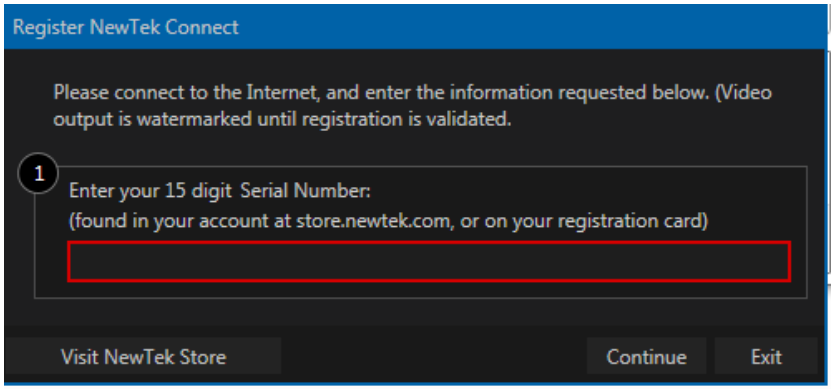


FIGURE 1-4

CHAPTER 2 NEWTEK™ CONNECT CONFIGURATION

SECTION 2.1 DISPLAY

Located in the lower right corner of the interface, the *Display* widget provides a variety of layout options for viewing channels in groups or individually, on one or two monitors. Options are based on which version of the NewTek™ Connect software you have installed.

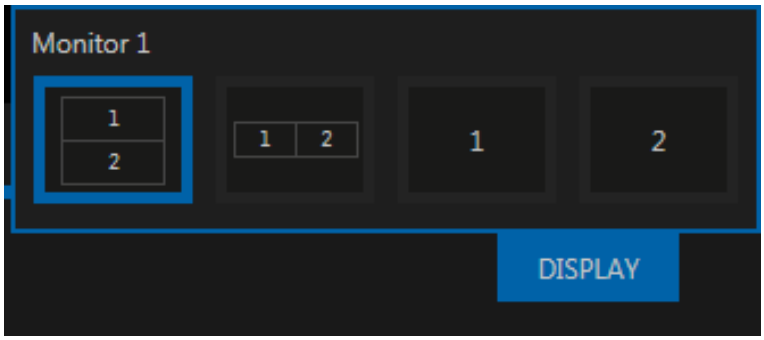


FIGURE 2-1 STANDARD VERSION

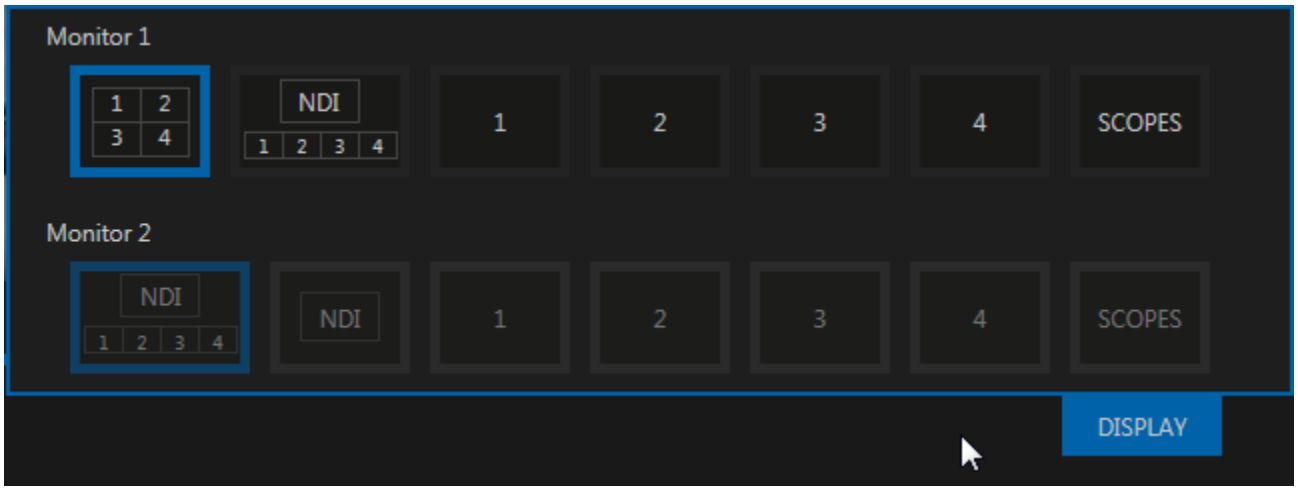


FIGURE 2-2 PRO VERSION

SECTION 2.2 OVERLAY

An Overlay can be a useful tool for visualizing safe zones, centering and more. Overlay options are provided for each channel.

FIGURE 2-3

The list of overlay options vary between versions of NewTek Connect and can be opened by clicking on the icon in the lower right corner of each quadrant (see Figure 2-3). Activate an overlay by clicking on it in the list, you can activate more than one and stack them (see Figure 2-4 and Figure 2-5).

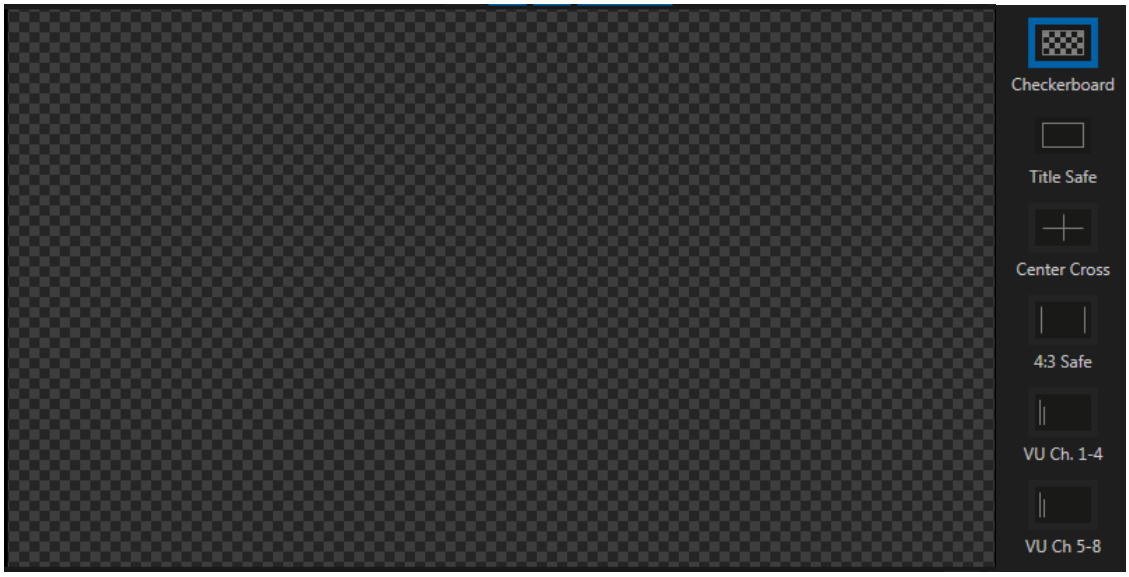


FIGURE 2-4 CHECKERBOARD OVERLAY

FIGURE 2-5

SECTION 2.3 SETUP

Each channel has a gear icon in its lower left corner. The gear will appear for that channel when you hover inside its quadrant. Clicking on this gear will open the *Configure* panel where you can manage *Input, Output* and *Color (on Pro edition)* options for that channel.

2.3.1 INPUT CONFIG

The Input panel allows you to select audio and video sources for this channel, and set their format. You can choose an NDI source, an input from A/V capture card, a webcam or even a stored video file. As an added level of control over A/V synchronization a delay (Figure 2-6) can be applied to the audio or video sources (NewTek™ Connect Pro only).

For key/fill source configurations, continue to choose the *Alpha Matte Source* (NewTek™ Connect Pro only). Key/fill sources must be synchronized and have the same format.

Note: It is unnecessary to configure the key input for 32bit NDI sources.

NDI Group Manager, included in NDI Tools (available from NDI.newtek.com), can control which NDI sources are visible on the system.

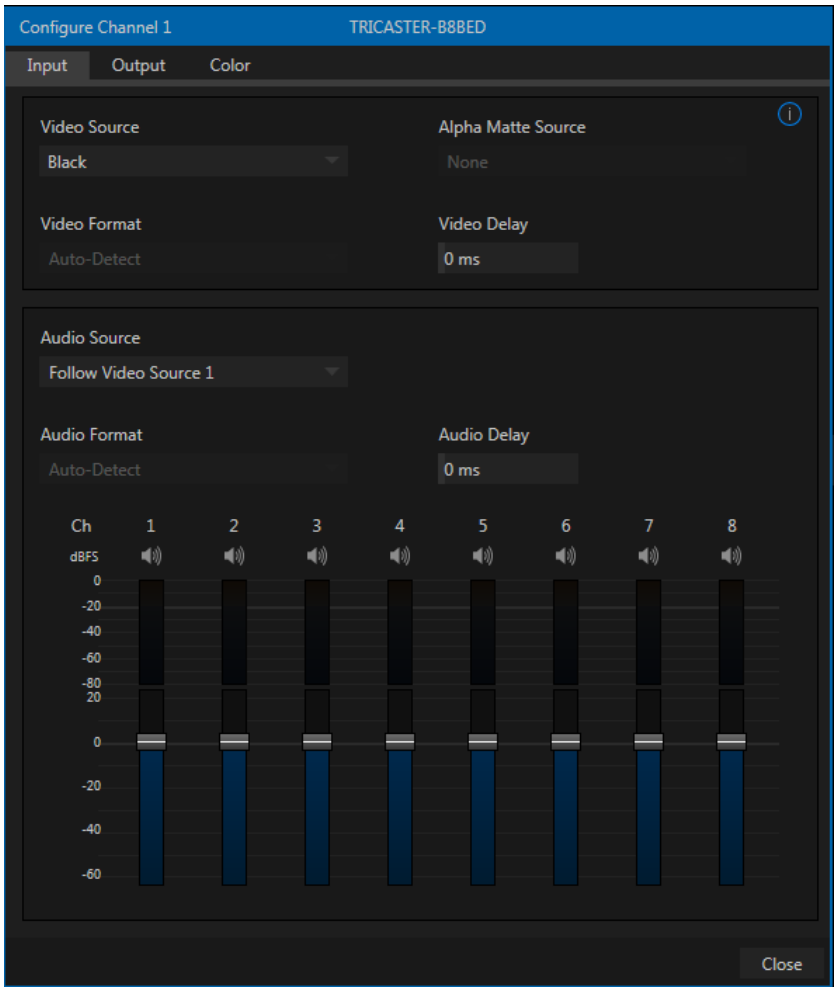


FIGURE 2-6

2.3.1.1 IP CAMERA SOURCES

The Pro version also allows IP sources to be selected from the **Input** tab (Figure 2-6). Opening the *Video Source* menu reveals an *IP camera* icon among the source type options (Figure 2-7).

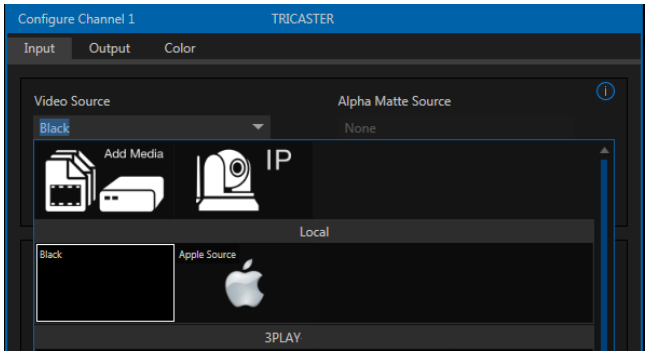


FIGURE 2-7

Clicking the *IP camera* icon opens the **NewTek Connect Source Manager (**Figure 2-8**)**. From here you click on *Add New Camera* and select a camera from the list.

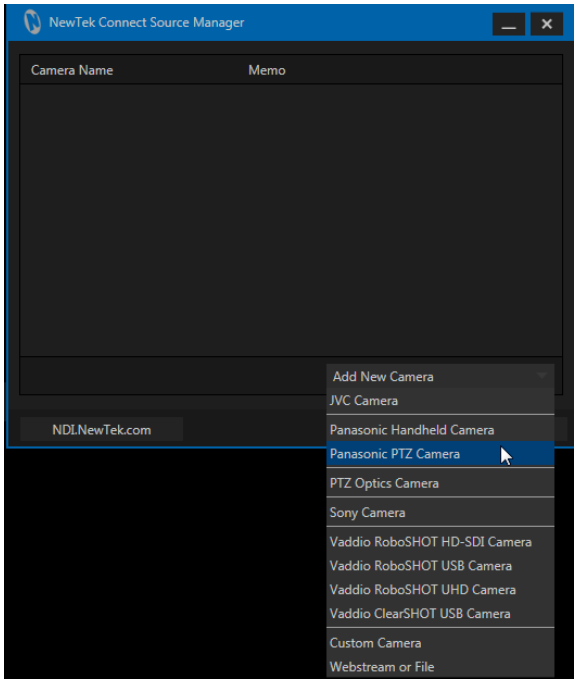


FIGURE 2-8

Once you have selected a camera from the list a panel will open allowing you to configure the settings for the chosen camera.

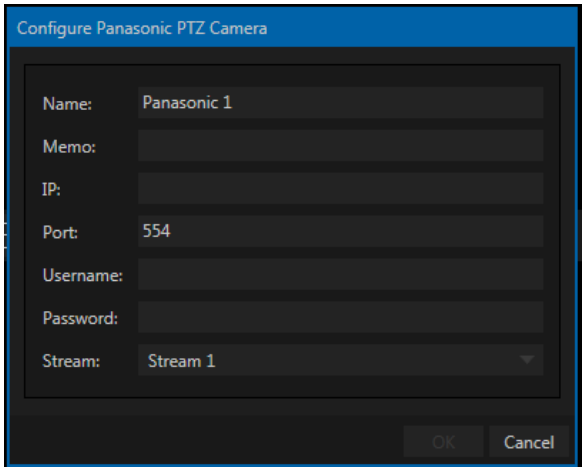


FIGURE 2-9

NewTek Connect will need to be restarted once you have finished selecting and setting up the camera.

2.3.1.2 APPLE SOURCES

Devices running NewTek Connect Pro can also be present themselves as destinations for Apple devices and software supporting AirPlay®. Select the *Apple Source* icon in the *Video Source* menu to enable this feature for an input.

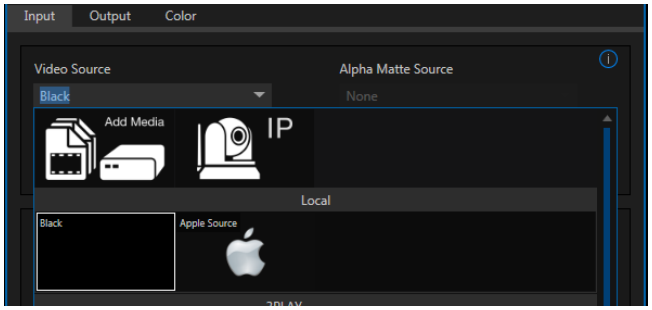


FIGURE 2-10

2.3.2 OUTPUT CONFIG

The *Output* from the channel is always sent to your network as an NDI source. NDI Group Manager, included in NDI Tools (available from NDI.newtek.com), can be used to control access to NewTek Connect output.

If you have a hardware output card, choose video and audio outputs and formats here. Some hardware also supports separated key/fill output.

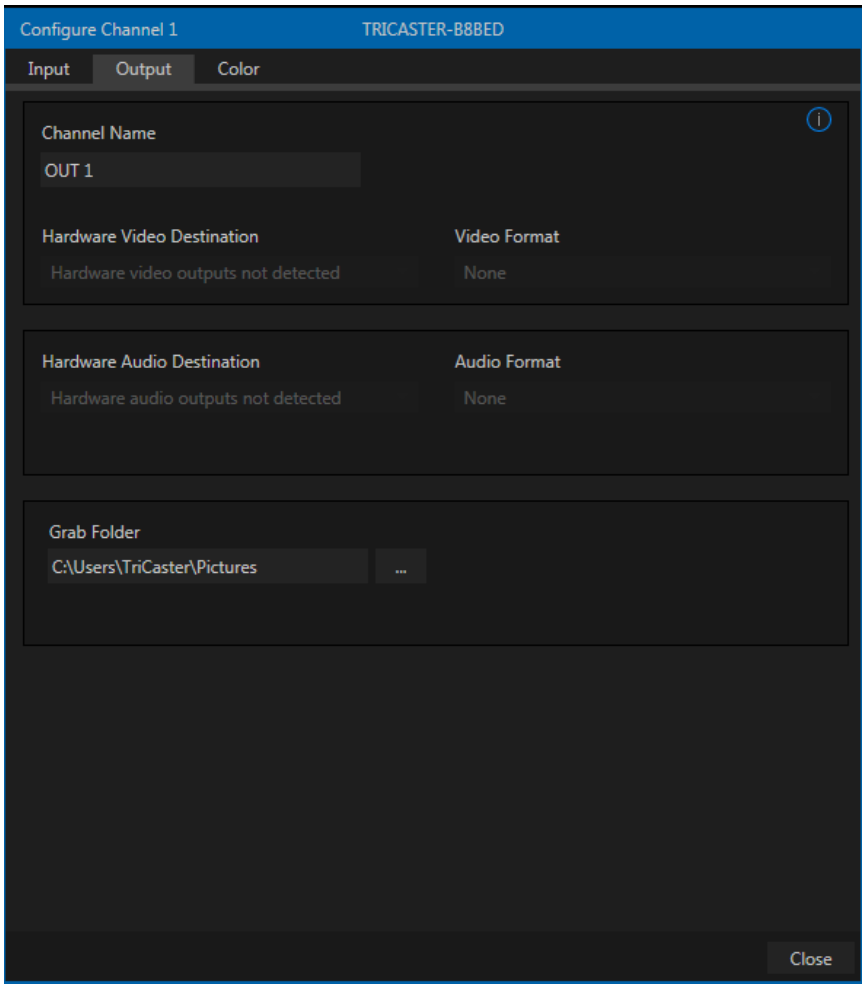


FIGURE 2-11

Selecting an odd-numbered output connection reveals Video and Alpha options in the Format menu. When you choose this option, key output is sent to the next higher numbered connector on the same card.

2.3.3 COLOR CONTROLS (PRO ONLY)

Choosing *Auto Color* automatically adapts color balance as lighting conditions change over time.

Note: Proc Amp adjustments follow Auto Color processing.

By default each camera with *Auto Color* enabled is processed by itself. Enable *Multicam* to process multiple cameras as a group.

To apply *Multicam* processing to a source without its own colors being evaluated, checkmark *Listen Only*. Or enable *Listen Only* for all *Multicam* group members except one to make that source the 'master' color reference.

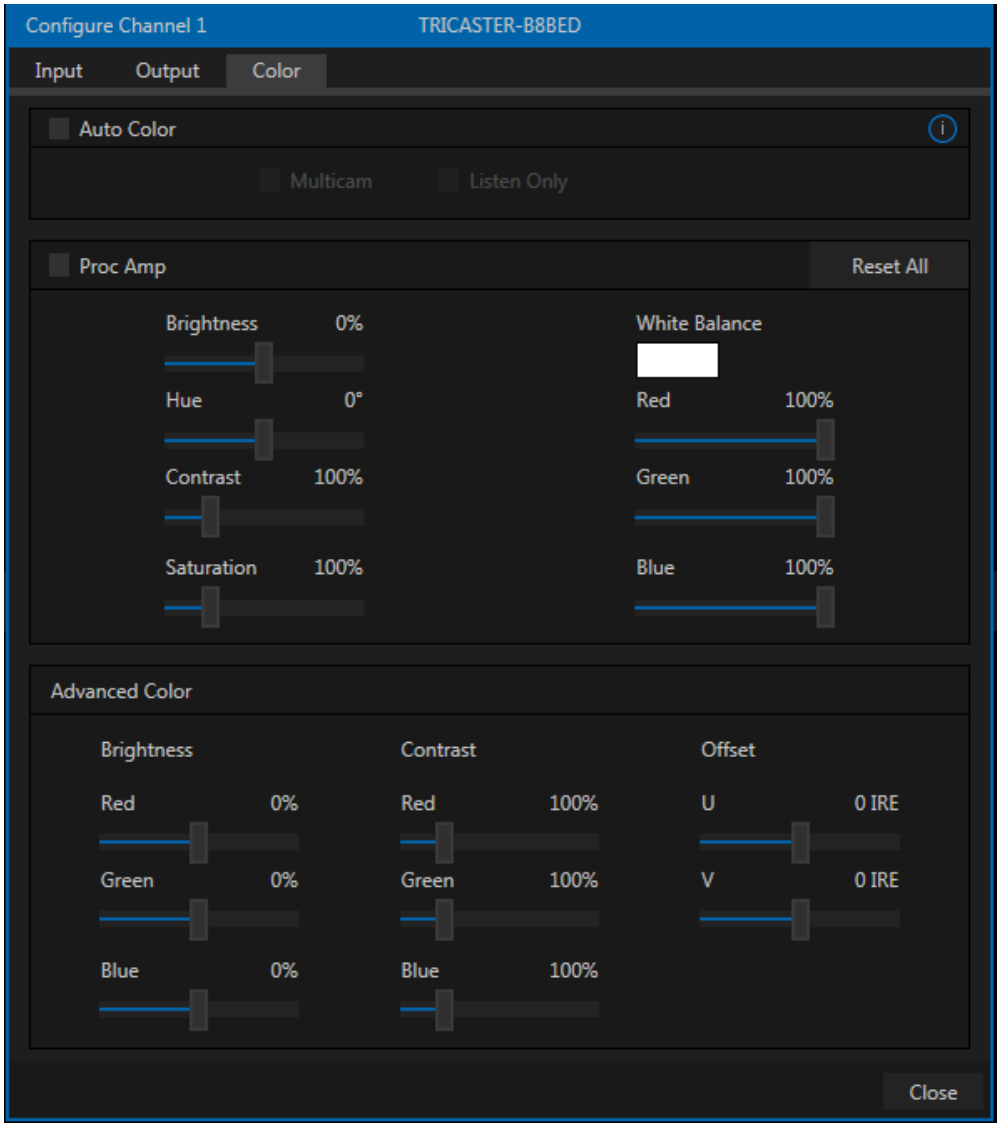


FIGURE 2-12

2.3.4 GRAB (PRO ONLY)

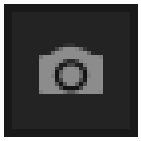


FIGURE 2-13

In NewTek Connect Pro, a *Grab Input* tool is located in the lower right corner below the monitor for a channel. By default, still image files are stored in the system "Pictures" folder. The path can be modified in the *Output* window for the channel (see Section 2.3.2).

2.3.5 HEADPHONE AND TITLEBAR TOOLS

2.3.5.1 HEADPHONES

Audio controls are located in the lower left of the NewTek Connect interface.

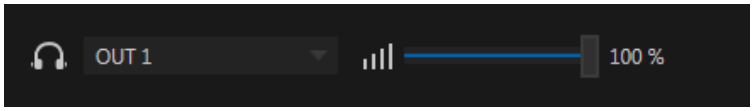
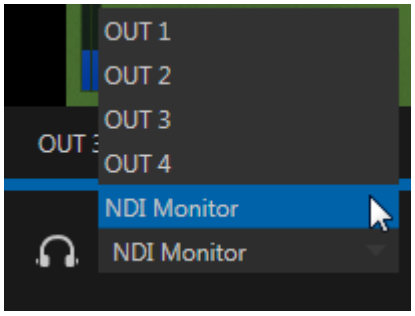


FIGURE 2-14



You can select which channel to listen to using the pop-up menu to the right of the headphone icon. The volume control can then be adjusted from this corner of the interface (see Figure 2-14).

Note: The first two audio channels from the source selected in the menu are transmitted to the headphone jack.

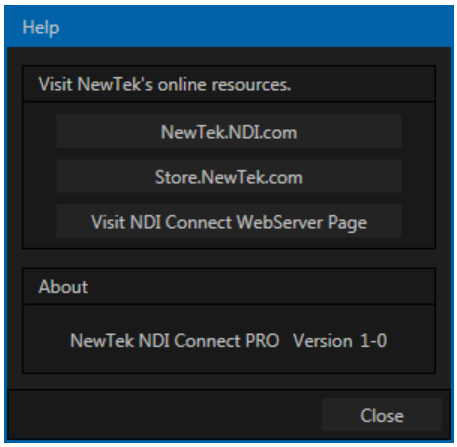
FIGURE 2-15

2.3.5.2 TITLEBAR TOOLS

Across the top of the application you will find the titlebar tools. This includes a *clock diplay*, *help*, *minimize*, and *exit* buttons.

FIGURE 2-16

2.3.5.3 HELP



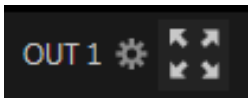
Clicking on the *Help* icon opens the panel shown in Figure 2-17.

In the *Help* window you can find links to:

- NewTek.NDI.com – the place to go for NDI Developer tools.
- Store.NewTek.com -
- Visit NewTek Connect WebServer Page -

FIGURE 2-17

SECTION 2.4 FULLSCREEN



Next to the gear in each quadrant is a **fullscreen** button. Clicking this button will expand the video in the selected quad to fill your monitor. Pressing ESC on your keyboard will return the display to normal.

CHAPTER 3 NEWTEK™ CONNECT WEBSERVER

Another very useful application is included with NewTek™ Connect Pro. Wouldn't it be great if a configurable display showing one or more NDI sources was available in the web browser of any system on your network? NewTek™ Connect Webserver gives you just that (Figure 3-1).

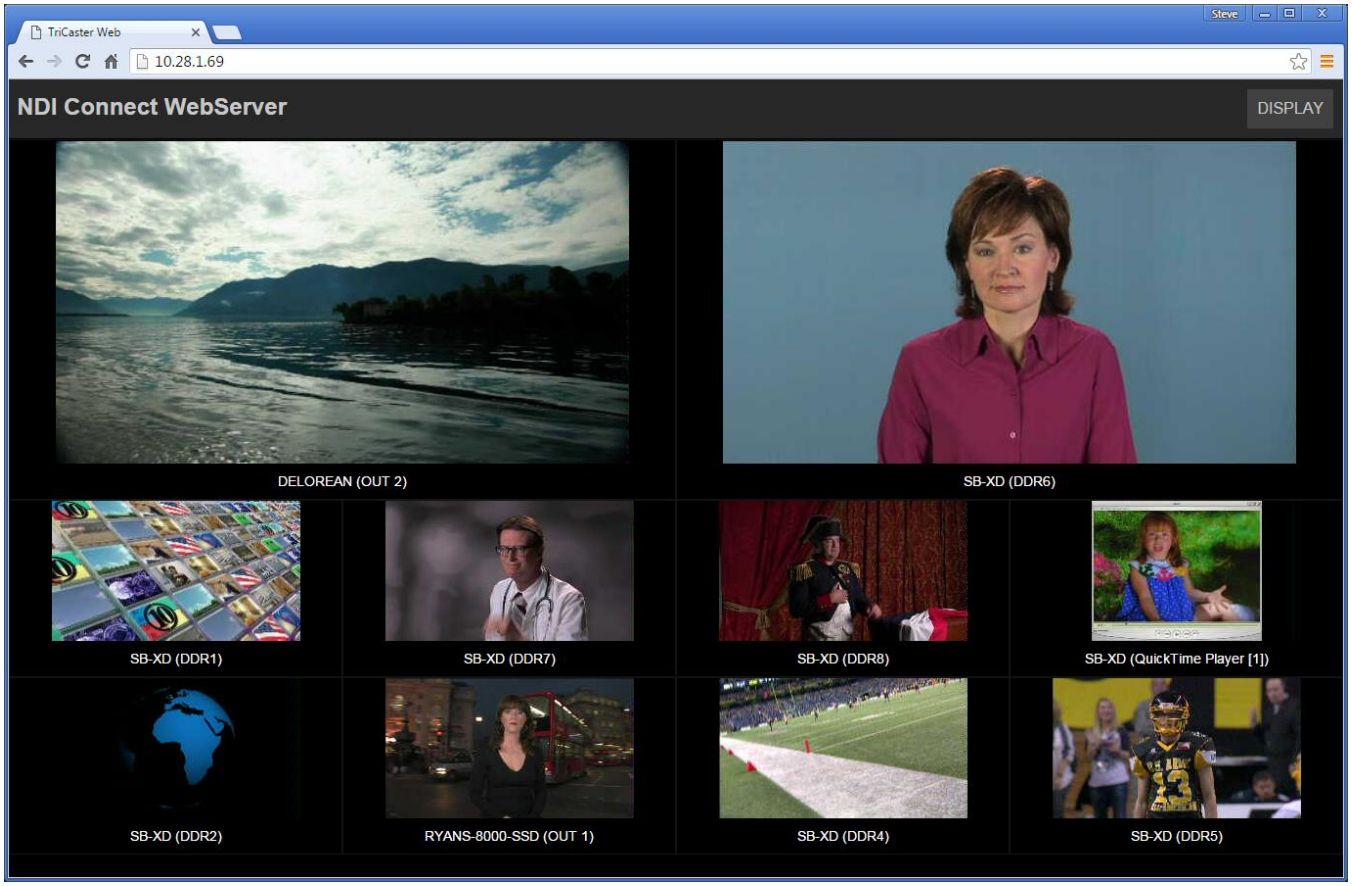


FIGURE 3-1

NewTek™ Connect Webserver runs automatically when you launch Connect Pro. You can easily open the corresponding webpage to examine it on the same system by clicking the *Visit NewTek Connect Webserver Page* link in NewTek™ Connect Pro's *Help* panel.

FIGURE 3-2

Click *Display* at upper right to choose a viewport layout (Figure 3-2). Then click a viewport to select one of the NDI sources currently being supplied to your network, assigning it to that viewport.

Continue to populate all of the viewports, then try a different *Display* layout. Notice that the sources you have chosen are retained as you do so. Configuration options are independent on each system, allowing you to freely design displays for different requirements.

Appendix A HELP

In this section, we'll consider common problems you may encounter using when NewTek Connect™. Where appropriate, we'll also point you to explanatory information elsewhere in this manual or elsewhere. If you've largely mastered your NewTek Connect but questions, this may be the best place to look first.

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

Table of Contents

CONNECTIONS 17
Connect does not see external NDI sources *17*
Debugging Failed Connections *18*
DOES MY PRODUCT SUPPORT NDI? 18
iVGA Pro *18*
LiveText *18*
NewTek TriCaster Mini, Mini SDI, 410, 460, 860, 8000 ..... *18*
TriCaster Advanced Edition *18*
Other TriCaster Models *18*
NewTek TalkShow *19*
NewTek 3Play *19*
Applications created prior to March 2016 by other vendors that support Network Inputs using AirSend *19*
NDI AND YOUR NETWORK 19
Routers and Firewalls *21*

SECTION A.1 CONNECTIONS

Like any network based system, NDI depends on at least two machines or devices being able to connect and communicate with each-other; of course there are a number of reasons why this might not be successful in any environment. This section will help explain the most common issues and help you diagnose and correct them to get the full benefit of NDI.

A.1.1 CONNECT DOES NOT SEE EXTERNAL NDI SOURCES?

If you cannot see other NDI sources on the network, the two most common causes are:

1. The NDI sources might not be in the same NDI groups as you are monitoring. The easiest way to check this is to use the NDI Group Manager (provided in NDI Tools) and remove to all of the listed sending and receiving groups for both systems.
2. The mDNS ports are blocked on either the sender, receiver or network.

SECTION A.2 DEBUGGING FAILED CONNECTIONS

If you can see other NDI sources on the network, the most common cause is that the port numbers required for video transfer are blocked by local firewalls, or by the network hub itself.

To debug failed connections, proceed as follows:

1. Run reliable NDI sending and receiving applications (such as NDI Test Patterns and NDI Video Monitor, both in NDI Tools) on the same computer system. This approach bypasses the local network infrastructure. If they fail to connect, then the problem is either your NDI group configuration, or local software based firewalls.
2. Connect two computers together using a network crossover cable. If NewTek Connections succeed in this configuration but fail when attached to the network, the network infrastructure is the most likely cause of the problem.

SECTION A.3 DOES MY PRODUCT SUPPORT NDI?

A.1.2 NEWTEK IVGA PRO

This application is not supported for NDI, having been replaced by "NDI Scan Converter". The latter is included in NDI Tools, which you can download without cost from NDI.NewTek.Com

A.1.3 NEWTEK LIVETEXT

Native NDI support is provided by LiveText 3.0, which will be a free download from the main NewTek downloads page.

A.1.4 NEWTEK TRICASTER MINI, MINI SDI, 410, 460, 860, 8000

Version 2-5 for these systems provides support for NDI using the Net 1 and 2 inputs and Network output. This update may be downloaded from the NewTek website.

A.1.5 NEWTEK TRICASTER ADVANCED EDITION

The TriCaster Advanced Edition version 3-2 provides support for NDI using the Net 1 and 2 inputs and Network output. and may be downloaded from the NewTek website.

The upcoming TriCaster Advanced Edition IP version offers a complete, end-to-end, NDI and IP based workflow on every input and output.

A.1.6 OTHER TRICASTER MODELS

NDI has not been extended to other TriCaster models at the current time, but may be added in the future.

A.1.7 NEWTEK TALKSHOW

The TalkShow version 1-2 update (or better) available from the NewTek website adds full NDI support.

A.1.8 NEWTEK 3PLAY

In the very near future, software updates providing native NDI output for all current 3Play models will be available from the NewTek website.

SECTION A.4 APPLICATIONS CREATED PRIOR TO MARCH 2016 BY OTHER VENDORS THAT SUPPORT NETWORK INPUTS USING AIRSEND

The "NewTek AirSend Updater", available from NDI.NewTek.Com, locates any AirSend applications and updates them to support NDI automatically.

SECTION A.5 NDI AND YOUR NETWORK

Basically, NDI networking consists of just two operations:

1. It detects other NDI sources on the network using mDNS. mDNS uses port 5353.
2. It establishes direct communication between sources using ports provided by the operating system. In Microsoft Windows, for example, you can determine what range of port numbers might be used with:

    netsh int ipv4 show dynamicport tcp

High port numbers are relatively common. On modern OSes the port numbers typically start around 49000.

Note: NDI Input supports dual network cards allowing for an even greater degree of quality when using NDI sources across your network. Some NewTek Live Production products facilitate this by design, in other cases you may need to add a USB3 network adapter. This feature is not available for Apple or Linux NDI enabled systems or mobile devices.

SECTION A.6 ROUTERS AND FIREWALLS

Obviously your local network router or switch must permit communication using the ports assigned to NDI. Although most common networks do not block the mDNS port, it is not uncommon for networks to be configured to block high port numbers. This would prevent NDI from transmitting video.

Similarly, a software based firewall on the system itself might block the ports used by NDI. It is best to first test with firewalls turned off, then add the relevant firewall rules as needed.

Although it is not recommended, the default range of ports are used for dynamic allocation can be configured in most modern OSes. For instance, Microsoft Windows can be instructed to use ports 10000-11000 with the following command:

```
netsh int ipv4 set dynamicport tcp start=10000 num=1000
```

Note, too, that WIFI routers often block multicast traffic or transfer over certain port ranges between wired and wireless networks.

INDEX

3

3Play, 19

A

AirSend, 19

C

Connections
  Connect does not see external NDI sources, 17
  Debugging, 18

D

delay, 7

F

Firewalls, 21

I

iVGA Pro, 18

L

LiveText, 18

N

NDI Connect Webserver, 15
NewTek TriCaster Advanced Edition, 18

O

Other TriCaster Models, 18

T

TalkShow, 19
Third-Party Applications, 19
TriCaster standard edition, 18

W

Webserver, 15

CREDITS

Acknowledgments: Tim Jenison, Jim Plant

Engineering: Andrew Cross, Alvaro Suarez, Brian Brice, Cary Tetrick, Charles Steinkuehler, Dan Fletcher, Gil Triana, Greg Heine, James Killian, Jan Uribe, Jarrod Davis, Jeremy Wiseman, John Perkins, Karen Zipper, Kevin Rouviere, Kirk Morger, Mahdi Mohajer, Masaaki Konno, Matt Gorner, Menghua Wang, Michael Watkins, Mike Murphy, Nathan Kovner, Naveen Jayakumar, Ryan Hansberger, Shawn Wisniewski, Steve Bowie, Troy Stevenson, Zack Lounsbury

Additional thanks to: NewTek Marketing, Sales, Business Development, Customer Support,Training and Development, and Operations

With special recognition to: 3D Storm, DVS Direct, Lanlink Digital Broadcast

This product uses the following libraries, licensed under the LGPL license (see link below). For the source, and the ability to change and recompile these components, please visit the links provided:

- FreeImage library http://freeimage.sourceforge.net/
- LAME library http://lame.sourceforge.net/
- FFMPEG library http://ffmpeg.org/

For a copy of the LGPL licence, please look in the folder c:\TriCaster\LGPL\

Portions use Microsoft Windows Media Technologies. Copyright (c)1999-2008 Microsoft Corporation. All Rights reserved. VST PlugIn Spec. by Steinberg Media Technologies GmbH.

This product uses Inno Setup. Copyright (C) 1997-2010 Jordan Russell. All rights reserved.

Portions Copyright (C) 2000-2010 Martijn Laan. All rights reserved. Inno Setup is provided subject to its license, which can be found at:

http://www.jrsoftware.org/files/is/license.txt. Inno Setup is distributed WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY of FITNESS FOR A PARTICULAR PURPOSE.

Trademarks: NewTek, NewTek VMC1, NewTek VMC1 IN, NewTek VMC1 OUT, NewTek NC1, NewTek NC1 IN, NewTek NC1 I/O, TriCaster, TriCaster TC1, TriCaster Advanced Edition, TriCaster XD, TriCaster 8000, TriCaster TCXD8000, TCXD8000, TriCaster 860, TriCaster TCXD860, TCXD860, TriCaster 460, TriCaster TCXD460, TCXD460, TriCaster 410, TriCaster TCXD410, TCXD410, TriCaster Mini SDI, TriCaster Mini, TriCaster 40, TriCaster TCXD40, TCXD40, TriCaster 855, TriCaster TCXD855, TCXD855, TriCaster 455, TriCaster TCXD455, TCXD455, TriCaster EXTREME, TriCaster 850 EXTREME, TriCaster TCXD850 EXTREME, TCXD850 EXTREME, TriCaster 450 EXTREME, TriCaster TCXD450 EXTREME, TCXD450 EXTREME, TriCaster 850, TriCaster TCXD850, TCXD850, TriCaster 450, TriCaster TCXD450, TCXD450, TriCaster 300, TriCaster TCXD300, TCXD300, TriCaster PRO, TriCaster STUDIO, TriCaster BROADCAST, TriCaster DUO, MediaDS, MDS1, 3PLAY, 3Play, 3Play 3P1, 3Play 4800, 3PXD4800, 3Play 440, 3PXD440, 3Play Mini, 3Play 820, 3PXD820, 3Play 425, 3PXD425 3Play 330, 3PXD330, TalkShow, TalkShow VS 4000, TalkShow VS100, Network Device Interface, NDI, NewTek Connect, NewTek Connect Spark, NewTek IsoCorder, ProTek, ProTek Care, ProTek Elite, iVGA, SpeedEDIT, IsoCorder, LiveText, LiveGraphics Creator, LiveGraphics, DataLink, LiveSet, LiveGraphics, TriCaster Virtual Set Editor, Virtual Set Editor Advanced Edition, TriCaster VSE, TriCaster VSE Advanced Edition, LiveMatte, TimeWarp, VT, VT[3], VT[4], V[T5], Video Toaster, Toaster, Inspire 3D, 3D Arsenal, Aura, LightWave, LightWave 3D and LightWave CORE are trademarks, service marks, and registered trademarks of NewTek. All other brand names, product names, or trademarks belong to their respective holders.

NDI®

NewTek™ Connect

NewTek Connect is a trademark of NewTek Inc.
Copyright © 1990-2018 NewTek Inc. San Antonio TX USA