



Installation and Operation Manual

Teranex Processors

June 2017

English, 日本語, Français, Deutsch, Español, 中文,
한국어, Русский, Italiano, Português and Türkçe.

Languages

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Welcome

Thank you for purchasing a Blackmagic Design Teranex converter for your facility.

The Teranex converter you have purchased is an amazing quality standards converter that you will spend hours playing with to discover all the wonderful functions it has. I am still playing with it myself to see all the other things I can use it for! We have packed it with the latest SDI, HDMI and analog connections so you can use it to convert and connect anything!

One of the exciting advantages of the Teranex converter is the amazing quality of the conversions. It features a powerful SIMD processor that allows more complex calculations, allowing the Teranex to do a better job at processing video, removing field movement, detecting cadence, noise reduction, timecode conversions, subtitle conversion and much more!

Enjoy exploring your Teranex processor and we all hope you have many years of enjoyment out of it. Please let us know of any ideas and features you would like to see, as we are constantly updating the software so it gets better and better!

A stylized, handwritten signature in black ink that reads "Grant Petty". The script is fluid and cursive.

Grant Petty

CEO Blackmagic Design

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Getting Started

Plugging in Power

Getting started with your Teranex processor is as easy as plugging in power and connecting your signal input and output.

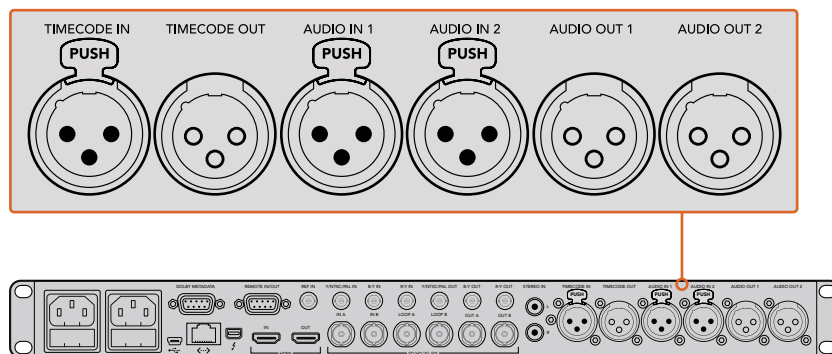
To supply power, plug in a standard IEC power cable to your Teranex processor's power input on the rear panel.

Plugging in Video

Plug your source video input into your Teranex processor's video input, and plug the video output into your destination equipment. Note that all video outputs are simultaneously active so you can connect to more equipment if needed. Confirm the signal by checking the LCD on the control panel. The LCD can display the input or output video, pressing the 'in' or 'out' button will set the display accordingly. The LCD also gives details about the video format and frame rate. The Teranex Express and AV also display timecode and audio levels.

Plugging in Audio

If you are connecting SDI video, then you already have audio connected as it is embedded in the SDI video signal. On Teranex processors with XLR connectors you can also plug in analog or AES digital audio.



Teranex 3D has XLR connectors for analog or AES audio input and output, plus LTC timecode in and out.

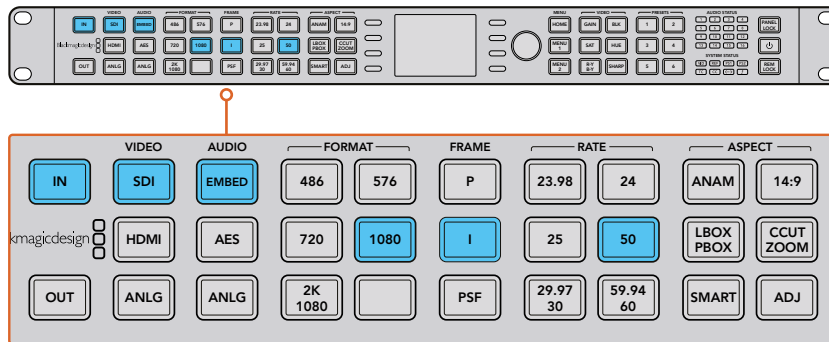
Conversions

Once you have powered your Teranex processor and connected your inputs and outputs, you are ready to perform a conversion. To set a conversion, the first thing to do is set your input and confirm the input signal.

Setting your input

- 1 Press the 'in' button on the left side of the control panel. The button will illuminate when selected.
- 2 Using the 'video' buttons, select the SDI, HDMI, analog or optical video input.
- 3 When your input is selected, you will see the image displayed on the built in LCD and your Teranex will automatically detect the input format and illuminate all the corresponding buttons, including format and frame rate.

- 4 Using the 'audio' buttons, select the embedded, AES, or analog audio input.
- 5 After setting your input, you can now change your output settings for your desired conversion.



Press the IN button to display the video input format. In this example, the format is 1080i50 via SDI with embedded audio.

Setting your output

- 1 Press the 'out' button on the left side of the control panel.
- 2 Select the video 'format' you want to convert to.
- 3 Choose the 'frame' line mode you want. For example, progressive, interlaced or progressive segmented frame.
- 4 Choose the desired frame 'rate'.
- 5 Now set the 'aspect' ratio you want.

Your converted video will now appear on the LCD and is available on all relevant video outputs.

Setting the Latency for Teranex AV

Teranex AV has a processing mode which by default is set to 'lowest latency.' This mode is ideal for use in live productions, with a typical latency or processing delay through the Teranex AV of 2 frames. To achieve this low latency, Teranex features not required in live productions are bypassed without affecting the overall image quality of your program. For post production applications we recommend that you use the 'highest quality' setting, which will enable you to utilize scene cut detection, noise reduction and linear interpolation algorithms as needed. To set the latency for Teranex AV:

- 1 Press the 'home' button, then press 'system setup' and then 'processing' to reach the 'processing' menu.
- 2 Select 'lowest latency' for live productions or 'highest quality' for post production applications.
- 3 Your Teranex AV will restart to enable the chosen processing mode.

NOTE For more information, refer to the "Conversion Workflows" section in this manual.

That's all there is to getting started with your Teranex processor. With the setup utility installed and your Teranex updated with the latest internal software, you can start setting your conversion workflows. Please keep reading the instruction manual for more detailed information on all the different conversion types, settings and powerful features of your Teranex processor.

Installing Admin Software

Software Installation

Blackmagic Teranex Setup is used to update your Teranex processor and to change conversion settings remotely. The software is very easy to use, and all the settings for any connected Teranex units can be accessed by clicking on each respective unit's settings icon on the Home page.

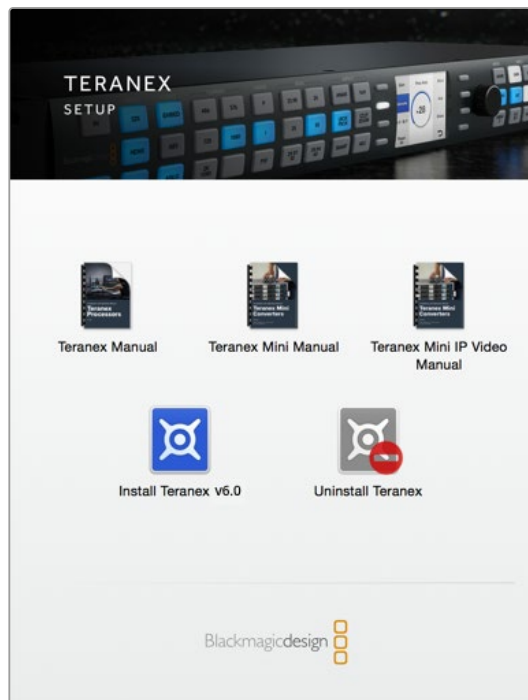
Installation on Mac OS X

- 1 Download the Blackmagic Teranex Setup software from www.blackmagicdesign.com
- 2 Unzip the downloaded file and open the resulting disk image to reveal its contents.
- 3 Double click the installer and follow the prompts to complete the installation.

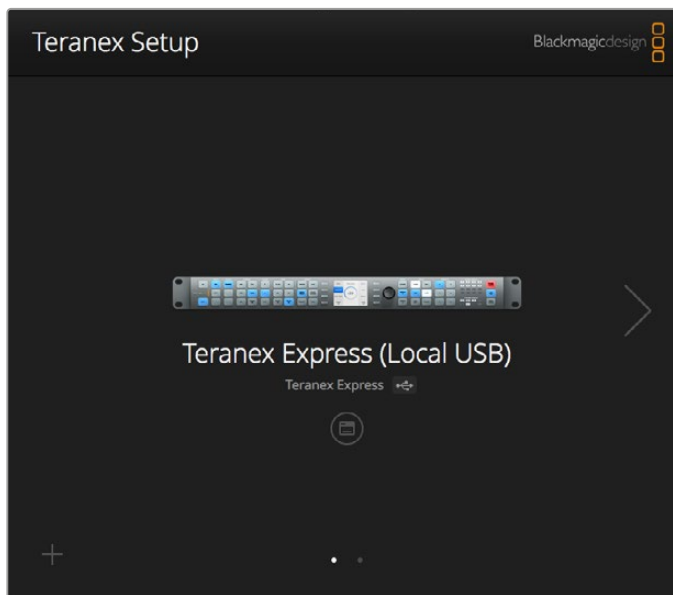
Installation on Windows

- 1 Download Blackmagic Teranex Setup from www.blackmagicdesign.com
- 2 Unzip the downloaded file. You should see a Blackmagic Teranex Setup folder containing this PDF manual and the Teranex setup utility installer.
- 3 Double click the installer and follow the prompts to complete the installation.
- 4 When the installation has finished, it will prompt you to restart your computer. Click 'restart' to complete the installation.

Once your computer has restarted, Blackmagic Teranex Setup will be ready to use.



After downloading and unzipping the Blackmagic Teranex Installer, simply launch the installer and follow the install prompts.



Use Blackmagic Teranex Setup for updating your Teranex processor and for changing settings remotely from a Mac OS X or Windows computer.

Updating the Internal Software

It is important to ensure that power is connected to your Teranex processor before connecting a USB cable between the computer and your Teranex.

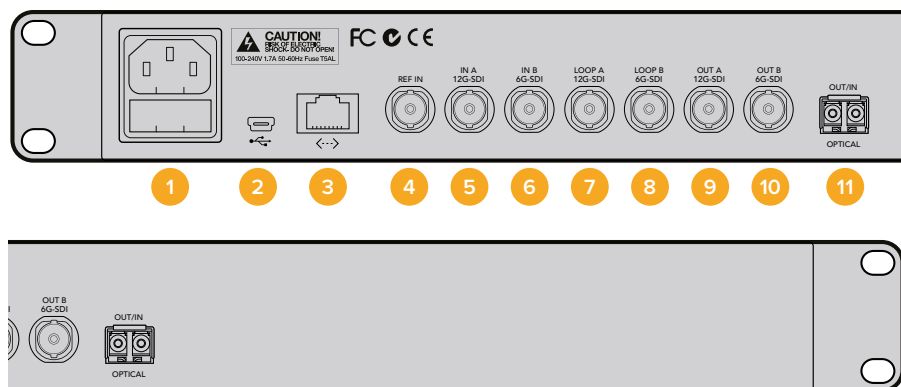
- 1 Power your Teranex processor.
- 2 Attach a USB cable from the computer to your Teranex.
- 3 Launch the Blackmagic Teranex Setup application. Teranex Setup will detect the USB connection to your Teranex and will display it as a “Local USB” connection. A USB connected device is always positioned as the first device in the list of connected devices in Teranex Setup. Note the white dot at the bottom of the screenshot on the previous page.
- 4 Click the icon below the processor’s name to establish a connection. If Blackmagic Teranex Setup contains newer internal software than that currently installed in your Teranex, you will be prompted to update. Just follow the onscreen instructions to complete the update. Once the internal software update is complete, disconnect the USB cable. If you are connected to your Teranex via Ethernet, you may locate your Teranex by name within the list of Teranex connected devices to make changes to your Teranex settings using the setup utility.

Connectors

The types of connectors will vary depending on your Teranex processor model. Generally, all Teranex processors can convert SDI signals. Other models can also convert HDMI and analog video, but you will need to check your particular model to know which information in this manual is relevant to your Teranex.

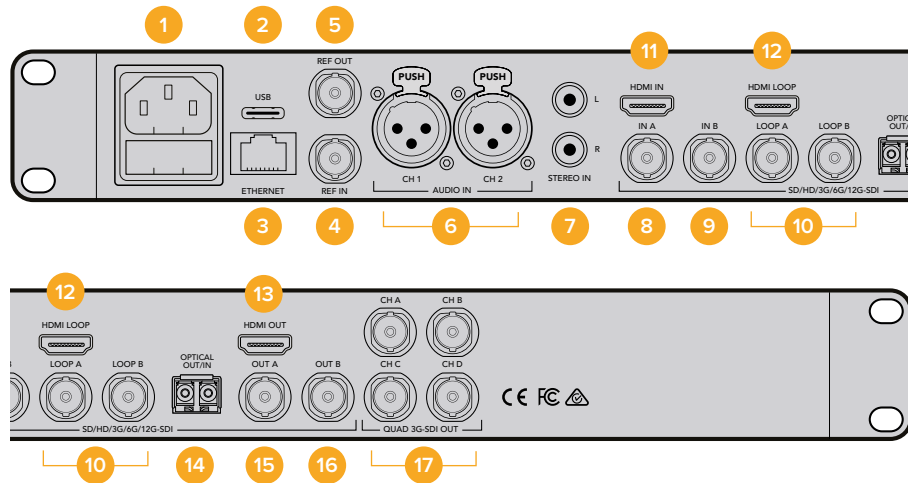
This section shows you all the connectors that are built into each Teranex model so you can quickly identify them.

Teranex Express



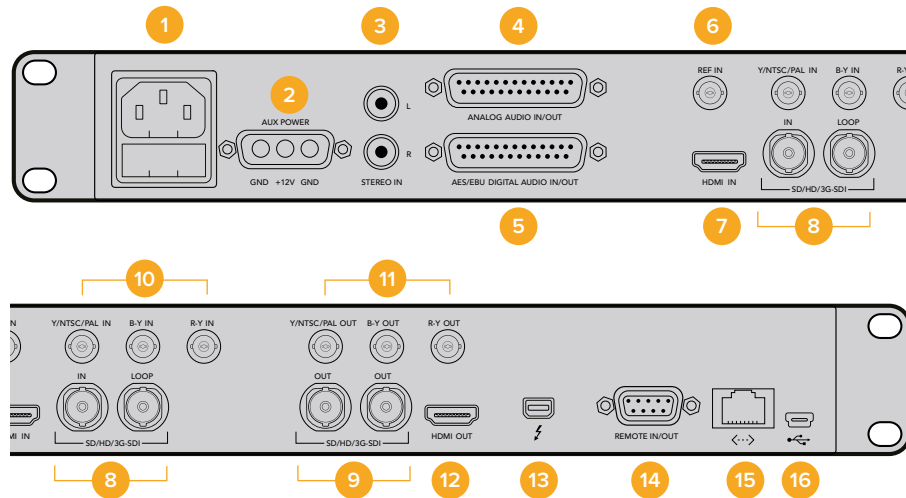
- 1 Power**
1x IEC C14 – For built-in international 90 – 240 volt AC power supply.
- 2 USB**
1x USB Type B – Connect to a computer running Blackmagic Teranex Setup software to update the internal software.
- 3 Ethernet**
1x RJ-45 – Connect to a computer running Blackmagic Teranex Setup software to apply settings remotely.
- 4 REF In**
1x BNC – Black burst or tri-level reference input.
- 5 SDI In A**
1x BNC – 12G-SDI input A. Usable for single link or dual-link=SDI input.
- 6 SDI In B**
1x BNC – 6G-SDI input B. For dual-link input only.
- 7 SDI In A Loop**
1x BNC – 12G-SDI video loop output. May also be used for one channel of quad-3G output.
- 8 SDI In B Loop**
1x BNC – 6G-SDI video loop output. May also be used for one channel of quad-3G output.
- 9 SDI Out A**
1x BNC – 12G-SDI video output A.
May also be used for dual-link output or for one channel of quad-3G output.
- 10 SDI Out B**
1x BNC – 6G-SDI video output B. Will replicate output A if output format is 6G-SDI or less.
May be used for dual-link output or for one channel of quad-3G output.
- 11 Optical Out/In Socket**
Supports SMPTE optical fiber SFP modules for 3G, 6G or 12G SDI speeds to support video formats up to Ultra HD 2160p60 depending on the module that is installed.

Teranex AV



- 1 Power**
1x IEC C14 – For built-in international 90 – 240 volt AC power supply.
- 2 USB**
1x USB Type C – Connect to a computer running Blackmagic Teranex Setup software to update the internal software.
- 3 Ethernet**
1x RJ-45 – Connect to a computer running Blackmagic Teranex Setup software to apply settings remotely.
- 4 REF In**
1x BNC – Black burst or tri-level reference input.
- 5 REF Out**
1x BNC – Black burst or tri-level reference generator output running at current output video format.
- 6 Audio In CH 1 and CH 2**
2x XLR – Two channels of balanced analog audio in or two pairs of AES digital audio in, user selectable.
- 7 Analog Inputs, Left and Right**
2x RCA Phono – Stereo audio Inputs, left and right, unbalanced, line level.
- 8 SDI In A**
1x BNC – 12G-SDI input A. Usable for single link or dual-link SDI input.
- 9 SDI In B**
1x BNC – 12G-SDI input B. Usable for single link or dual-link SDI input.
- 10 SDI In A and In B Loop**
1x BNC – 12G-SDI input A active loop through.
1x BNC – 12G-SDI input B active loop through.
- 11 HDMI In**
1x HDMI type A – HDMI input.
- 12 HDMI Loop**
1x HDMI type A – loop out of HDMI input that is not changed by Teranex processing.
- 13 HDMI Out**
1x HDMI type A – Processed output via HDMI out
- 14 Optical Out/In Socket**
Supports SMPTE optical fiber SFP modules for 3G, 6G or 12G SDI speeds to support video formats up to Ultra HD 2160p60 depending on the module that is installed.
- 15 SDI Out A**
1x BNC – 12G-SDI video output A. May also be used for dual-link output.
- 16 SDI Out B**
1x BNC – 12G-SDI video output B. Replicates SDI output A, except when used for dual-link output
- 17 Quad 3G-SDI Out – CH A, B, C, D**
4x BNC – Quad 3G-SDI outputs, active with applicable Ultra HD output formats up to 2160p60.
If output format is not Ultra HD, these become 4 replicated SDI outputs.

Teranex 2D



1 Power

1x IEC C14 – For built-in international 90 – 240 volt AC power supply.

2 Power – 12VDC

1x – Military grade port for external battery power or failover redundancy with optional “brick” DC adapter.

3 Analog Inputs, Left and Right

2x RCA Phono – Stereo audio inputs, left & right, unbalanced, line level.

4 Analog Audio In/Out

1x DB-25 – Four channels of balanced analog audio I/O.

5 AES/EBU Digital Audio In/Out

1x DB-25 – Four pairs of digital audio I/O.

6 REF In

1x BNC – Black burst or tri-level reference input.

7 HDMI In

1x HDMI type A – HDMI input

8 SDI In and Input Loop

1x BNC – 3G-SDI input.
1x BNC – 3G-SDI input active loop through.

9 SDI Outputs

2x BNC – Replicated 3G-SDI outputs.

10 Analog Video Inputs

1x BNC – Y/NTSC/PAL component/composite input.
1x BNC – B-Y component input.
1x BNC – R-Y component input.

11 Analog Video Outputs

1x BNC – Y/NTSC/PAL component/composite output.
1x BNC – B-Y component output.
1x BNC – R-Y component output.

12 HDMI Out

1x HDMI type A – HDMI output.

13 Thunderbolt

1x Thunderbolt – Capture/playback computer interface.

14 Remote In/Out

1x DB9 – Sony™ compatible RS-422 deck control port.

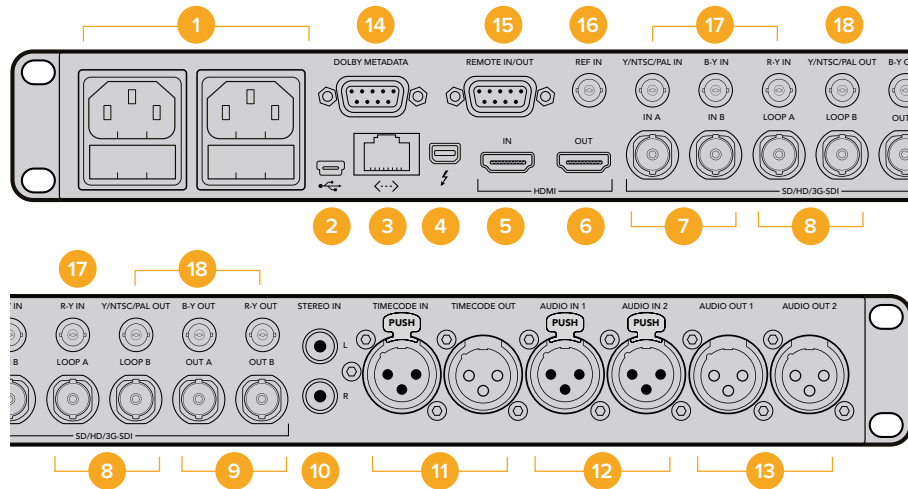
15 Ethernet

1x RJ-45 – Connect to a computer running Blackmagic Teranex Setup software to apply settings remotely.

16 USB

1x USB Type B – Connect to a computer running Blackmagic Teranex Setup software to update the internal software.

Teranex 3D



- 1 Power**
2x IEC C14 – For built-in international 90 – 240 volt AC power supplies for failover redundancy.
- 2 USB**
1x USB Type B – Connect to a computer running Blackmagic Teranex Setup software to update the internal software.
- 3 Ethernet**
1x RJ-45 – Connect to a computer running Blackmagic Teranex Setup software to apply settings remotely.
- 4 Thunderbolt**
1x Thunderbolt – Capture/playback computer interface.
- 5 HDMI In**
1x HDMI type A – HDMI input.
- 6 HDMI Out**
1x HDMI type A – HDMI output.
- 7 SDI Inputs A and B**
1x BNC – 3G-SDI input A
Usable for single link, encoded 3D input, dual link HD-SDI or dual stream 3D left eye input.
1x BNC – 3G-SDI input B
Usable for dual link HD-SDI or dual stream 3D right eye input.
- 8 SDI Input A and B Loop**
1x BNC – SDI input A active loop through.
1x BNC – SDI input B active loop through.
- 9 SDI Outputs A and B**
1x BNC – 3G-SDI output A. Single link output. Usable for dual link HDSDI or dual stream 3D left eye output.
1x BNC – 3G-SDI output B. Replicated Single link output. Usable for dual link HDSDI or dual stream 3D right eye output.
- 10 Analog Inputs, Left and Right**
2x RCA Phono – Stereo audio Inputs, left and right, unbalanced, line level.
- 11 LTC Timecode In/Out**
1x XLR – Timecode Input.
1x XLR – Timecode Output.
- 12 Analog/AES-EBU Audio In**
2x XLR – Two channels of balanced analog audio in or two pairs of AES digital audio in, user selectable.
- 13 Analog/AES-EBU Audio Out**
2x XLR – Two channels of balanced analog audio out or two pairs of AES digital audio out, user selectable.
- 14 Dolby Metadata**
1x DB9 – Dolby metadata support using RS-485.
- 15 Remote In/Out**
1x DB9 – Sony™ compatible RS-422 deck control port.
- 16 REF In**
1x BNC – Black burst or tri-level reference input.

17 Analog Video Inputs

- 1x BNC – Y/NTSC/PAL component/composite input.
- 1x BNC – B-Y component input.
- 1x BNC – R-Y component input.

18 Analog Video Outputs

- 1x BNC – Y/NTSC/PAL component/composite output.
- 1x BNC – B-Y component output.
- 1x BNC – R-Y component output.

Changing Settings

There are two different ways you can change settings on your Teranex processor. You can use the front control panel, or the Blackmagic Teranex Setup software. This section will show you how to use the control panel, or the setup software, to change settings on your Teranex processor.

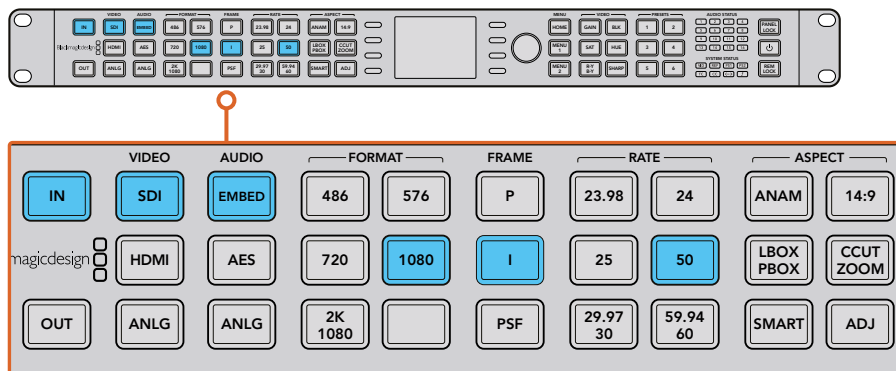
Changing Settings using the Front Control Panel

Changing settings with the built in control panel is very easy! Once you know the basic principles behind a conversion, all other conversions will become intuitive.

To set a conversion, the first thing to do is set your input and confirm the input signal.

Setting your Input

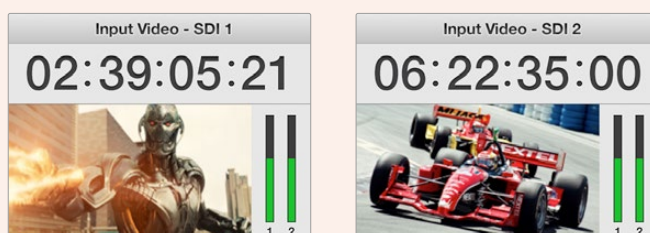
- 1 Press the 'in' button on the left side of the control panel. The button will illuminate when selected.



Press the 'in' button to display the video input format. In this example, the format is 1080i50 via SDI with embedded audio.

- 2 Using the 'video' buttons, select the SDI, HDMI, analog or optical video input. The inputs available will depend on your Teranex model. When your input is selected, you will see the image displayed on the built in LCD and your Teranex will automatically detect the input format and illuminate all the corresponding buttons, including format and frame rate. The 'frame' button will also illuminate to show you whether your input format is progressive, interlaced or progressive segmented frame.

NOTE If selecting analog video on Teranex 2D or 3D, confirm component or composite video on the LCD by turning the rotary knob. On Teranex AV, pressing the SDI button more than once will alternate between the two rear panel SDI inputs, SDI 1 and SDI 2. On the first button press, the LCD will momentarily display which SDI input is currently selected. If you press SDI again within 5 seconds, the Teranex AV will switch to your other SDI input signal.



When selecting between the 2 SDI sources on Teranex AV, the LCD will momentarily display which input you have selected.

- 3 Using the 'audio' buttons, select the embedded, AES, or analog audio input. If selecting analog, confirm your connection as either 'XLR', 'DB25' or 'RCA' to let your Teranex know you want analog audio from the XLR connectors, DB25 connector or the RCA HiFi line input connectors.

Setting your Output

After setting your input, you can now change your output settings for your desired conversion.

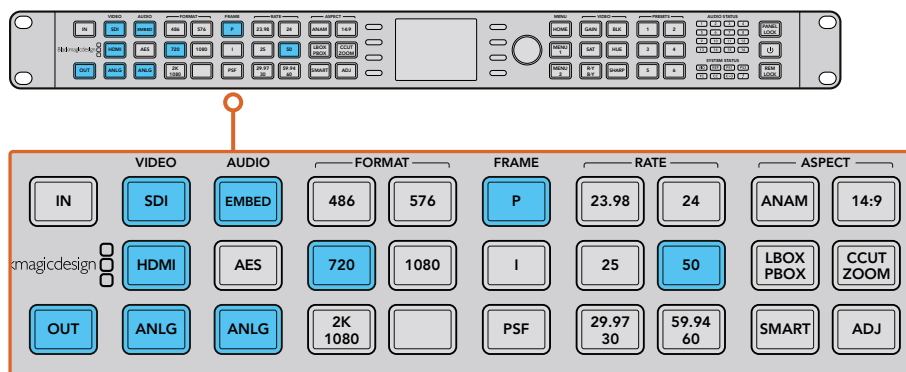
- 1 Press the 'out' button on the left side of the control panel.
- 2 Select the video 'format' you want to convert to.
- 3 Choose the 'frame' line mode you want. For example, progressive, interlaced or progressive segmented frame.
- 4 Choose the desired frame 'rate'.

TIP Buttons with two options, for example the 29.97 and 30 frame rate, alternate with each press of the button.

- 5 Now set the 'aspect' ratio you want.

Your converted video will now appear on the LCD and is available on all relevant video outputs. You can improve the quality of your conversion by making adjustments to the 'proc amp' and 'video' settings, such as noise reduction, clean cadence, color correction, sharpness, and more.

Refer to the 'Teranex processor settings' and 'conversion workflows' sections for more information about all of the settings on your Teranex and how they work together.



Press the 'out' button and select a format to convert to. In this example, the conversion is set to: 720p50, embedded SDI and HDMI audio, plus analog audio.

Control Panel Overview

This section contains a general overview of all the buttons and features on your Teranex processor's front control panel.

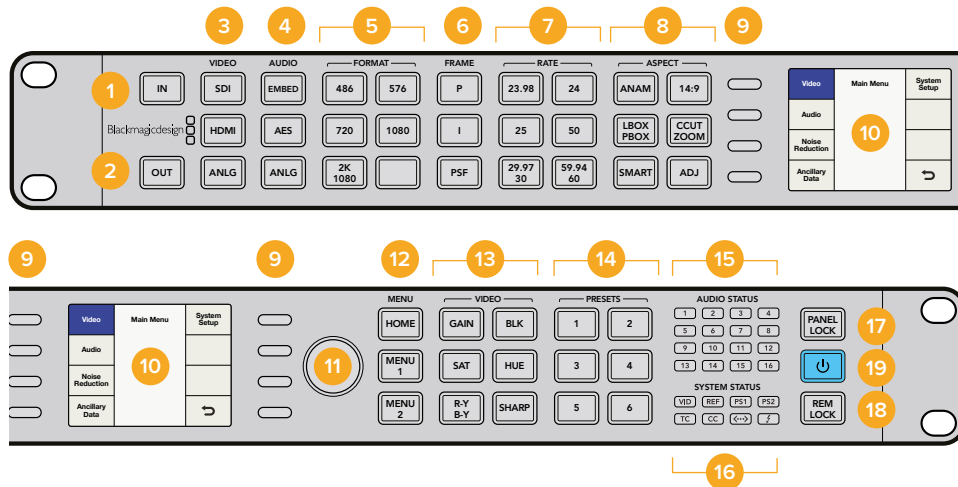
Everything you need to set up your conversions and monitor their status is right there in front of you. Use the control panel LCD, soft menu buttons and rotary knob to navigate through the menus and make your selections. For example, when setting timecode, the cursor is moved forward or backward through the timecode register using the soft menu buttons. Timecode digits are adjusted using the rotary knob. Pressing the rotary knob returns parameters to their default value.

Program your conversion settings by pressing the buttons on the control panel. Buttons are illuminated so you can quickly check the status of your audio and video connections and output settings.

Explore the Teranex menus and experiment with conversion workflows. You'll find examples of common workflows in the 'Conversion Workflows' section.

Some minor features will differ based on the model you are using, but the principles for how they work are the same.

Below is an overview of control panel features.



- 1 IN**
Press to display current input settings.
- 2 OUT**
Press to display and change current output settings.
- 3 VIDEO**
Press to select video input type, and displays all video outputs.
- 4 AUDIO**
Press to select audio input type, and displays available audio outputs.
- 5 FORMAT**
Press to select the video output format, and displays the video input format.
- 6 FRAME**
Press to select the video output frame type, and displays video input frame type.
- 7 RATE**
Displays video input frame rate as frames or fields per second. Press to select video output rate.
- 8 ASPECT**
Press to select video input and output aspect ratio settings.
- 9 SOFT MENU BUTTONS**
Press to navigate the LCD menus and apply settings.
- 10 LCD**
Displays the video input and output, and menu settings.
- 11 ROTARY KNOB**
Turn to adjust menu settings. Press to return settings to default.
- 12 MENU**
Press to toggle the LCD between main menu and live video. 'menu 1' and 'menu 2' are programmable as menu page shortcuts. Press and hold to program them.
- 13 VIDEO**
Press to activate video proc amp settings.
- 14 PRESETS**
Press to save or recall custom system configurations.
- 15 AUDIO STATUS**
Displays available input and output audio channels.
- 16 SYSTEM STATUS**
Displays input, output and control status information.
- 17 PANEL LOCK**
Press and hold to lock the control panel to prevent accidental changes. Press and hold to unlock.
- 18 REM LOCK**
Press and hold to prevent access by Teranex Setup remote users. When active, button will turn red. Remote users will see a pop up stating that remote lock is set on the device. Press and hold to unlock.
- 19 POWER**
Press to power on. Press and hold to power off.

Presets

Use the six 'preset' buttons to save and recall your conversion settings. Presets may also be saved, recalled and given descriptive names via the Blackmagic Teranex Setup utility.

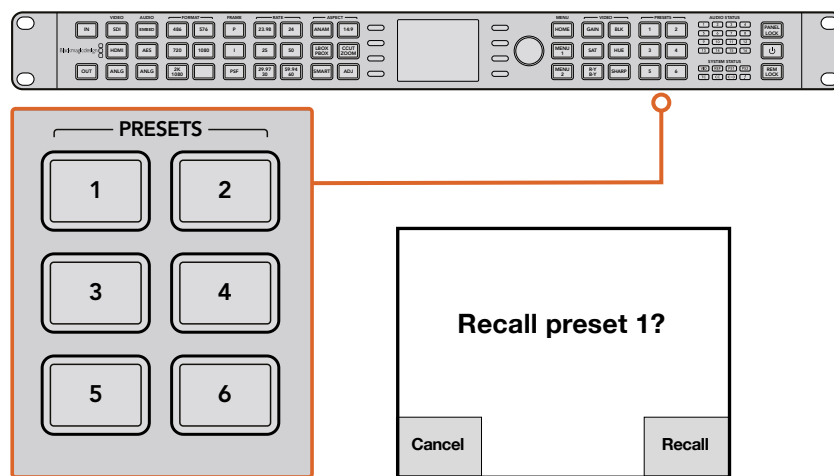
Presets will save all operating parameters of your Teranex for later recall. For example, you could store customized proc amp or aspect ratio settings for instant recall at the moment they are needed in your production. Or, you could save special timecode, closed caption or audio channel mapping configurations for easy repetitive use day after day.

- **To SAVE a preset:**

Hold the desired 'preset' button for three seconds. The button flashes to indicate the preset was saved and remains illuminated until a setting is adjusted.

- **To RECALL a preset:**

Press the desired 'preset' button and select 'recall' using the soft menu button. Once recalled, the 'preset' button will illuminate until settings are changed.



The Preset buttons are used to easily save and recall conversion settings.

TIP Depending on the preset settings, recalling a preset may momentarily disrupt the output video and audio. An example would be a format conversion preset. A preset that only changes 'proc amp' or 'aspect ratio' settings will not typically cause a loss of output. Be sure to test your presets prior to using them.

Audio and System Status LEDs

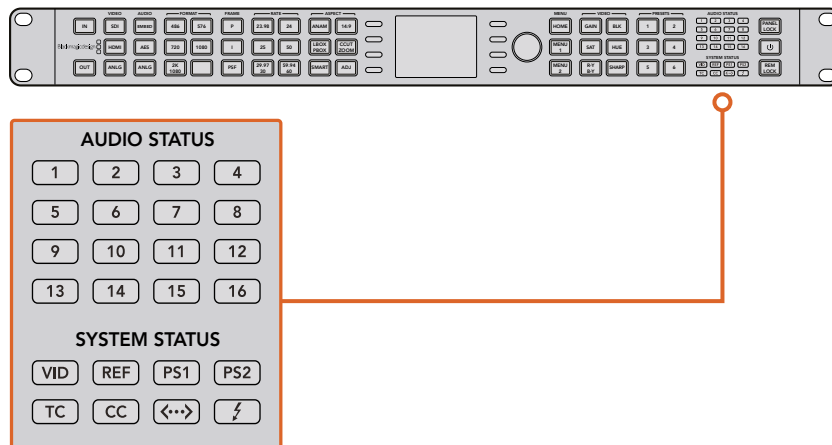
While performing your conversions, keep an eye on the status LEDs. Illuminated LEDs display signals and communications that are present. For example, indicators tell you which channels contain audio, what power connections are being used, if an external reference signal is present and more. The maximum number of channels supported for each audio type is as follows:

Audio Type	Teranex 2D	Teranex 3D	Teranex AV	Teranex Express
Embedded	16	16	16	16
AES/EBU	8	4	4	0
Analog	4	2	2	0

System Status LEDs indicate the following when illuminated:

VID	Input video is present
REF	External Reference is selected and External Reference input is present
PS1	Power Supply 1 is operational
PS2	Power Supply 2 is operational. For Teranex 2D and Teranex 3D only
TC	Timecode is present in input or output video
CC	Closed Captions are present in input or output video
<-->	Ethernet communication is present
⚡	Thunderbolt™ communication is present. For Teranex 2D and Teranex 3D only

The 'audio', 'timecode', and 'close caption' status lights show the presence of these parameters in either the input or output video, depending on the selection of 'in' or 'out'.



Status LEDs are located on the right side of the control panel.

Connecting to a Network

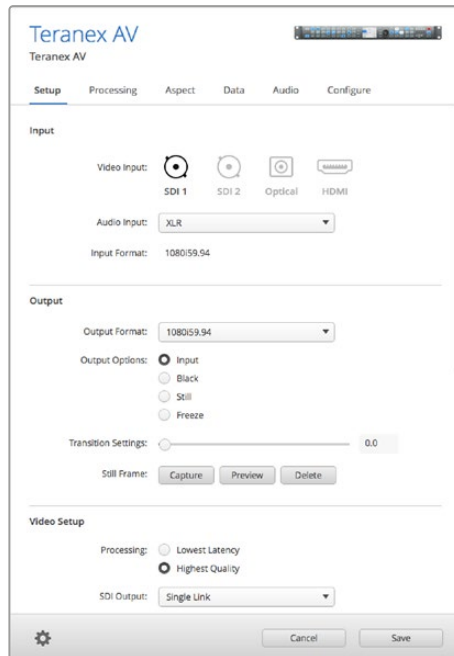
Connect your Teranex processor to your network by plugging a standard CAT-5 network cable into the Ethernet port on the rear panel. Connect the other end of the cable to your network.

By default, your Teranex is configured to automatically acquire a network address. You may change the network settings via the front panel 'system setup' menu. Press the 'home' button on the front panel, select 'system setup' and then the 'Ethernet' menu via the LCD soft buttons. Make the necessary adjustments to your network settings using the menus. Details for the 'Ethernet' menu are provided in the 'System Setup Menu Settings' section in this manual.

Plugging into your network lets you control your Teranex from a computer using the Blackmagic Teranex Setup software. This is helpful if you need to control your Teranex from a separate location, away from the built in control panel.

Changing Settings using Blackmagic Teranex Setup

The Blackmagic Teranex Setup utility offers an intuitive way to view the status of your Teranex Processor and provides remote control from any location on your Ethernet network. This convenient application lets you control your Teranex remotely, away from the front panel.



All your conversion settings can be set remotely using Blackmagic Teranex Setup.

Getting to Know the Interface

When you launch Blackmagic Teranex Setup, you'll first see the login pane. From here you can see all your connected Teranex Processors on your network, and you can add more Teranex Processors if you need to. Open the setup utility by clicking on the 'settings' icon below the name of your Teranex Processor.

Resizing the Interface

Click and drag the bottom right corner of the login pane to proportionally resize the interface to best fit your screen size. Alternatively, drag a window edge to resize either vertically or horizontally.

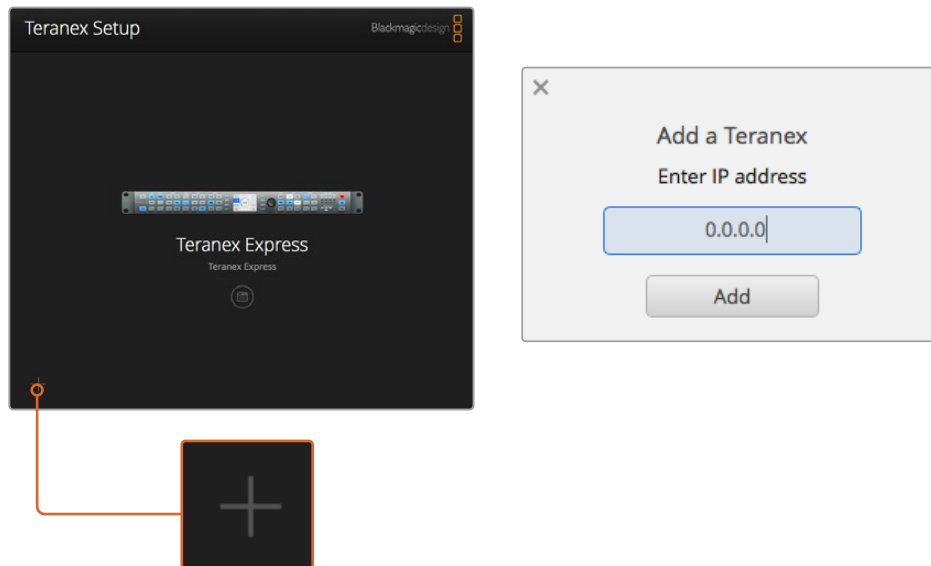
Selecting a Teranex Processor

The Teranex Setup utility will automatically locate your Teranex processor on your Ethernet network and will display it by model name in the log in pane. If more than one Teranex Processor is found, each will be displayed in a separate window. Simply click the arrows in the right and left screen margins to select the desired processor, then click the icon below the processor's name to establish a connection.

If your Teranex Processor did not automatically appear, you can add the unit manually using its IP address. The IP address of your Teranex Processor can be found via the unit's front panel in the 'system setup menu'. If you need to establish a new IP address, either static or via DHCP, this can also be done from the front panel. Please refer to the 'system setup menu' section of this manual for details.

To add a Teranex Processor using Teranex Setup:

- 1 Press the + button at the bottom left corner of the login pane to add a device.
- 2 Type in the IP address and press 'add'.
- 3 The Teranex Processor will appear as another controllable device on your network.



To manually add a Teranex Processor, click the “+” icon on the login pane to open the ‘Add a Teranex’ window, then enter the IP address of your Teranex Processor.

Menus and Buttons

Most of the remote control functions and parameters in the interface are very intuitive, especially if you are familiar with the front panel operation of the Teranex Processors.

Function Page Bar

Setup and operational controls are separated by function into six pages.

Setup

Selection of video and audio input sources, output video format, external reference and other functions. Unlike the front panel mode of operation, a change of output format is immediately processed and does not require confirmation.

Processing

Access to Video Proc Amp and Color Correction controls, as well as noise reduction and other advanced functions.

Aspect

Choice of aspect ratio, including fixed aspect ratios, variable aspect ratio controls and choice of color fill for PBOX/LBOX aspect ratios.

Data

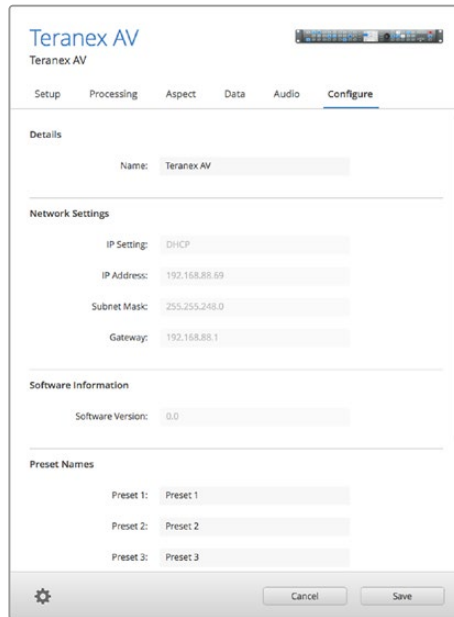
Ancillary data parameters, including timecode, closed captions and video indexing.

Audio

Audio gain, delay and mapping functions.

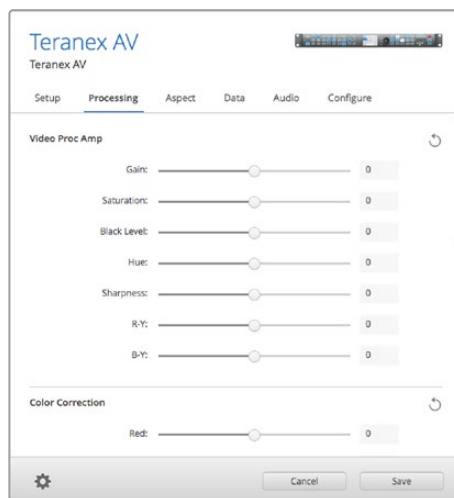
Configure

The configure tab displays the name and IP address of the Teranex you are controlling. You can assign a unique name to the unit so you can identify it when you have multiple Teranex units in your system. Simply click in the 'name' field and enter a new name for the device. The name will be seen when you are selecting a Teranex via the Teranex Setup utility and will also be displayed in the utility's header once connected. You can also assign descriptive names for each preset to make it easier to identify the owner, purpose or settings saved in the preset.



Slider Adjustments

To make adjustments, click and drag a slider with your mouse. Another way to adjust a slider is to use the directional keys on your keyboard. The 'up' and 'right' arrows will increment the slider by 1 unit, while the 'left' and 'down' arrows will decrement the value. You can also click in the value box to enter a slider value directly. When needed, you can simultaneously reset all parameters within a section to their default values by clicking the circular back arrow icon.



Settings Menu Using the Gear Icon

Clicking on the 'settings gear' icon reveals the settings menu used for remotely locking the front panel and saving or recalling presets. You may also save the current Teranex settings to a computer or load settings into a Teranex.

Panel Lock via Remote Control

You can remotely lock the Teranex front panel to prevent accidental changes by someone operating the front panel locally. Click on Panel Lock/Unlock in the gear menu to lock or unlock the front panel.

The Panel Lock button on the front panel will turn red when locked. When operating the unit locally, you can override this feature by disabling the panel lock, however caution should be exercised as the unit may be in use by another operator.

Saving and Recalling Presets

There are six presets available in your Teranex. The settings menu lets you save and recall them as needed. Click 'save preset' or 'recall preset', choose the desired 'preset' number and confirm your selection in the dialog box. In the 'configure' tab, you can assign descriptive names for each preset to make it easier to identify the owner, purpose or settings saved in the preset.

Using an External Computer to Save or Recall Current Settings

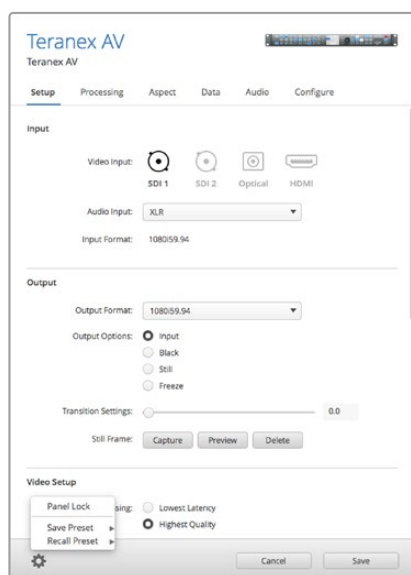
Through the Teranex Setup utility, you can save the current settings of your Teranex to a file on your computer and recall them later. This feature can also be used to quickly transfer a Teranex configuration from one Teranex to other units within your facility.

Save Current Settings:

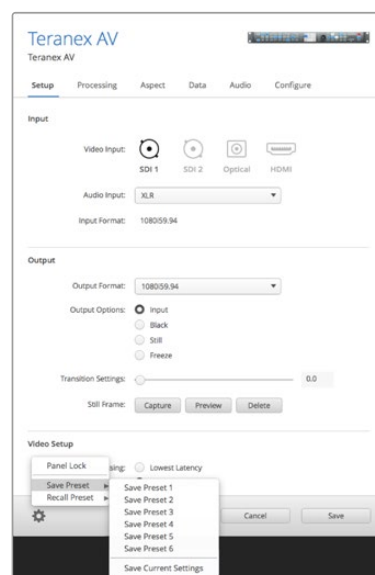
This command will export the current settings of your Teranex to a special '.tnx' settings file on your computer. Click on the 'settings gear' icon; click 'save preset' then 'save current settings.' A 'save settings' dialog box will open and prompt you to name the file and choose the desired folder in which to save it for future use. The file will automatically be given an extension of '.tnx.'

Recall Current Settings:

This command enables you to load a previously saved '.tnx' settings file from your computer to your Teranex. Make sure that you are connected to the desired target Teranex on your network. Click on the 'settings gear' icon; click 'recall preset,' then 'recall current settings.' A 'recall settings' window will open on your computer. Locate the desired '.tnx' settings file, click 'open' and the settings will immediately upload to your Teranex.



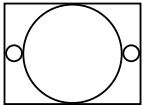
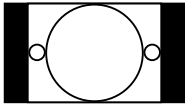
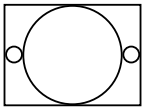
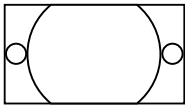
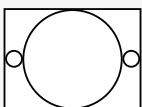
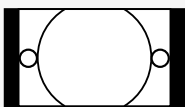
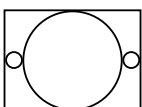
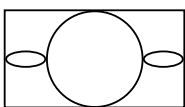
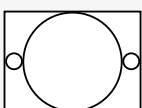
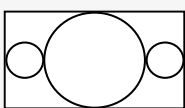
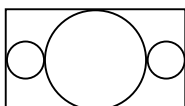

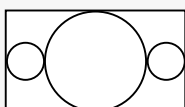
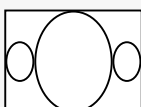
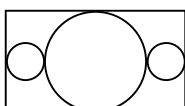
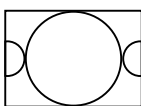
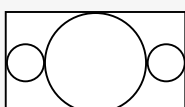
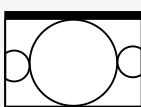
Click the 'settings gear' icon to reveal the menu.



Select the desired function from nested menu.

Aspect Ratio Conversions

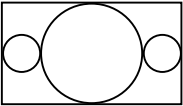
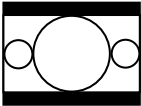
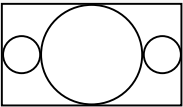
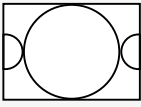
A conversion table is provided so you can easily see how each aspect ratio setting will appear in your conversion. This is a helpful reference tool so you can visually identify each setting and make your selection faster.

Up Conversion	Input 4:3	Output 16:9	
PBOX Pillarbox			Displays a 4:3 SD image inside an HD 16:9 frame. Black bars feature on the sides.
ZOOM			Zooms into an SD 4:3 image until it completely fills the HD 16:9 frame. A portion of the top and bottom is lost.
14:9			A compromise between Pillarbox and Zoom. Minimal black bars with a slight crop on the top and bottom.
SMART			Incrementally stretches the sides to fit 16:9 without distorting the main action of the 4:3 image.
ANAM Anamorphic			Horizontally stretches the 4:3 SD image into a 16:9 HD frame.
Down Conversion	Input 16:9	Output 4:3	
LBOX Letterbox			Scales the entire 16:9 HD image into a 4:3 SD frame leaving black bars on the top and bottom.
ANAM Anamorphic			Horizontally squeezes the 16:9 HD image into a 4:3 SD frame.
CCUT Center Cut			Cuts a 4:3 SD frame from the 16:9 HD image.
14:9			A compromise between Letterbox and Center Cut. Minimal black bars with a slight edge crop.

.Widescreen 16:9 SD Conversion to 4:3 SD

While most standard definition programming utilizes a 4:3 aspect ratio, some SD sources may have been recorded in widescreen 16:9. To process SD widescreen inputs properly, the Teranex Processor must be configured to recognize the source as a 16:9 signal.

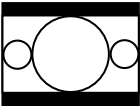
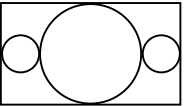
- 1 Press the 'in' button on the front panel.
- 2 In the 'aspect' section, press the 'lbox' button to define your SD input as 16:9 widescreen.
- 3 Press the 'out' button on the front panel.
- 4 To output a letterbox version of your widescreen SD source, press the 'lbox' button.
To output a center cut from the your widescreen SD source, press the 'ccut' button.

SD to SD Conversion	Input is Widescreen SD	Output 4:3	
Input LBOX with Output LBOX			Scales the entire 16:9 SD image into a 4:3 frame leaving black bars on the top and bottom.
Input LBOX with Output CCUT			Cuts a 4:3 SD frame from the 16:9 SD image.

4:3 Letterbox SD Conversion to 16:9 SD or HD

A 4:3 standard definition source with an letterboxed 16:9 image can be converted to a full 16:9 output aspect ratio by extracting the 16:9 letterbox and expanding it to a full 16:9 image. The output format can be SD or HD in the Teranex 2D or 3D, as well as Ultra HD in Teranex AV and Teranex Express.

- 1 Press the 'in' button on the front panel.
- 2 In the 'aspect' section, press 'ccut'.
- 3 Press the 'out' button on the front panel and select the desired output video format.
- 4 In the 'aspect' section, press 'ccut' to output a full 16:9 image. For an SD output, the front panel LCD will display an anamorphic 4:3 image. For HD formats, the image will be 16:9.

4:3 LBOX to 16:9 Conversion	Input is Letterbox SD	Output 16:9	
Input CCUT with Output CCUT			Expands the 16:9 letterbox to a full 16:9 aspect ratio

Conversion Workflows

This section of the manual demonstrates the set up workflows for the main conversions you can perform with your Teranex Processor. All conversions such as standards conversion, up, down and cross conversion, follow the same general set up using the front control panel. You will also see how to save and recall presets for frequently used conversions and how to set cadence settings so you can clean or remove cadence in material using 3:2 pull down.

TIP When setting up a conversion, the status LEDs on the control panel let you monitor exactly what signals are present. You can find more information in the 'Audio and System Status LEDs' section.

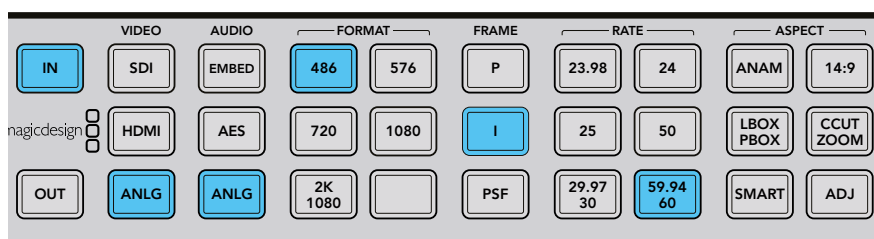
Up Conversion

Up Conversion is the process of converting your video to a higher resolution. For example, you may need to insert an NTSC SD source into an HD production. The NTSC clip can be converted to many 720 and 1080 HD output formats and frame rates, depending on your project's requirement. Teranex processors employ high quality de-interlacing and up conversion algorithms, assuring outstanding results. In this example, 486i59.94 component analog video is converted to 1080p29.97 using zoom aspect ratio and RCA analog audio inputs on the Teranex 2D or 3D.

Power your Teranex Processor and connect your inputs and outputs.

Setting your Input

- 1 Press the 'in' button on the control panel and select 'anlg' video. The 'analog input' menu will be displayed on the LCD.
- 2 Using the rotary knob, select 'component' as your analog input type. Press the 'in' button to display your input video on the LCD. Teranex automatically detects the input format and illuminates the corresponding buttons on the control panel.
- 3 Press the 'anlg' audio button. Using the rotary knob, select RCA as your analog audio input type.

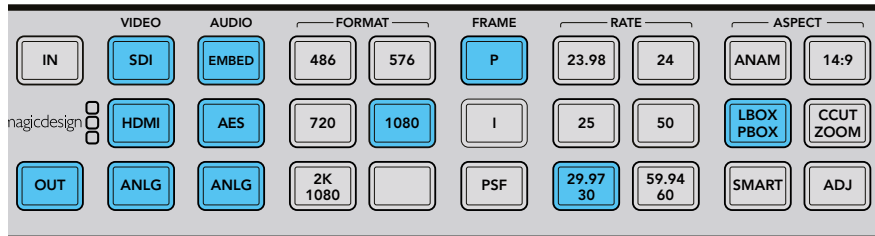


Pressing the IN button displays the input format on the control panel buttons. In the above illustration, the input format is 486i59.94 via analog component with analog audio.

Setting your Output

- 1 Press the 'out' button on the control panel. On the Teranex 2D, all output buttons will be illuminated blue. On the Teranex 3D, the 'embed' audio button will be blue. Select the 'AES' or 'anlg' button. AES/EBU and analog audio outputs share the XLR connectors. On the Teranex Express, the 'embed' audio button will be blue.

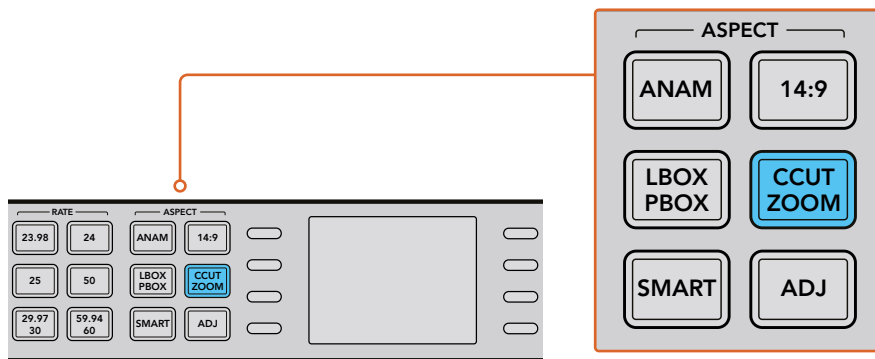
- 2 Press the '1080' button. Select the 'p' button for progressive output, and the '29.97/30' button to select your frame rate. The format, frame and rate buttons are now illuminated green, ready for you to accept your conversion set up or make changes.
- 3 Using the soft menu buttons, select 'change'. The output video is now displayed on the LCD and sent to all output connectors. The buttons will also illuminate blue to confirm your settings.



Press the OUT button to select your output settings. In the above illustration the output is set to 1080p29.97 with pillarbox aspect ratio.

Setting your Aspect Ratio

Press the 'ccut/zoom' button to set your aspect ratio to 'zoom'.
Your Teranex Processor is now ready to up convert your video.



Aspect ratios are set using the Aspect buttons on the control panel.

TIP For information on the types of aspect ratio settings and how they appear, refer to "Aspect Ratio Conversions" on page 23 and "Video Menu Settings" on page 35.

Up Conversion to Ultra HD using Teranex AV and Teranex Express

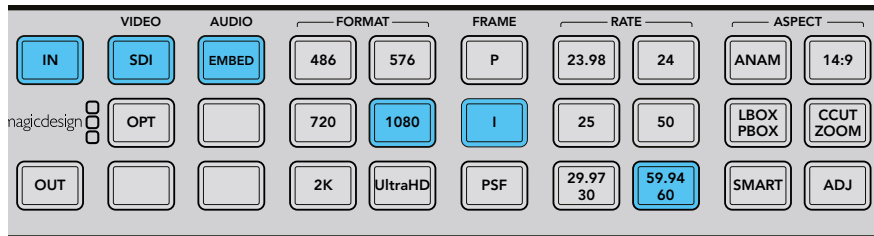
The Teranex AV and Teranex Express models support up conversion to Ultra HD and down conversion from Ultra HD. Both models feature 12G-SDI connections that support multi rate switching between 12G-SDI, 6G-SDI, 3G-SDI, regular HD-SDI and standard definition SDI. This means you can convert between SD, HD and Ultra HD formats easily.

In this example, 1080i59.94 SDI input video is being converted to Ultra HD 2160p59.94 with embedded audio.

Power your Teranex processor and connect your inputs and outputs.

Setting your Input

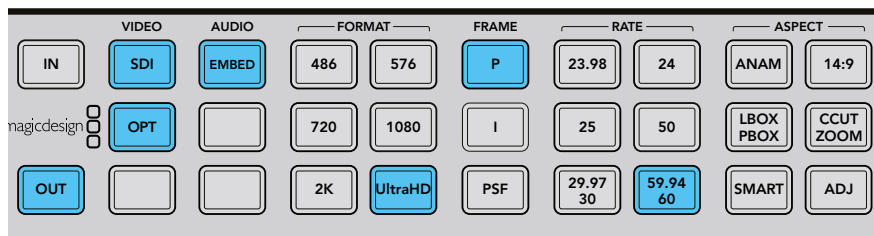
- 1 Press the 'in' button on the Teranex control panel and select 'SDI' video. Your Teranex will automatically detect the input format, display the input video on the LCD and illuminate the corresponding buttons.
- 2 'Embed' will be illuminated as the audio input type.



Pressing the IN button displays the input format on the control panel buttons. In the above illustration, the input format is 1080i59.94 via SDI with embedded audio.

Setting your Output

- 1 Press the 'out' button on the control panel. The 'SDI' and 'embed' audio buttons will be illuminated blue. If the optional optical fiber module is installed, the 'opt' button will also be blue.
- 2 Press the 'Ultra HD' button. Select the 'p' button for progressive output, and the '59.94/60' button to select your frame rate. The format, frame and rate buttons are now illuminated green, ready for you to accept your conversion set up or make changes.
- 3 Using the soft menu buttons, select 'change'. The output video is now displayed on the LCD and sent to all output connectors. The buttons will also illuminate blue to confirm your settings.



Press the OUT button to select your output settings. In the above illustration the output is set to Ultra HD 2160p59.94.

Setting your Aspect Ratio

The HD to Ultra HD up conversion in the above example maintains a 16:9 aspect ratio, so no aspect ratio buttons will be illuminated. However, the 'adj' adjustable aspect ratio function is always available when converting HD to Ultra HD if you wish to make any manual aspect ratio adjustments.

Your Teranex Processor is now ready to up convert your HD video to a 12Gb/s UltraHD single link output via OUT A. If you need dual link 6Gb/s output instead, select this mode via the Dual Link Output menu and use outputs A and B for 6 Gb/s dual link UltraHD connections.

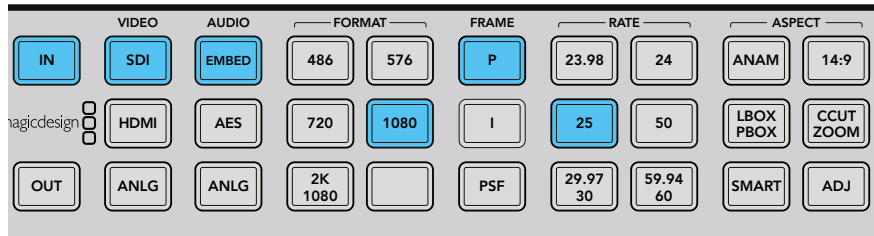
Down Conversion

Down Conversion allows you to convert your video to a lower resolution. For example, you may need to distribute a PAL SD version of a 1080p25 HD program master to a client. Once again, high quality de-interlacing, down-sampling and anti-aliasing algorithms will assure outstanding down conversion results. In this example, 1080p25 video via SDI is converted to 576i50 PAL with letterbox aspect ratio. Audio is embedded in the input SDI signal.

Power your Teranex Processor and connect your inputs and outputs.

Setting your Input

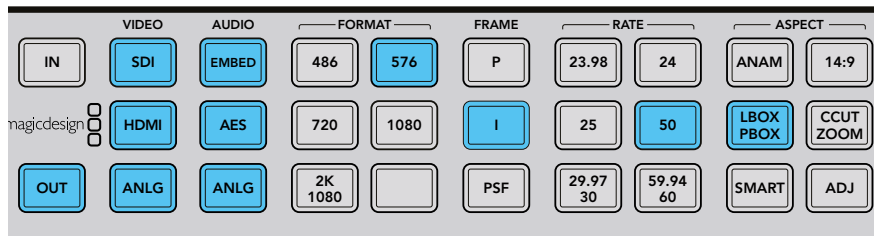
- 1 Press the 'in' button on the control panel and select 'SDI' video. Teranex will display the input video on the LCD, automatically detect the input format and illuminate the corresponding buttons.
- 2 Select 'embed' as the audio input format.



Pressing the 'in' button displays the input format on the control panel buttons. In the above illustration, the input format is 1080p25 via SDI with embedded audio.

Setting your Output

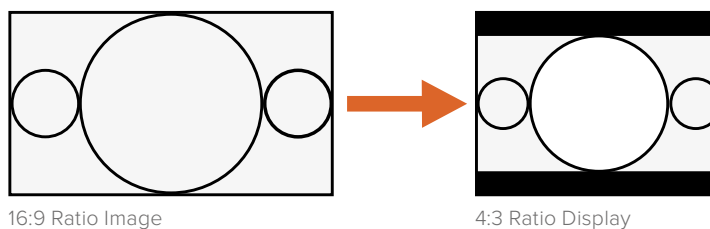
- 1 Press the 'out' button on the control panel. On the Teranex 2D, all output buttons will be illuminated blue. On the Teranex 3D, the 'embed' audio button will be blue. Select the 'AES' or 'anlg' button. AES/EBU and analog audio outputs share the XLR connectors.
- 2 Press the '576' button. The button will illuminate green. Note that the 'I' button and the '50' button are also illuminated green. This is because interlaced video and 50 fields per second are the only selections available for a PAL 576 output.
- 3 Using the soft menu buttons, select 'change'. The output video is now displayed on the LCD and sent to all output connectors. The buttons will also illuminate blue to confirm your settings.



Press the 'out' button to select your output settings. In the above illustration the output is set to 576i50 with letterbox aspect ratio.

Setting your Aspect Ratio

Press the 'lbox/pbox' button to set your aspect ratio to letterbox. Your Teranex Processor is now ready to down convert your video.



16:9 Ratio Image

4:3 Ratio Display

Setting the LBOX/PBOX button on your SD output fits the 16:9 image inside the 4:3 frame. The 4:3 conversion will have black bars top and bottom and the correct widescreen geometry will be maintained.

TIP For more information on aspect ratio conversion refer to “Aspect Menu” on page 35 and “Aspect Ratio Conversions” on page 23.

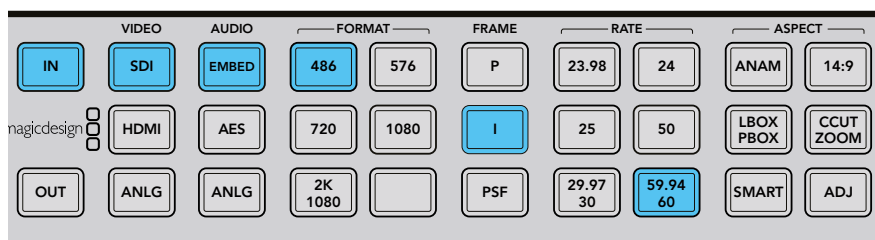
Cross Conversion

Cross Conversion allows you to change the video resolution and/or aspect ratio of your program material. Cross conversions between 1080 and 720 HD formats are accomplished using a high quality de-interlacing algorithm that permits all conversions to be performed in the progressive domain. In SD formats, aspect ratio conversions between 4:3 and 16:9 are also easy to perform. In this example 486i59.94 with 16:9 aspect ratio is cross converted to letterbox 4:3 via SDI with embedded audio.

Power your Teranex Processor and connect your inputs and outputs.

Setting your Input

- 1 Press the ‘in’ button on the control panel and select ‘SDI’ video. Teranex will display the input video on the LCD, automatically detect the input format and illuminate the corresponding buttons.
- 2 Select ‘embed’ as the audio input format.



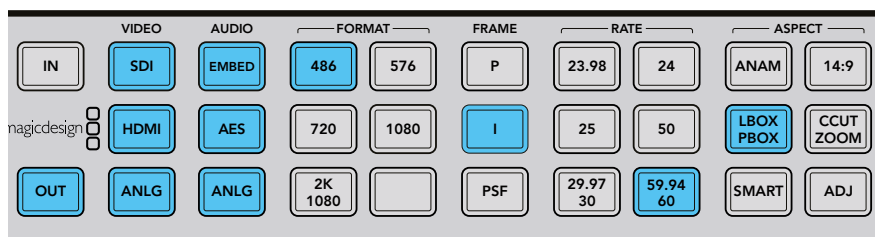
Press the ‘in’ button to see the format of the video signal that you are converting. In this example, the format is 486i59.94 over SDI with embedded audio.

Setting your Input Aspect Ratio

Press the ‘lbox’ button to select letterbox, indicating that the input aspect ratio is 16:9.

Setting your Output

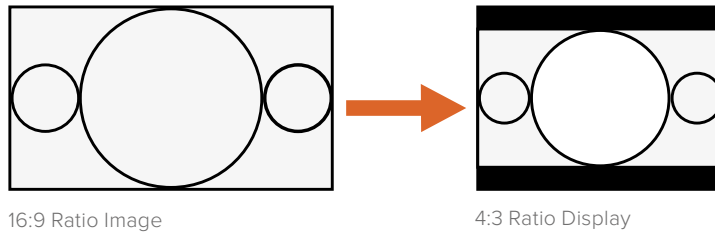
- 1 Press the ‘out’ button on the control panel. On the Teranex 2D, all output buttons will be illuminated blue. On the Teranex 3D, the ‘embed’ audio button will be blue. Select the ‘AES’ or ‘anlg’ button. AES/EBU and analog audio outputs share the XLR connectors. On Teranex AV and Teranex Express, the ‘embed’ audio button will be blue.
- 2 Press the ‘486’ button. The button is illuminated green. Note that the ‘I’ button and the ‘59.94/60’ button are also illuminated green. This is because interlaced video and 59.94 fields per second are the only selections available for an NTSC 486 output.
- 3 Using the soft menu buttons, select ‘change’. The output video is now displayed on the LCD and sent to all output connectors.



Press the ‘out’ button to select your output settings. In the above illustration the output is set to 486i59.94 with letterbox aspect ratio.

Setting your Output Aspect Ratio

Press the 'lbox/pbox' button to set your aspect ratio to letterbox. Your Teranex Processor is now ready to cross convert your video.



16:9 Ratio Image

4:3 Ratio Display

Setting the LBOX/PBOX button on your SD output fits the 16:9 image inside the 4:3 frame. The 4:3 conversion will have black bars top and bottom and the correct widescreen geometry will be maintained.

TIP For more information on aspect ratio conversion refer to "Aspect Menu" on page 35 and "Aspect Ratio Conversions" on page 23.

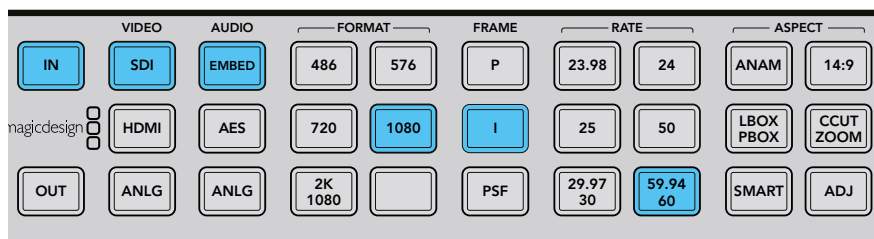
Standards Conversion

Standards Conversion, also known as 'frame rate conversion', is the process of converting one video frame rate to another, such as converting NTSC at 59.94 fps to PAL at 50 fps. The powerful Teranex linear interpolation algorithm analyzes pixels between and within frames, calculating new pixels in real time to create the new output frame rate. In this example 1080i59.94 video is converted to 1080i50 via SDI with embedded audio.

Power your Teranex Processor and connect your inputs and outputs.

Setting your Input

- 1 Press the 'in' button on the control panel and select 'SDI' video. Teranex will display the input video on the LCD, automatically detect the input format and illuminate the corresponding buttons.
- 2 Select 'embed' as the audio input format.

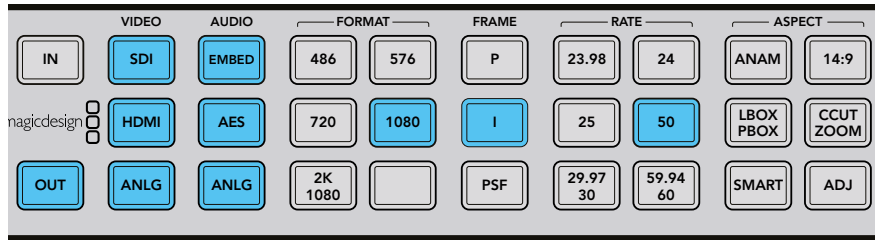


Pressing the 'in' button displays the input format on the control panel buttons. In the above illustration, the input format is 1080i59.94 via SDI with embedded audio.

Setting your Output

- 1 Press the 'out' button on the control panel. On the Teranex 2D, all output buttons will be illuminated blue. On the Teranex 3D, the 'embed' audio button will be blue. Select the 'AES' or 'anlg' button. AES/EBU and analog audio outputs share the XLR connectors.
- 2 Press the '1080' button. The button will illuminate green. Select the 'I' button for interlaced output and the '50' button to set the frame rate. These buttons will also illuminate green.

- Using the soft menu buttons, select 'change'. The output video is now displayed on the LCD and sent to all output connectors. The buttons will also illuminate blue to confirm your settings.



Press the 'out' button to select your output settings.
In the above illustration the output is set to 1080i50.

Setting your Frame Rate Conversion Aperture

When converting frame rates you'll need to set the appropriate frame rate aperture. Select your settings from 0 'Drama' to 3 'Sport' depending on the amount of motion in your video. These settings are adjusted using the soft menu buttons and rotary knob.

- Press the 'home' button.
- Using the soft menu buttons, select Video>Advanced>FRC Aperture.
- Using the rotary knob, select the aperture setting most suited to your video.

Video	Main Menu	System Setup
Audio		
Noise Reduction		
Ancillary Data		↶

Main Menu>Video

Color	Video	Proc Amp
Clip		Test Patterns
Aspect		Advanced
Setup		↶

Video>Advanced Menu

Clean Cadence	FRC Aperture	Source Type
Scene Detect	0 (Drama)	FRC Aperture
	1	
	2	
	3 (Sport)	↶

Advanced Menu>FRC Aperture

Setting your Aspect Ratio

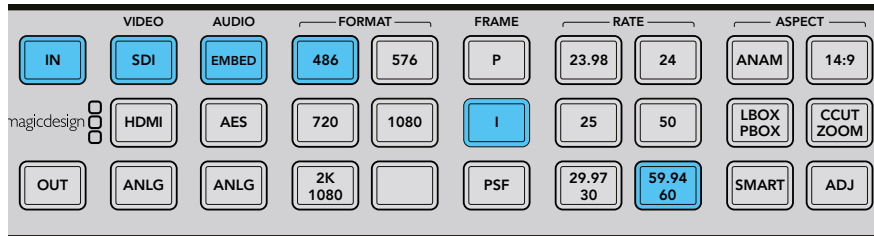
When up, down or cross converting between HD and Ultra HD, the aspect ratio will always be 16:9, so no aspect ratio buttons will be illuminated. However, the 'adj' adjustable aspect ratio function is always available when converting within the same format if you wish to make any manual adjustments.

When converting from one format to another, for example SD to HD, other aspect ratio settings will become available. Your Teranex Processor is now ready to convert your 1080i59.94 video to 1080i50.

TIP For more information on aspect ratio conversion refer to "Aspect Menu" on page 35 and "Aspect Ratio Conversions" on page 23.

Cadence Removal

Cadence Removal involves the removal of the 3:2 pulldown sequence. 3:2 pulldown is applied when a telecine transfers film at 24 frames per second to video at 59.94 fields per second. Your Teranex processor will remove cadence automatically when converting video with a 3:2 pulldown to 24 frames per second.



Cadence Removal is applied automatically when converting from an NTSC frame rate to a film frame rate. For example, 59.94fps to 23.98fps.

Clean Cadence

Clean Cadence in the Teranex 2D and 3D removes broken, non standard and mixed cadences and creates a clean 3:2 pulldown. A 3:2 cadence is found in 59.94 program material, so clean cadence is only available when working with 59.94 frame rates. In this example, we will perform a cross conversion to clean the cadence on a 1080i59.94 video signal via SDI with embedded audio.

TIP For information on advanced clean cadence settings, refer to “Advanced Menu” on page 43.

Power your Teranex and connect your inputs and outputs.

Setting your Input

- 1 Press the 'in' button on the control panel and select 'SDI' video. Teranex will display the input video on the LCD, automatically detect the input format and illuminate the corresponding buttons.
- 2 Select 'embed' as the audio input format.

Setting your Output

- 1 Press the 'out' button on the control panel. All active video output buttons are illuminated blue.
- 2 Press the '1080' button. The button is now illuminated green. Select the 'I' button for interlaced output and the '59.94/60' button to set the frame rate. These buttons will also illuminate green.
- 3 Using the soft menu buttons, select 'change'. The output video is now displayed on the LCD and sent to all output connectors. The buttons will also illuminate blue to confirm your settings.
- 4 In this example aspect ratio is locked to 16:9. However, if you wish to adjust it manually press the 'adj' button and adjust your aspect ratio settings using the soft menu buttons and LCD.

- 5 Press the 'home' menu button, then select Video>Advanced>Clean Cadence. Use the rotary knob or soft button to set clean cadence to 'on'. The 1080i59.94 output format will now contain a clean 3:2 cadence. Remember to set clean cadence to 'off' after completing your conversion.

Color	Video	Proc Amp
Clip		Test Patterns
Aspect		Advanced
Setup		↶

Main Menu>Video Menu>Advanced

Clean Cadence	Advanced	Source Type
Scene Detect	On	FRC Aperture
	Off	
		↶

Advanced Menu>Clean Cadence

Setting your Aspect Ratio

The 'adj' adjustable aspect ratio button is available for custom aspect ratio settings.

After all cadence and aspect ratio settings are done, your video will now have a clean cadence applied.

TIP For information on the types of aspect ratio settings and how they appear, refer to "Aspect Ratio Conversions" on page 23 and "Video Menu Settings" on page 35.

Lowest Latency Processing on Teranex AV

A low latency mode is available on Teranex AV that can perform common conversions in much lower latency than regular processing. The lowest latency mode of processing for certain format conversions will run at a latency of 2 frames. This is very useful in live production environments to reduce delays between the live action and the image being displayed on monitors or projectors.

In this example, 1080i59.94 is converted to Ultra HD 2160p59.94 using the Lowest Latency mode in the 'processing' menu.

Power your Teranex AV processor and connect your inputs and outputs.

Select a conversion that supports low latency, then enable low latency mode.

Setting your Input

- 1 Press the 'in' button on the control panel and select 'SDI' video.
- 2 Teranex will display the input video on the LCD, automatically detect the input format and illuminate the corresponding buttons.

Setting your Output

- 1 Press the 'out' button on the control panel. On the Teranex AV, the 'SDI' and 'embed' buttons will be blue.
- 2 Press the 'Ultra HD' button. The button will illuminate green. Select the 'P' button for progressive output and the '59.94' button to set the frame rate. These buttons will also illuminate green.
- 3 Using the soft menu buttons, select 'change'. The output video is now displayed on the LCD and sent to all output connectors. The buttons will also illuminate blue to confirm your settings.

Enabling the Lowest Latency Mode

- 1 Go to the 'System Setup' LCD menu in your Teranex AV, select the 'processing' submenu and then select 'lowest latency.' You can also access this feature via the Setup tab in the Teranex Setup application.
- 2 The Teranex AV will load the 'lowest latency' configuration for this conversion, which will run at the minimal latency of 2 frames or less. Once selected, your Teranex AV will operate in the lowest latency available for the conversion and features you want to enable.

Audio Embedding

Embedding external analog or AES audio into your SDI or HDMI outputs is possible in the Teranex 2D, Teranex 3D and Teranex AV. Connect your audio source and select the corresponding input on the front panel, either "ANLG" or "AES." The Teranex will embed the audio into your SDI and HDMI outputs.

In the Teranex AV, you may embed audio even if you do not have an active video input. When no video input is detected, the Teranex AV will embed your external audio into internal black or color bars, depending on the selection made in the "No Video Input" menu in the Video Setup menu.

Teranex Processor Settings

Demonstrations are provided in this section to show you how to set your Teranex Processor for each conversion type using the control panel buttons and LCD. Plus you can find out how to use all the settings available to help you maximize the quality of your conversion. For example, setting the FRC aperture to achieve the best motion quality in a standards conversion, or choosing your desired aspect ratio for up or down conversion. With all the different settings available you get many opportunities to improve the quality of your converted video. You can use the clean cadence feature to clean up potential cadence issues, add noise reduction, change video levels and more.

LCD Menu

The LCD menu is controlled by 8 soft buttons used to make your selections. The 8 buttons are called soft buttons because their function changes with each menu displayed.

The rotary knob adjusts parameter values by turning clockwise or counterclockwise. If a parameter 'default' setting exists, press the rotary knob to quickly reset it.

Home Button

The 'home' button toggles the LCD between the video display and the main menu.

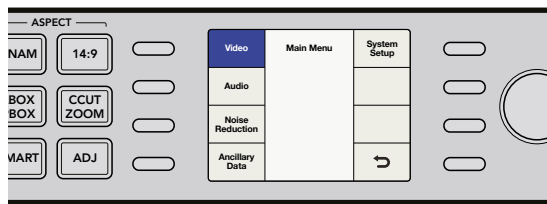
Menu 1 and Menu 2 Buttons

These buttons save shortcuts to frequently used menu pages and settings.

To store a menu page:

- 1 Navigate to the menu page you want to save.
- 2 Press and hold 'MENU 1' or 'MENU 2' for 3 seconds.

The button will illuminate to indicate a saved page. Thereafter, when the button is pressed, the LCD will switch directly to the saved page.



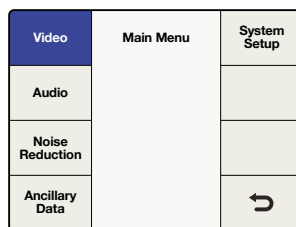
Video Menu Settings

The 'video menu' controls settings that adjust your video output, such as color, clipping, aspect ratio and more.

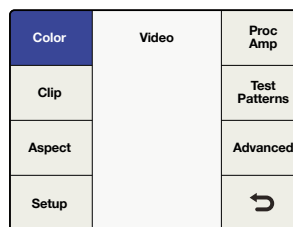
Color Menu

To adjust your Red, Green and Blue Gain settings, turn the rotary knob on each color channel.

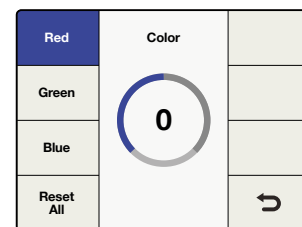
- The Range of each color control is -200 to +200.
- The default is 0.



Main Menu>Video



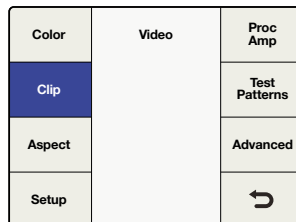
Video Menu>Color



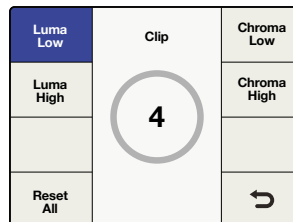
Color Menu>Red

Clip Menu

To adjust luminance and chrominance clipping on your output video, go to Main Menu>Video>Clip. Adjust high and low ranges using the rotary knob.



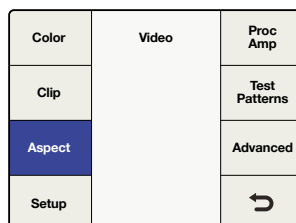
Video Menu>Clip



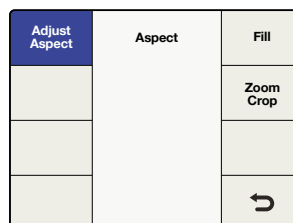
Clip Menu

Aspect Menu

To adjust the aspect ratio settings of your Teranex output video, go to Main Menu>Video>Aspect>Adjust Aspect, or simply press the 'adj' button in the front panel. 'Fill' defines a color for the letterbox or pillar box bars.



Video Menu>Aspect Menu



Aspect Menu

Adjust Aspect

To customize the aspect ratio size, position and trim settings, use the soft menu buttons and rotary knob.

Size

The 'size' setting adjusts the horizontal and/or vertical image size. The range is approximately -50 to +200 percent.

Position

Position allows you to move the input image within the output frame. The range of adjustment is dependent on the current image size.

Trim

Trim masks the edges of your input image horizontally and/or vertically.

Horizontal

Used for horizontal sizing, positioning and trimming.

Vertical

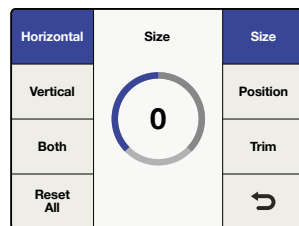
Used for vertical sizing, positioning and trimming.

Both

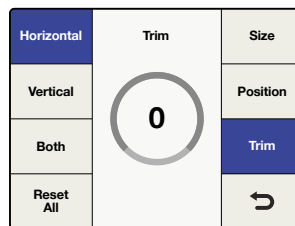
Links horizontal and vertical controls together. For example, when changing the input image size, linking both controls maintains the proper aspect ratio.

Reset All

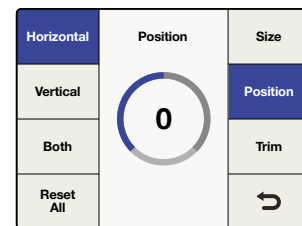
Press to return all settings to their default values.



Horizontal>Size



Horizontal>Trim



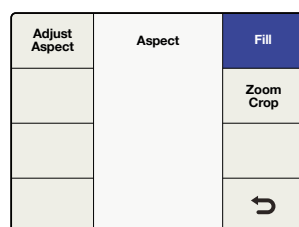
Horizontal>Position

Aspect Fill

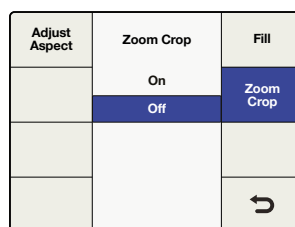
To define the color of the bars used in pillarbox and letterbox aspect ratios, adjust the 'luminance', and 'cb' and 'cr' chroma values using the rotary knob.

Zoom/Crop

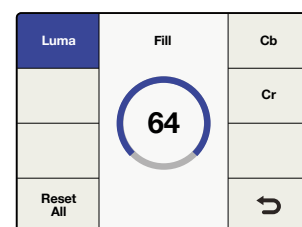
Zoom/crop is used to mask potential video disturbances that may appear at the top, bottom, left or right edges of your source image. This is performed by trimming your conversion slightly. Turning zoom/crop on will instantly zoom the converted image vertically by 3 lines and horizontally by 3 pixels, then crop the image by the same amount. Zoom/crop will not effect your adjustable aspect ratio settings.



Aspect Menu>Aspect Fill



Aspect Menu>Zoom/Crop



Aspect Fill>Luma

Video Setup Menu

The 'video setup' menu lets you define the video parameters of your analog, SDI and HDMI inputs and outputs. The Teranex model you are using determines menu availability.

No Video Input Menu

Use this menu to select black or colorbars to be output when no video input is detected. The default setting is black.

HDMI Output Menu for Teranex AV only

The color space of the HDMI output may be set to YUV or RGB in this menu and via the 'Setup' tab in the Blackmagic Teranex Setup utility.

Color	Video	Proc Amp
Clip		Test Patterns
Aspect		Advanced
Setup		↶

Video Menu>Setup

No Video Input	SDI Output	SDI Output
HDMI Output	Black Colorbar 75%	3G SDI Output Quad SDI Output ↶

Video>Setup>No Video Input

No Video Input	Setup	SDI Output
HDMI Output	YUV RGB	3G SDI Output Quad SDI Output ↶

Video>Setup>HDMI Output

NOTE: Teranex AV automatically detects the HDMI input color space and switches between YUV and RGB as needed. The HDMI loop output follows the input color space.

Analog Input Video Setup Menu

In the Teranex 2D and 3D Processors, this menu lets you set the analog video input type.

- **Component**
Sets the analog input BNC connections as component Y, R-Y and B-Y.
- **Composite**
Sets the analog Y/NTSC/PAL input BNC connector as composite.

The default setting is 'component'.

Analog Output Video Setup Menu

In the Teranex 2D and 3D Processors, this menu lets you set the analog video output type.

- **Component**
Sets the analog output BNC connections as component Y, R-Y and B-Y.
- **Composite**
Sets the analog Y/NTSC/PAL output BNC connector as composite.

The default setting is 'component'.

Color	Video	Proc Amp
Clip		Test Patterns
Aspect		Advanced
Setup		↶

Video Menu>Setup

No Video Input	Setup	Video Sampling
Analog Input	Component Composite	SDI Output ↶
Analog Output		

Video>Setup>Analog Input

No Video Input	Setup	Video Sampling
Analog Input	Component Composite	SDI Output ↶
Analog Output		

Video>Setup>Analog Output

Video Sampling Menu for Teranex 3D Processor only

The 'video sampling' menu allows selection of the following sampling types for the Teranex 3D Processor.

- **4:2:2 – YUV**
- **4:4:4 – YUV**
- **4:4:4 – RGB**

Color	Video	Proc Amp
Clip		Test Patterns
Aspect		Advanced
Setup		↶

Video Menu>Setup

No Video Input	Setup	Video Sampling
Analog Input	4:2:2 YUV	SDI Output
	4:4:4 YUV	
Analog Output	4:4:4 RGB	
		↶

Video>Setup>Video Sampling

SDI Output Menu for Teranex 3D Processor only

This menu allows you to select between Single Link or HD Dual Link Outputs. Press the Dual Link Output button, or use the front panel knob to toggle between the Single Link and Dual Link output types.

- **Single Link SDI** supports data rates from 270 Mb/s to 3 Gb/s. In Single Link mode, the Teranex 3D provides redundant SDI outputs on Outputs A and B.
- **Dual Link SDI** supports Level B 1080p at 3 Gb/s which is 2x 1.5 Gb/s on SDI Outputs A and B. You may use the Video Sampling Menu to choose between 4:2:2 YUV, 4:4:4 YUV and 4:4:4 RGB.

No Video Input	Single Link	Video Sampling
Analog Input	Out A	SDI Output
Analog Output	Use this for Single Link SD or HD	
	● ○	↶

Video Menu>Setup>SDI Output>Single Link Output

No Video Input	Single Link	Video Sampling
Analog Input	Out A	SDI Output
Analog Output	Use this for Single Link SD or HD	
	● ○	↶

Video Menu>Setup>SDI Output>Dual Link Output

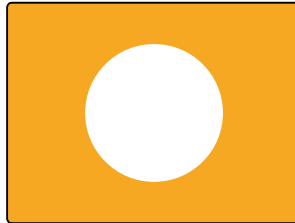
SDI Output Menu for Teranex Express Processor only

This menu lets you select between single link, dual link or quad HD outputs for your chosen output format. Press the 'SDI output' button, or use the front panel knob to toggle between 'single link', 'dual link' and 'quad HD-SDI' outputs.

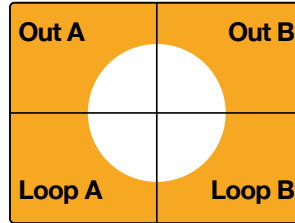
- **Single Link SDI** supports SDI data rates from 270 Mb/s to 12Gb/s. 'Output A' supports single link outputs up to 12Gb/s, while 'output B' supports single link outputs up to 6Gb/s.
- **Dual Link SDI** supports 3G via 2x 1.5Gb/s, 6G via 2x 3Gb/s, and 12G via 2x 6Gb/s. SDI outputs A and B facilitate dual-link output.
- **Quad HD Split** in the Teranex Express supports Ultra HD output formats in the square division method of 4x1080p as outlined in SMPTE 435-1. To provide the required four SDI outputs, Teranex Express utilizes the two SDI outputs and repurposes the two SDI Input Loop connectors as outputs.

The quad HD outputs are assigned as follows:

- SDI Output A: Sub image 1
- SDI Output B: Sub image 2
- SDI Input Loop A: Sub image 3
- SDI Input Loop B: Sub image 4



Full Frame Ultra HD Image



Quad HD Split Output

Color	Video	Proc Amp
Clip		Test Patterns
Aspect		Advanced
Setup		↶

Video>Setup

No Video Input	Setup	SDI Output
	Single Link	3G SDI Output
	Dual Link	
	Quad HD Split	
		↶

Setup>SDI Output

SDI Output Menu for Teranex AV only

This menu allows you select between single link or dual link outputs for your chosen output format. Press the 'SDI output' button, or use the front panel knob to toggle between 'single link' and 'dual link.'

- **Single Link SDI** outputs A and B support data rates from 270 Mb/s to 12Gb/s.
- **Dual Link SDI** supports 3G via 2x 1.5Gb/s, 6G via 2x 3Gb/s, and 12G via 2x 6Gb/s. SDI outputs A and B facilitate dual-link output.

No Video Input	Setup	SDI Output
	Single Link	3G SDI Output
	Dual Link	
		Quad SDI Output
		↶

Video>Setup>SDI Output

3G SDI Output Menu for Teranex Express and Teranex AV

This menu lets you change the 3G-SDI output standard to maintain compatibility with equipment that can only receive level A or level B 3G-SDI video.

No Video Input	Setup	SDI Output
	Level A	3G SDI Output
	Level B	
		Quad SDI Output
		↶

Video>Setup>3G SDI Output

TIP This setting only applies when outputting 3G-SDI video. For 3G-SDI inputs, 'level A' and 'level B' signals are detected automatically.

Quad SDI Output Menu for Teranex AV only

Teranex AV provides continuous quad SDI outputs via four dedicated BNC connectors when Ultra HD output formats are in use. The BNC output connectors are labeled 'ch A', 'ch B', 'ch C', and 'ch D'.

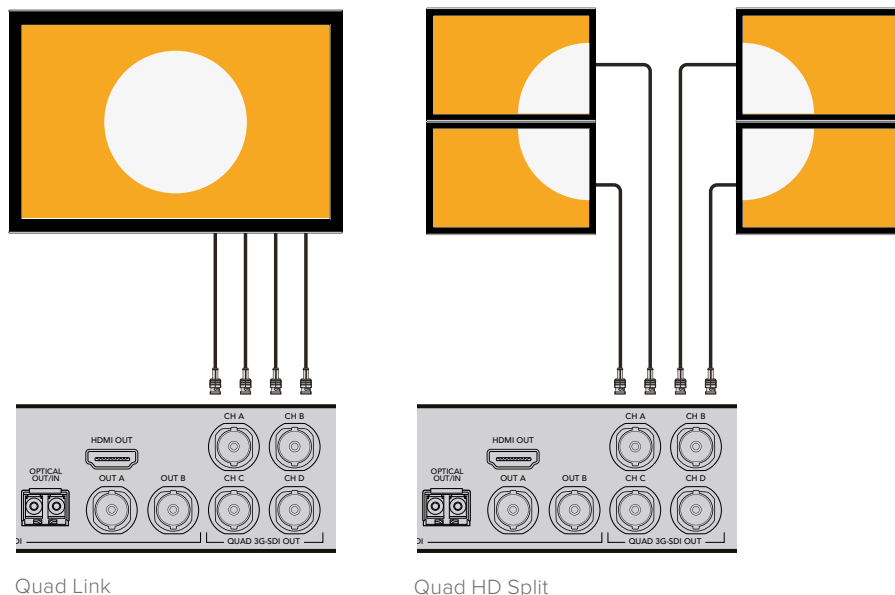
Teranex AV supports 'quad link' two-sample interleave, or 2SI, and 'quad HD split' square division outputs for Ultra HD p50/59.94/60 output formats. Use the 'quad SDI output' menu below to define the output type you are using.

For Ultra HD p23.98/24/25/29.97/30 formats, only 'quad HD split' is supported, regardless of the setting in the 'quad SDI output' menu.

No Video Input	Setup	SDI Output
	Quad Link	3G SDI Output
	Quad HD Split	Quad SDI Output
		↩

Video>Setup>Quad SDI Output

This diagram represents the difference between 'quad link', where image information is split between four 3G-SDI cables to form a single Ultra HD image, and 'quad HD split', where each of the four HD outputs receives one quarter of the complete image.

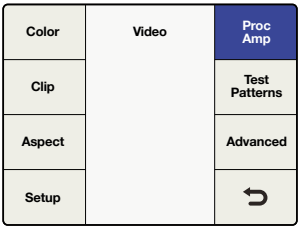


Proc Amp Menu

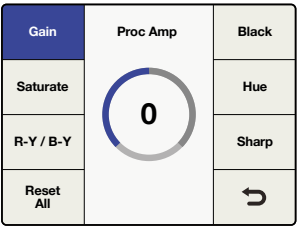
Use the 'proc amp' menu to adjust gain, saturation, hue, sharpness and more. The 'proc amp' menu is accessed via the 'video' menu. A quicker way to reach this menu is by pressing one of the 'proc amp' video buttons on the control panel. Turn the rotary knob to adjust your settings.

After adjustment, the associated button will illuminate white to indicate a non-default setting. To reset to its default setting, select the parameter via the 'proc amp' menu or control panel button and then push the rotary knob. To easily return all parameters to their default settings, go to the 'proc amp' menu and select 'reset all'.

- **Gain**
Range: -60 to +60. Default: 0
- **Saturate**
Range: -60 to +60. Default: 0
- **Black**
Range: -30 to +30. Default: 0
- **Hue**
Range: -179 to +180. Default: 0 degrees
- **R-Y and B-Y**
Range: -200 to +200. Default: 0
- **Sharp**
Range: -50 to +50. Default: 0
- **Reset All**
Resets all Proc Amp parameters to their default values



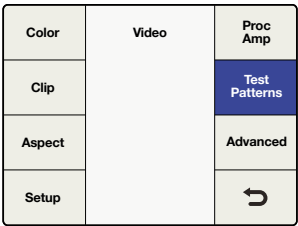
Video Menu>Proc Amp



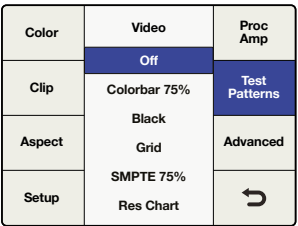
Proc Amp Menu>Gain

Test Patterns Menu

The internal test signal generator provides a black output and test patterns. You can add audio test tones via 'output mapping' in the 'audio main menu'. For more information on output mapping, see the 'audio menu settings' section in this manual.

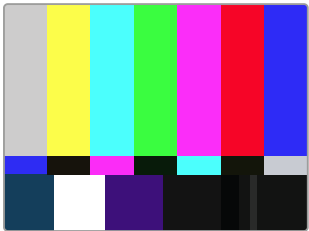


Video Menu>Test Patterns

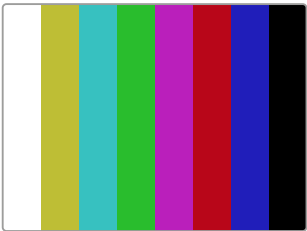


Test Patterns Menu

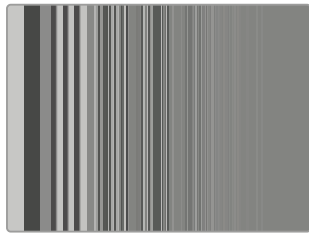
Below are test patterns available via the 'video>test patterns' menu.



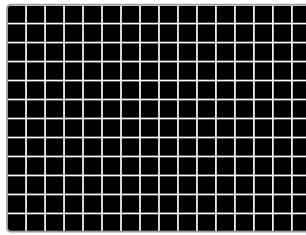
SMPTE 75%.



Colorbar 75%.



Res Chart.



Grid.

Test Patterns in Teranex AV

In addition to the video test patterns shown above, the Teranex AV includes a menu for pattern motion and an integrated audio test tone menu.

• Test Patterns

Select 'test patterns' to choose the desired video test signal.

• Audio

The 'audio' menu will be grayed out until a video test signal is selected. Select the desired audio frequency using the rotary knob. The tone will be applied to all output audio channels, temporarily overriding any pre-existing audio output mapping.

The original audio output mapping will be restored when the video test pattern or the 'audio' menu is turned off.

• Motion

The 'motion' menu will also be grayed out until a video test pattern is selected. Turn on the 'motion' menu to activate the 'horizontal' control button and adjust the rate of motion, as described below. When the 'motion' menu is turned off, the test pattern will return to its static, full frame position.

- **Horizontal:** Turn the rotary knob clockwise for left-to-right motion, counterclockwise for right-to-left motion. Three speeds are available in each direction, with a range of -3 to +3. Press the rotary knob to reset the default speed of 0, which will stop the test pattern at the current screen location.

Your Teranex AV will remember the settings in the 'audio' and 'motion' menus when the test pattern is turned off. This allows you to choose your audio tones and/or motion speed and direction in advance, as these settings will be used whenever you turn on your video test pattern. You can also save a test pattern configuration in one of the six system presets for fast and easy recall when needed.

Color	Video	Proc Amp
Clip		Test Patterns
Aspect		Advanced
Setup		↺

Video>Test Patterns

Test Patterns	Test Patterns	Horizontal
Audio	Off	
Motion	SMPTE 75% Colorbars 75% Black Grid	↺

Test Patterns menu

Test Patterns	Test Patterns	Horizontal
Audio	Off	
Motion	Tone .75 KHz Tone 1.5 KHz Tone 3 KHz Tone 6 KHz	↺

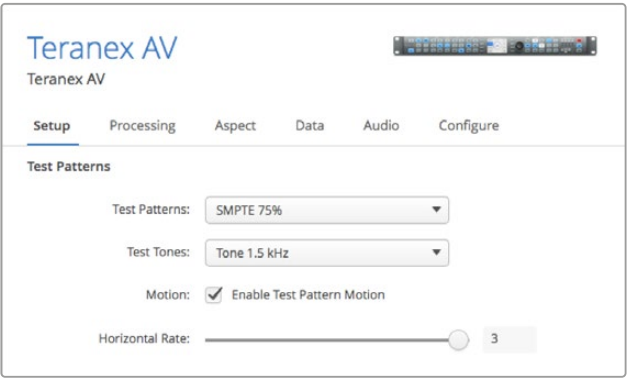
Test Patterns>Audio

Test Patterns	Test Patterns	Horizontal
Audio	On	
Motion	Off	
		↺

Video>Test Patterns>On/Off

Test Patterns	Test Patterns	Horizontal
Audio	0	
Motion		
		↺

Motion>Horizontal Rate



The Setup page in the Blackmagic Teranex Setup utility provides motion control, selection of video test patterns and audio test tones

Advanced Menu

Your Teranex processor provides the following advanced cadence correction features:

Clean Cadence for Teranex 2D and 3D

The clean cadence feature creates a clean 3:2 pull down sequence in your 59.94 output video.

Setting Clean Cadence

Turn ‘clean cadence’ on or off using the soft menu buttons and rotary knob.

- **On**
Selects the ‘clean cadence’ mode
- **Off**
Selects the ‘normal video’ mode

The default mode is ‘off’

TIP Use the ‘clean cadence’ mode when you are certain your source material was originated with a 3:2 pulldown sequence, such as film transferred to video by a telecine. If ‘clean cadence’ is used on video without 3:2 pulldown, unwanted artifacts may be seen.

‘Clean cadence’ is available for the following format conversions:

- 486i59.94 to 486i59.94
- 486i59.94 to 1080i59.94
- 1080i59.94 to 486i59.94
- 1080i59.94 to 1080i59.94

Color	Video	Proc Amp
Clip		Test Patterns
Aspect		Advanced
Setup		↺

Video Menu>Advanced

Clean Cadence	Advanced	Source Type
Scene Detect	On	FRC Aperture
	Off	
		↺

Advanced Menu>Clean Cadence

Scene Detect

Scene change detection minimizes field blending between cuts for a cleaner looking output. This prevents fields from previous scenes mixing with new scenes.

- **On**
Enables 'scene cut detection'
- **Off**
Disables 'scene cut detection'

The default mode is 'on'

Most video is fine with 'scene detect on', but some video sequences may "stutter" due to the momentary change in temporal resolution. Video with a text crawl at the bottom of the picture may show this effect. Be sure to turn 'scene detection off' if you see this "stutter" effect.

Color	Video	Proc Amp
Clip		Test Patterns
Aspect		Advanced
Setup		↶

Video Menu>Advanced

Clean Cadence	Advanced	Source Type
Scene Detect	On	FRC Aperture
	Off	
		↶

Advanced Menu>Scene Detect

Setting Source Type

'Source type' sets processing based on the type of input video being received. The default mode is 'auto', but if you want to select 'film' or 'video' modes, you can select them in the menu.

- **Auto**
This mode will look for film and video based material and select the appropriate processing algorithm. This mode should be used in most instances.
- **Film**
Select this mode when you're sure the source material contains a 3:2 pulldown cadence.
- **Video**
Select this mode when you're sure the source material does not contain a 3:2 pulldown cadence.

Frame Rate Conversion Aperture

'FRC aperture' adjusts processing based on the amount of motion in your source image.

A setting of 0 is typically used for dramatic scenes with little motion and will produce a sharper image with potential for judder in motion areas. A setting of 3 is typically used for scenes with faster motion, such as sporting events, and produces a softer image with less motion judder.

Clean Cadence	Advanced	Source Type
Scene Detect	Audio	FRC Aperture
	Video	
	Film	
		↶

Advanced Menu>Source Type

Clean Cadence	FRC Aperture	Source Type
Scene Detect	0 (Drama)	FRC Aperture
	1	
	2	
	3 (Sport)	
		↶

Advanced Menu>FRC Aperture

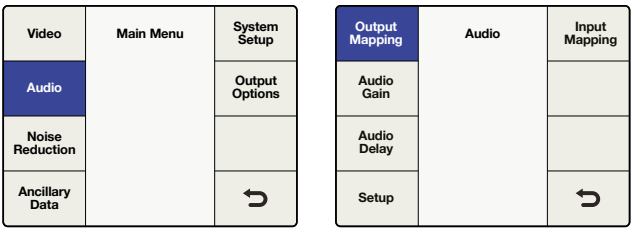
Audio Menu Settings

The ‘audio’ menu permits output mapping of input audio channels, offers control of audio gain and delay and provides access to certain setup parameters. In Teranex 2D, an ‘input mapping’ menu is available, permitting simultaneous selection of channels from the embedded, AES and/or analog input sources.

Output Mapping Menu

Teranex processors provide up to 16 channels of output audio, depending on the output audio type in use. In its default configuration, the input channels are mapped one to one from the selected inputs to up to 16 outputs. The ‘output mapping’ menu allows you to route incoming audio channels, decoded Dolby channels or internally generated test tones to any output channel. You may also mute individual audio channels.

- 1 On the front panel, select your audio input source, either ‘embed’, ‘AES’ or ‘anlg’. In Teranex 2D, you may also use the ‘input mapping’ menu to select from your input audio sources.
- 2 Go to the ‘output mapping’ menu, then press the ‘prev’ or ‘next’ buttons to select the desired output channel. The current audio input associated with the selected output will be displayed in the drop-down list as you step through the output channels.



Main Menu>Audio

Audio Menu>Output Mapping

- 3 Once the desired output channel has been selected, turn the knob to select the input source to map to that output channel. As you turn the knob, you will progress through each group of sources:
 - **Inputs 1-16**
This is a list of available audio input channels from your selected input audio source: SDI, AES, or analog.
 - **Dolby Decoded Channels**
If the optional Blackmagic Dolby decoder is installed, Dolby D or Dolby E will appear in the list. Dolby D allows for 1-6 channels of audio, and Dolby E allows for 1-8 channels of audio.
 - **Dolby Encoded Channels**
If the optional Blackmagic Dolby D or E encoder is installed, ‘encode 1 and encode 2’ will appear in the list.
 - **Test Tones**
Select from internally generated tones: 0.75 kHz, 1.5 kHz, 3 kHz, 6 kHz.
 - **Mute**
Mutes the specific output channel.
- 4 Pressing the knob will return the current output channel to its default input. Pressing the ‘reset all’ button will return all output channels to their default settings, i.e. ‘input 1’ to ‘output 1’, ‘input 2’ to ‘output 2’.

Prev	Output Mapping Channel 1 Source	Next
	Input 1	
	Input 2	
	Input 3	
	Input 4	
	Input 5	
Reset All	▼	↺

Output Mapping Menu

Prev	Output Mapping Channel 4 Source	Next
	Input 1	
	Input 2	
	Input 3	
	Input 4	
	Input 5	
Reset All	▼	↺

Input 1 mapped to Output 4

Prev	Output Mapping Channel 13 Source	Next
	▲	
	Tone .75 kHz	
	Tone 1.5 kHz	
	Tone 3 kHz	
	Tone 6 kHz	
Reset All	Mute	↺

3 kHz tone mapped to Output 13

Prev	Output Mapping Channel 16 Source	Next
	▲	
	Dolby 1	
	Dolby 2	
	Dolby 3	
	Dolby 4	
Reset All	▼	↺

Dolby 1 mapped to Output 1

Prev	Output Mapping Channel 16 Source	Next
	▲	
	Tone .75 kHz	
	Tone 1.5 kHz	
	Tone 3 kHz	
	Tone 6 kHz	
Reset All	Mute	↺

Output 16 is muted

Above are examples of output mapping choices.

Input Mapping Menu

Teranex 2D models have multiple audio input types including embedded SDI and HDMI audio, plus separate analog and AES/EBU audio inputs. With only a few exceptions, which are contained in the points listed below, you can map the audio from any of these inputs into your Teranex 2D independent of the video source selected.

TIP Use the 'input mapping' functionality in Teranex 2D to select the audio inputs you would like for your audio source. You can even map different audio input types to various audio output channels for extremely flexible audio control.

- 'Input mapping' is available via the front panel LCD menus and the 'audio' tab in the Teranex setup application.
- When audio input sources are selected, the corresponding front panel buttons 'embed', 'AES' and/or 'anlg' will illuminate to indicate that audio has been selected from those sources.
- Analog audio via RCA and DB25 inputs are available simultaneously via the 'input mapping' menu.
- Pressing any 'audio' input source button on the front panel will reset the 'input mapping' menu to the default mapping configuration for that input. The current input mapping will be lost.
- Pressing 'factory reset' will set the input selection to 'embed'.
- 'Presets' may be used to save input mapping configurations for later recall. Also, if power is lost, the 'power on' preset will save the mapping for use when power is restored.
- Only one embedded audio source is available at any given time. The embedded audio source in use is determined by your selection of SDI or HDMI video inputs.
- If your video source is 'anlg', you may only use the audio from the 'AES' and/or 'anlg' input connectors. Embedded audio channels from the SDI or HDMI inputs may not be used.

- If Dolby encoded audio is present on your 'AES' input, you cannot mix 'AES' with other audio input types. In this situation, you should select 'AES' as your input type.

Prev	Input Mapping Input 1/2 Source	Next
	Embedded 1/2	
	Embedded 3/4	
	Embedded 5/6	
	Embedded 7/8	
Reset All	Embedded 9/10	↶

Embedded 1/2 mapped to
Input 1/2 Source

Prev	Input Mapping Input 3/4 Source	Next
	▲ AES 5/6	
	AES 7/8	
	ANLG-DB25 1/2	
Reset All	ANLG-DB25 3/4	↶

ANLG-DB25 1/2 mapped to
Input 3/4 Source

Audio Gain Menu

The 'audio gain' control allows you to vary the output from -32 to +16 dB in 0.1 dB increments. Turn the knob to adjust. Pressing the knob will return the 'gain' to zero.

Video	Main Menu	System Setup
Audio		Output Options
Noise Reduction		
Ancillary Data		↶

Main Menu>Audio

Audio Mapping	Audio	Audio Meters
Audio Gain	0.0	
Audio Delay		
Setup		↶

Audio Menu>Audio Gain
Turn knob to adjust gain

Audio Delay Menu

The maximum audio delay is 1 second. In the menu, you may chose between a 'time delay' or 'frame delay' adjustment. Time is resolved to millisecond resolution, while frame delay is expressed in one-half frame increments. In addition, audio may be advanced by up to 1 frame. Turn the knob to adjust. Pressing the knob will return the 'delay' to zero.

Output Mapping	Audio	Input Mapping
Audio Gain		
Audio Delay		
Setup		↶

Audio Menu>Audio Delay

Time Delay	Audio Delay	
Frame Delay	0.000	
		↶

Turn knob to adjust Time Delay

Time Delay	Audio Delay	
Frame Delay	0.0	
		↶

Turn knob to adjust Frame Delay

Audio Setup Menu

In Teranex processors with analog audio inputs, the 'audio setup' menu includes an analog audio input reference level adjustment and analog input type selection.

Analog In Level for Teranex 2D and Teranex 3D

Teranex 2D and 3D processors are factory set to analog audio input reference levels of + = -20dBFS. If you are using a different analog input reference level, you may adjust the 'level' control to compensate.

NOTE This setting will not affect the RCA audio input level.

Turn the knob to adjust. The range of adjustment is -12 to +12dB. Pressing the knob will return the level to zero.

Video	Main Menu	System Setup
Audio		Output Options
Noise Reduction		
Ancillary Data		↩

Main Menu>Audio Menu

Output Mapping	Audio	Input Mapping
Audio Gain		
Audio Delay		
Setup		↩

Audio Menu>Setup Menu

Analog In Level	Setup	Analog Input
	0.0	
		↩

Setup Menu>Analog In Level

Analog In Level for Teranex AV only

Teranex AV provides an input level selection menu that offers a choice between two audio standards, such as SMPTE -20dBFS and EBU -18dBFS.

Video	Main Menu	System Setup
Audio		Output Options
Noise Reduction		
Ancillary Data		↩

Main Menu>Audio Menu

Output Mapping	Audio	Audio Meters
Audio Gain		
Audio Delay		
Setup		↩

Audio Menu>Setup Menu

Analog In Level	Audio Setup	
	SMPTE(-20dBFS)	
	EBU(-18dBFS)	
		↩

Setup Menu>Analog In Level

Analog Input Menu

The 'audio setup' menu lets you select between the various analog audio input types.

The choices for Teranex 3D and Teranex AV are RCA Phono or XLR. The choices for Teranex 2D are RCA Phono or DB25.

- **RCA**
Stereo RCA Phono connectors. Default for the Teranex 2D and 3D processors.
- **DB25 for Teranex 2D only**
Balanced analog audio input via the DB25 connector.
- **XLR for Teranex 3D and Teranex AV only**
Balanced analog audio input via the XLR connectors.

Video	Main Menu	System Setup
Audio		Output Options
Noise Reduction		
Ancillary Data		↩

Main Menu>Audio

Output Mapping	Audio	Input Mapping
Audio Gain		
Audio Delay		
Setup		↩

Audio Menu>Setup

Analog In Level	Audio Setup	Analog Input
	RCA	
	DB25	
		↩

Setup Menu>Analog Input for Teranex 2D

Analog In Level	Audio Setup	Analog Input
	RCA	
	XLR	
		↩

Setup Menu>Analog Input for Teranex 3D and Teranex AV

Audio Meters for Teranex AV only

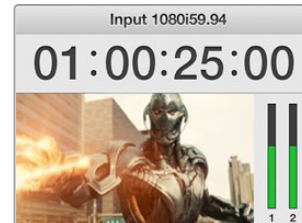
The Teranex AV allows you to select which pair of input or output audio channels will be displayed on the front panel LCD. The channel numbers are displayed below the meters for confirmation.

Video	Main Menu	System Setup
Audio		Output Options
Noise Reduction		
Ancillary Data		↩

Main Menu>Audio Menu

Output Mapping	Audio	Audio Meters
Audio Gain	Channels 1&2	
Audio Delay	Channels 3&4	
	Channels 5&6	
	Channels 7&8	
Setup	Channels 9&10	↩

Audio Menu>Audio Meters



Channel numbers are shown below the audio meters

When a Dolby Digital or Dolby E encoder is installed in the Teranex 3D, two additional selections will appear in the Audio Menu:

Dolby Encode Menu

The 'dolby encode' menu will allow you to select your source for each channel to be encoded. For Dolby Digital encoding, you may select up to 6 channels to be encoded. For Dolby E, you may select up to 8 channels.

You may select from discrete audio channels, Dolby decoded channels if a Dolby decoder is installed, test tones or mute. This menu is similar to the 'output mapping' menu, but you should understand that the sources selected in the 'dolby encode' menu will be mapped to two Dolby encoded channels, which may later be mapped to your output.

As an example, let's say that you need to encode input channels 3 through 10 to Dolby E and you want your Teranex to provide Dolby E encoded audio outputs on SDI channels 9 and 10.

- First, you would use the 'dolby encode menu to route 'input 3' as the source for Dolby Encode channel 1.
- Press the 'next' button on the menu to move to Dolby Encode channel 2 and route 'input 4' to it. Continue this process until you have routed the remaining input channels 5-10 to Encoder channels 3-8.
- The 8 input sources routed to the Dolby E encoder module will result in two encoded output channels. Using the 'output mapping' menu in the 'audio menu settings' section of this manual, you would map the two Dolby E encoded channels, which we call 'encode 1' and 'encode 2', to your SDI output channels 9 and 10.

Video	Main Menu	System Setup
Audio		Output Options
Noise Reduction		
Ancillary Data		↩

Main Menu>Audio Menu

Output Mapping	Audio	Dolby Encode
Audio Gain		Dolby Metadata
Audio Delay		
Setup		↩

Audio Menu>Dolby Encode

Prev	Dolby Encode Channel 1 Source	Next
	▲	
	Input 1	
	Input 2	
	Input 3	
	Input 4	
Reset All	▼	↩

Select sources for Dolby encoder channels

Dolby Metadata Menu

'Dolby metadata' describes the encoded audio and conveys information to control downstream equipment. Metadata is usually carried in the Dolby Digital or Dolby E bitstream, but can also be carried as a serial data stream between Dolby E and/or Dolby digital equipment.

In Teranex 3D, Dolby metadata may be derived from incoming Dolby audio, if a Dolby decoder is installed, and may also be input as serial data via the 9-pin Dolby metadata connector on the rear of the Teranex 3D. You may also generate your own metadata in the Teranex 3D by using one of the two commonly used configurations provided in the 'dolby metadata' menu, 'stereo' and '5.1'. See the configurations assigned by each in the table below. The variations between the two configurations are shown by bold text.

Video	Main Menu	System Setup
Audio		Output Options
Noise Reduction		
Ancillary Data		↩

Main Menu>Audio

Output Mapping	Audio	Dolby Encode
Audio Gain		Dolby Metadata
Audio Delay		
Setup		↩

Audio Menu>Dolby Metadata

Dolby Metadata	Dolby Metadata	
	Pass-Thru	
	External	
	Stereo	
	5.1	
		↩

Dolby Metadata Menu

The 'dolby metadata' menu provides for:

- **Pass-Thru**

If your Teranex 3D also contains a 'dolby decoder' module, any metadata derived from the decoded Dolby stream will be reinserted in the Dolby encoded output.

- **External**

To add metadata from an external metadata generator to your Dolby encoded output, connect the generator to the '9 pin dolby metadata' connector on the rear panel.

- **Stereo**

Pre-configured metadata for stereo output.

- **5.1**

Pre-configured metadata for 5.1 encoding, typically used with Dolby digital encoding.

Metadata Parameter	Stereo	5.1
Program Configuration	4x2	5.1+2
Program Description Text	Not programmed	Not programmed
Frame Rate	Set by Conversion	Set by Conversion
Bitstream Mode	Complete Main	Complete Main
Channel Mode	2/0 L/R	3/2 L,C,R,Ls,Rs
Center Downmix Level	-3 dB	-3 dB
Surround Downmix Level	-3 dB	-3 dB
Dolby Surround Mode	Not Indicated	Not Indicated
LFE Channel	LFE Off	LFE On
Dialogue Normalization	27	27
Audio Production Information	No	No
Mix Level	0	0
Room Type	Not Indicated	Not Indicated
Copyright Bit	Yes	Yes

Metadata Parameter	Stereo	5.1
Original Bitstream	Yes	Yes
Extended Bitstream Info 1	Yes	Yes
Preferred Stereo Downmix	Not Indicated	Not Indicated
Lt/Rt Center Downmix Level	-3 dB	-3 dB
Lt/Rt Surround Downmix Level	-3 dB	-3 dB
Lo/Ro Center Downmix Level	-3 dB	-3 dB
Lo/Ro Surround Downmix Level	-4.5 dB	-4.5 dB
Extended Bitstream Info 2	Yes	Yes
Dolby Surround EX Mode	Not Indicated	Not Indicated
Dolby Headphone	Not Indicated	Not Indicated
A/D Converter Type	Standard	Standard
DC Filter	Enabled	Enabled
Lowpass Filter	Enabled	Enabled
LFE Lowpass Filter	Disabled	Enabled
Surround Phase Shift	Disabled	Enabled
Surround 3 dB Attenuation	Disabled	Enabled
RF Mode Compression Info	None	None
RF Mode Compression Profile	Film Standard	Film Standard
Line Mode Compression Info	None	None
Line Mode Compression Profile	Film Standard	Film Standard

Noise Reduction Menu Settings

The 'noise reduction' algorithm in Teranex processors looks at each pixel in an image and processes it based on motion and types of noise. Spatial noise reduction is applied to still areas of the picture and temporal recursive noise reduction is applied to moving areas. Using both types provides higher quality results.

To enable noise reduction, go to Main Menu>Noise Reduction and select 'on' using the soft menu buttons and rotary knob.

NOTE 'Noise reduction' is not available while performing frame rate conversions, such as 486i59.94 to 576i50 NTSC to PAL or 1080i59.94 to 1080i50.

Video	Main Menu	System Setup
Audio		
Noise Reduction		
Ancillary Data		↩

Main Menu>Noise Reduction

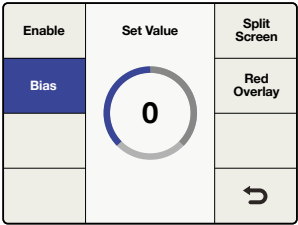
Enable	Noise Reduction	Split Screen
Bias	On	Red Overlay
	Off	
		↩

Noise Reduction Menu

Bias Menu

Adjust the 'bias' level to set the amount of noise reduction. The higher the 'bias' value, the more aggressive the noise reduction.

- The Bias range is -6 to +6.
- The default value is 0.

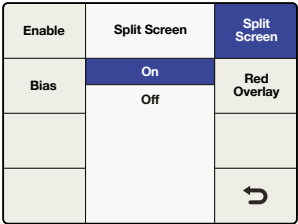


Noise Reduction Menu>Bias

Split Screen Menu

Split Screen divides the LCD, one half with noise reduction and one half without. This lets you compare your noise reduction settings to the original image.

To enable 'split screen', go to Main Menu>Noise Reduction>Split Screen and select 'on' using the soft menu buttons and rotary knob.

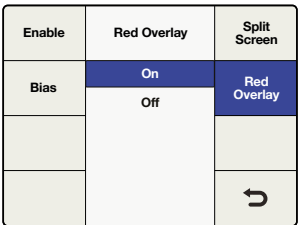


Noise Reduction Menu>Split Screen

Red Overlay Menu

In 'red overlay' mode, pixels in motion will be colored red. Temporal recursive noise reduction will not be applied to these pixels. Turning the 'red overlay' on will also allow you to see the effect of noise reduction 'bias' adjustments.

To enable 'red overlay', go to Main Menu>Noise Reduction>Red Overlay and select 'on' using the soft menu buttons and the rotary knob.



Noise Reduction Menu>Red Overlay



The red overlay helps to show which parts of the image have temporal recursive noise reduction applied.

Ancillary Data Menu Settings

The ‘ancillary data’ menu provides access to closed caption, timecode and video index features.

Closed Caption Menu

The ‘closed caption’ menu lets you configure closed captions for CEA-608B and CEA-708B standards. CEA-608B is the closed captioning reference standard for SD NTSC analog and SD-SDI. Captions are encoded on line 21 of the vertical blanking interval. CEA-708B is the standard for HD-SDI, typically encoding captions on line 9.

The Teranex processor automatically detects digital captions in both SD and HD video formats. If digital captions are not present in an SD signal, the processor will look for analog captions on line 21. If the program has captions on line 21 but you’re not seeing them, set the ‘analog in line’ menu to look for captions on lines 20 or 22.

TIP Closed caption processing also supports up conversion of 608 CC2 and CC3 secondary language services to 708 Service 2, or S2, via the ‘service 2 source’ menu.

Video	Main Menu	System Setup
Audio		
Noise Reduction		
Ancillary Data		↩

Main Menu>Ancillary Data

Closed Caption	Ancillary Data	Video Index
Timecode		
		↩

Ancillary Data Menu

Closed Caption	Ancillary Data	Video Index
Timecode		
		↩

Ancillary Data
Menu>Closed Caption

CC Enable	Closed Caption	Service 2 Source
Analog In Line		Service 1 Language
Analog Out Line		Service 2 Language
Reset All		↩

Closed Caption
Menu>CC Enable

The ‘closed captioning’ menu offers the following selections and adjustments:

- **CC Enable**
Turns ‘closed captions’ ‘on’ or ‘off’ in the output video.
- **Analog In Line**
Allows you to select the analog ‘closed caption’ input line.
- **Analog Out Line**
Allows you to select the analog ‘closed caption’ output line.
- **Service 2 Source**
Allows you to select between CC2 and CC3 as the ‘closed caption’ ‘service 2’ source.
- **Service 1 Language**
Allows you to select the language used for ‘service 1’.
- **Service 2 Language**
Allows you to select the language used for ‘service 2’.

CC Enable

‘CC enable’ is ‘off’ by default. To enable closed captioning, go to Main Menu>Ancillary Data>Closed Caption>CC Enable and select ‘on’ using the soft menu buttons or rotary knob.

Disabling captions may be helpful if the incoming closed caption data is incorrect or corrupt.

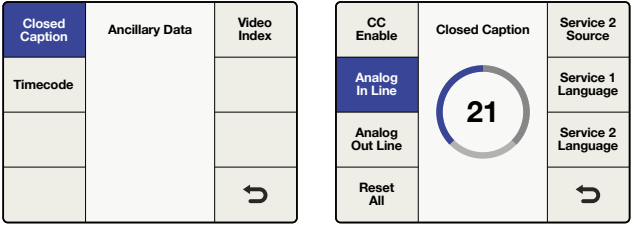
The CC status LED on the front panel is tied to the ‘in’ or ‘out’ selection. When ‘in’ is selected, the CC status LED will illuminate when closed captioning is detected in the input video.

When ‘out’ is selected, the CC status LED will illuminate when closed captioning data is present in the output video.

Analog In Line

‘Analog in line’ identifies the line on which closed caption information is located in the incoming video. This menu applies only to sources with analog closed captions. If your captions are digital, they will be automatically detected.

- The range of adjustment is lines 20 to 22.
- The default setting is line 21.



Ancillary Data
Menu>Closed Caption

Closed Caption Menu>
Analog In Line

Analog Out Line

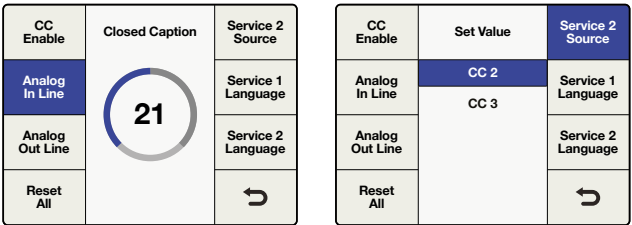
‘Analog out line’ identifies the line on which closed caption information is located in the output video. This menu applies only to analog SD output.

- The range of adjustment is lines 20 to 22.
- The default setting is line 21.

Service 2 Source

‘Service 2 source’ allows you to select CEA-608 CC2 or CC3 for up converting to CEA-708, ‘service 2’.

- The choices are CC2 and CC3.
- The default setting is CC2.



Closed Caption Menu>
Analog Out Line

Closed Caption Menu>
Service 2 Source

Service 1 Language

'Service 1 language' is used to select the language for that service in CEA-708 closed captions.

- The language choices are:
 - English
 - French
 - German
 - Italian
 - Spanish
- The default language is English.

CC Enable	Set Value	Service 2 Source
Analog In Line	English	Service 1 Language
	French	
Analog Out Line	German	Service 2 Language
	Italian	
Reset All	Spanish	↶

Closed Caption Menu>
Service 1 Language

Service 2 Language

'Service 2 language' is used to select the language for that service in CEA-708 closed captions.

- The language choices are:
 - English
 - French
 - German
 - Italian
 - Spanish
- The default language is English.

Closed Caption	Ancillary Data	Video Index
Timecode		
		↶

Ancillary Data
Menu>Closed Caption

CC Enable	Set Value	Service 2 Source
Analog In Line	English	Service 1 Language
	French	
Analog Out Line	German	Service 2 Language
	Italian	
Reset All	Spanish	↶

Closed Caption Menu>
Service 2 Language

Timecode Menu

Teranex lets you send incoming timecode to the output, strip incoming timecode completely or generate new timecode. Similar to broadcast decks, you can select the desired timecode mode, such as 'input regen' and 'jam sync', or set specific timecode data.

To enable timecode processing, go to Main Menu>Ancillary Data>Timecode and choose your desired timecode mode.

Timecode Generator

The 'timecode generator' menu lets you choose from four available timecode modes, or disable manual timecode processing.

Off

No timecode data will be inserted into the output video. This is the default setting.

Closed Caption	Ancillary Data	Video Index
Timecode		
		↺

Prev	Timecode	Next
Timecode Generator	Off	Start
Set Timecode	Input Regen	Start Source
Setup	Generate	↺
	Jam Sync	

Ancillary Data Menu>Timecode Timecode Menu

Input

Select 'input' mode to feed the input timecode directly to the output. This is useful if you want to preserve your source timecode and your input and output frame rates are the same.

It's important to make sure that the 'drop frame' mode in the 'timecode setup' menu is set to 'auto' to ensure the output timecode will match the input timecode.

NOTE If you want to ensure the output timecode matches your input timecode, do not use an external reference. The external reference can cause a dropped or duplicated frame in the output, which will affect your timecode count.

To set the 'reference' menu to 'input', go to Main Menu>Setup>Reference and select 'input'.

Prev	Timecode	Next
Timecode Generator	Off	Start
	Input	
Set Timecode	Input Regen	Start Source
	Generate	
Setup	Jam Sync	↺

Timecode Generator Menu>Input

Input Regen

The 'input regen' mode synchronizes the input timecode to the output timecode and is often used when performing frame rate conversions, such as 1080i50 to 1080i59.94.

'Input regen' mode should only be used when your Teranex processor is locked to your input video.

'Drop frame' and 'non drop frame' modes are both supported in 23.98, 29.97 and 59.94 frame rates. However, in a conversion where the source timecode is drop frame and the output format supports only non drop frame timecode, the output timecode will be automatically converted to non drop frame.

Closed Caption	Ancillary Data	Video Index
Timecode		
		↶

Ancillary Data Menu>
Timecode

Prev	Timecode	Next
Timecode Generator	Off	Start
	Input	
Set Timecode	Input Regen	Start Source
	Generate	
Setup	Jam Sync	↶

Timecode Menu>Input Regen

Generate

The timecode generator will generate free running output timecode appropriate for the selected output format, even if timecode is not present on your video input signal.

▪ Set Timecode

The 'set timecode' menu options you will have are determined by the selection you make in the 'start source' menu.

▪ Start Source = "Input"

If the 'start source' menu is set to 'input', the 'set timecode' menu will show 'input' as the start value for the generator. When you press the 'start' button, the generator will capture the current input timecode value and use that value to start outputting free running timecode. If no timecode is present on your input video source, the generator will begin counting at 00:00:00:00.

▪ Start Source = "Start Value"

If the 'start source' menu is set to 'start value', the 'set timecode' menu will display an eight-character register that allows the entry of a specific starting value for the generator. Turn the rotary knob to adjust the timecode generator values and use the 'previous' and 'next' buttons to move the cursor left or right. When you press the 'start' button the timecode generator will immediately output timecode from your 'start value' entry.

Prev	Timecode	Next
Timecode Generator	Off	Start
	Input	
Set Timecode	Input Regen	Start Source
	Generate	
Setup	Jam Sync	↶

Timecode Menu>Generate

Prev	Timecode	Next
Timecode Generator	Start Value	Start
	Input	
Set Timecode		Start Source
Setup		↶

Generate>Start Source

Prev	Timecode	Next
Timecode Generator	Start Value	Start
	00:00:00:00	
Set Timecode		Start Source
Setup		↶

Set Timecode Menu. Use the Rotary knob to set your values, and the Previous and Next buttons to move the cursor left and right.

Jam Sync

The 'jam sync' mode is similar to the 'generate' mode. However, when you press the 'start' button, 'jam sync' mode allows you to hold the output timecode generator until a pre-determined timecode point is reached in your input video, called the 'jam sync' value. The 'jam sync' value must be entered via the 'set timecode' menu.

Prev	Timecode	Next
Timecode Generator	Off	Start
	Input	
Set Timecode	Input Regen	Start Source
	Generate	
Setup	Jam Sync	↶

Timecode Menu>Jam Sync

- **Set Timecode**

The ‘set timecode’ menu options you will have are determined by the selection you make in the ‘start source’ menu.

Prev	Timecode	Next
Timecode Generator	Start Value Input	Start
Set Timecode	Jam Sync 00:00:00:00	Start Source
Setup		↶

Jam Sync>Set Timecode

- **Start Source = “Input”**

If the ‘start source’ menu is set to ‘input’, the ‘set timecode’ menu will show ‘input’ as the ‘start value’ for the timecode generator. When you press the ‘start’ button, the generator will start looking for a timecode match to the ‘jam sync’ value you have entered. When the match occurs, the generator will use that ‘input’ timecode as the start value to generate free running output timecode.

- **Start Source = “Start Value”**

If the ‘start source’ menu is set to ‘start value’, the ‘set timecode’ menu will display an eight-character register that allows the entry of a specific starting value for the generator. When you press the ‘start’ button the generator will look for a timecode match to the ‘jam sync’ value you have entered. When the match occurs, the generator will use the start value you entered to generate free running output timecode.

Video Index Menu

The ‘video index’ menu enables or disables reaction to video indexing signals that may be embedded in your source video. The three video indexing modes that are supported are Active Format Description, or AFD, Wide Screen Signaling, or WSS, and SMPTE RP186.

Index Reaction

If ‘index reaction’ is turned ‘on’, the Teranex processor will be set to react to incoming video indexing signals. The processor will automatically scan for the presence of video index packets and will react to them if found. AFD indexing takes precedence over the WSS, which takes precedence over RP186.

- The default setting is ‘off’.

NOTE The Teranex processor will not pass or insert WSS or RP186 codes. It will only react to them if they are present on the input.

Closed Caption	Ancillary Data	Video Index
Timecode		
		↶

Ancillary Data Menu>Video Index

Index Reaction	Index Reaction	AFD Insertion
	On	AFD Insert Line
	Off	
		↶

Video Index Menu>Index Reaction

AFD Insertion Menu

This menu allows you to select the desired AFD code that will be inserted in the output video. The output line on which the code will be inserted can be selected in the AFD Insert Line menu.

- Settings include:

Off

No AFD code will be inserted in the output ancillary data space.

Auto

The appropriate code will be inserted based on the current video output format.

Bypass

Any code present in the incoming video stream will be passed through to the output.

AFD codes 0000 – 1111

These codes are manual selections which may be used as needed.

- The default setting is 'off'.

Index Reaction	Video Index	AFD Insertion
	Off	AFD Insert Line
	Auto	
	Bypass	
	0000	
	0001	
	▼	↺

Video Index Menu>AFD Insertion

AFD Insert Line Menu

If AFD Insertion is enabled in the 'AFD insertion' menu above, the 'AFD insert line' menu allows you to select the line on which the AFD code will be inserted in the ancillary data space of the output video signal.

The range of adjustment is dependent on the current output video format:

- For SD formats, the range is lines 10 to 19. The default value is line 15.
- For HD 1080 formats, the range is lines 9 to 20. The default value is line 11.
- For HD 720 formats, the range is lines 9 to 25. The default value is line 11.

Press the rotary knob to go back to the default value.

Index Reaction	Video Index	AFD Insertion
	11	AFD Insert Line
		↺

Video Index Menu>AFD Insert Line

System Setup Menu Settings

The 'system setup' menu provides access to the 'ethernet,' 'factory reset' and 'reference' menus, as well as a system 'info' screen. Teranex AV offers additional selections, including processing latency and still frame capture controls.

Ethernet Menu

The 'Ethernet' menu allows you to display the current settings and assign new settings for static 'IP' address, 'subnet mask' address and IP 'gateway'. This menu also permits you to turn DHCP 'on' or 'off'.

When DHCP is 'on', the IP, 'subnet mask' and 'gateway' menus will display the addresses currently assigned to the chassis by the DHCP server. These values may not be adjusted unless DHCP is 'off'.

IP Menu

To set a static IP address for the Teranex processor, DHCP must be 'off'.

The IP menu will display a four-field register allowing you to enter specific IP address values. Adjust the selection highlighted by the cursor by turning the rotary knob. Use the 'prev' and 'next' buttons to move the cursor to the left or right, respectively. If you change this setting, press the 'back' button, then press the 'save and restart' button to power cycle the chassis and establish the new setting.

Video	Main Menu	System Setup
Audio		
Noise Reduction		
Ancillary Data		↩

Main Menu>System Setup

Ethernet	System Setup	Factory Reset
		Reference
		Info
		↩

System Setup Menu>Ethernet

Prev	Ethernet	Next
IP	192.126.10:50	Gateway
Subnet Mask		DHCP
Save and Restart		↩

System Setup Menu>Ethernet>IP

Subnet Mask Menu

The 'subnet mask' menu will display a four-field register allowing you to enter specific values. Adjust the selection highlighted by the cursor by turning the rotary knob. Use the 'prev' and 'next' buttons to move the cursor left or right, respectively. If you change this setting, press the 'back' button, then press the 'save and restart' button to power cycle the chassis and establish the new setting.

Prev	Ethernet	Next
IP	225.255:255:0	Gateway
Subnet Mask		DHCP
Save and Restart		↩

System Setup Menu>
Ethernet>Subnet Mask

Prev	Ethernet	Next
IP	190:169:10:1	Gateway
Subnet Mask		DHCP
Save and Restart		↩

System Setup Menu>
Ethernet>Gateway

Prev	Ethernet	Next
IP	On	Gateway
	Off	
Subnet Mask		DHCP
Save and Restart		↩

System Setup Menu>
Ethernet>DHCP

Gateway Menu

The 'gateway' menu will display a four-field register allowing you to enter specific values. Adjust the selection highlighted by the cursor by turning the rotary knob. Use the 'prev' and 'next' buttons to move the cursor left or right. To establish new settings, press the 'back' button, then 'save and restart'. Your Teranex will power cycle and apply the new settings.

DHCP Menu

The DHCP menu enables or disables the assignment of an IP address to the chassis using 'dynamic host configuration protocol' or DHCP. You can press the DHCP soft button or turn the rotary knob to turn DHCP 'on' or 'off'. If you change this setting, press the 'save and restart' button to power cycle the chassis and establish the new IP address.

- **ON**
The Teranex processor will accept an IP address assigned by your network router.
- **OFF**
The previous static IP address of the unit will be used if one was previously assigned.

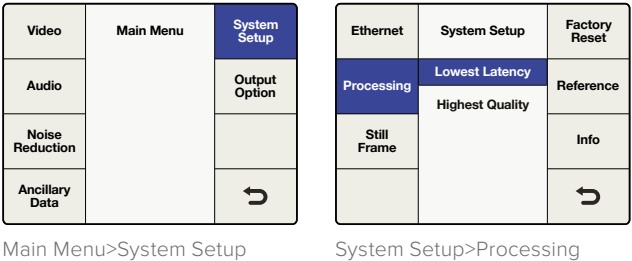
If you press the IP button with 'DHCP' 'on' and see an IP address of 0.0.0.0, this indicates that the processor was unsuccessful in obtaining an IP address from the DHCP server. Please check your Ethernet network connections.

Processing Menu for Teranex AV only

The 'processing' menu allows you to change the latency, or processing delay, through the Teranex AV. This feature is ideal when using a Teranex AV in live broadcast or production situations and can reduce the latency down to 2 frames.

The processing modes are:

- **Lowest latency**
In this mode format conversions will run with minimal latency, typically 2 frames.
- **Highest quality**
In this mode, all conversions will run with the same high quality algorithms currently used in Teranex processors.



Still Frame Menu for Teranex AV only

The still frame menu allows you to capture a full-frame image from the active video input or the freeze frame buffer of the Teranex AV. This means that you can capture a still from an HDMI input, like a computer, or from an SDI source, such as a camera. The still frame is saved into non-volatile memory, which means it will be preserved after a power cycle or until you decide to delete it or overwrite it with a new still.

Capture Mode

Pressing 'capture mode' will open a confirmation screen. Press 'capture' on the new screen to grab from the current input signal or, if a freeze is present, from the freeze frame buffer. Press 'cancel' to abort the process. Your still frame will be captured at the current output resolution of the Teranex AV. You may store other still frames at other resolutions by changing the output format of the Teranex AV to the new resolution and repeating the capture process.

If a still frame exists in the Teranex AV at a specific resolution, capturing a new still frame at the same resolution will overwrite the existing still frame.

NOTE Saving a Still to non-volatile memory is a background task that can take up to 30 seconds for Ultra HD still images. If you plan to power down after saving a still, be sure to allow enough time for this process to be completed.

▪ Preview

Once a still frame has been captured, the ‘preview’ button will allow you to see the image for 3 seconds on the output of the Teranex AV. The Preview button will be grayed out, indicating that it is unavailable, if no still frame exists for the current output resolution.

▪ Delete

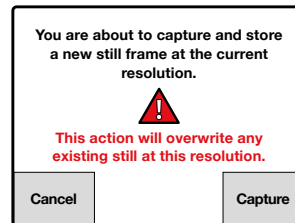
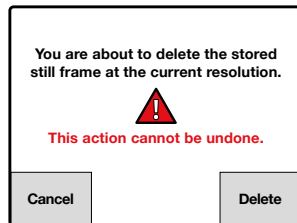
Press the ‘delete’ button to erase a still frame from memory. A confirmation screen will appear to prompt you to verify the deletion. You may also delete all still frames by performing a factory reset of the Teranex AV via the ‘System Setup>Factory Reset’ menu.

Ethernet	System Setup	Factory Reset
Processing		Reference
Still Frame		Info
		↶

System Setup>Still Frame

Delete	Still Frame	Capture Mode
		Preview
		↶

Still Frame Menu



When deleting or capturing a still frame, a warning screen gives you the option to continue or cancel.

Still Frame File Transfer via Blackmagic Teranex Setup

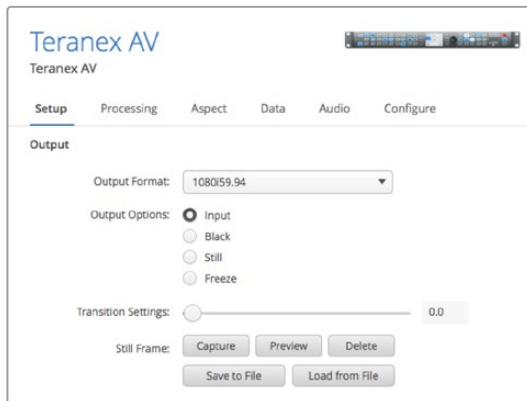
Using the Blackmagic Teranex Setup utility, you can save still frame images from the Teranex AV to your computer and load images from your computer, such as a company logo, into your Teranex AV. The following file formats are acceptable: png (default), bmp, ppm, xbm, xpm, pbm, pgm.

Save to File

To save the current still frame from your Teranex AV to your computer, launch the Teranex Setup utility on your computer and connect to your Teranex AV. On the Setup tab, click on the ‘save to file’ button. A window will open on your computer permitting you to name the file and select a location in which to save it. Click ‘save’ and wait for the save to complete.

Load from File

To load a still image file from your computer to a Teranex AV, click on the ‘load from file’ button in the Setup tab of the Teranex Setup utility. A window will open on your computer permitting you to select the target file.



When loading a graphic from a computer, the file may be of any resolution. Image conversion software will automatically resize the image to the output resolution of the Teranex AV. It's important to note that this scaling is not done using Teranex algorithms and the quality will be lower than if the scaling was done internally. If scaling with the highest quality is important, send the image to the Teranex AV via SDI or HDMI and use the algorithms in the Teranex AV to scale it internally for the best results.

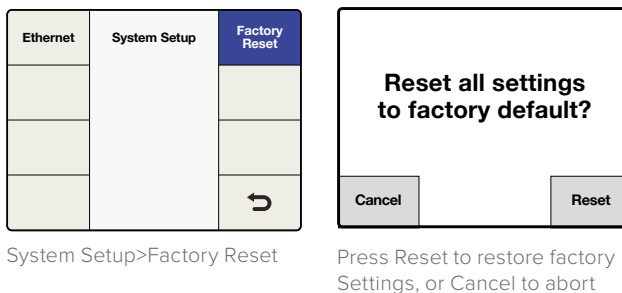
Factory Reset Menu

Select 'factory reset' to restore conversion setup settings to their factory defaults.

The following settings will not be affected:

- Presets.
- Output video settings, e.g., 'format, frame, rate'.
- Aspect selection; however, any adjustable aspect ratio settings will be reset to their default values.
- Ethernet IP address settings.

In the Teranex AV, all still images stored in the unit will be erased during a factory reset.



Reference Menu Settings

The 'reference' menu allows you to synchronize your video output to an input video source or an external reference. In the Teranex AV, you may also choose its internal reference.

Type Menu

The 'type' menu is where you choose the source of your reference.

- **Input**
Selects the current input video source as the reference.
- **External**
Selects the external reference input.

▪ Internal

Synchronizes the output of the Teranex AV to its internal freerunning oscillator, which produces constant sync in the output stream, even when changing inputs to the unit.

Video	Main Menu	System Setup
Audio		
Noise Reduction		
Ancillary Data		↩

Main Menu>System Setup

Ethernet	System Setup	Factory Reset
		Reference
		Info
		↩

System Setup>Reference

Type	Reference	Pixel Offset
Generate	Input	Line Offset
	External	
		↩

Reference>Type Menu for Teranex 2D, 3D and Express

Type	Reference	Pixel Offset
Generate	Input	Line Offset
	Internal	
	External	↩

Reference>Type Menu for Teranex AV

External Reference Compatibility Chart

Your external reference must be compatible with the current output video format. The table below lists the external reference signals acceptable for each output video format and frame rate. This chart is also applicable for reference signals generated by the Teranex AV in the Generate menu.

If external reference is selected and a valid reference signal is detected, the 'REF' status LED on the front panel will illuminate. If the external reference is removed or lost, the 'REF' LED will be turned off and the processor will go into a free run condition until the reference is restored.

Output Format and Frame Rate	Reference Signal
525i59.94 NTSC	Blackburst 59.94
625i50 PAL	Blackburst 50
720p50	Blackburst 50
720p59.94	Blackburst 59.94, Tri-level Progressive 59.94
720p60	Tri-level Progressive 60
1080p23.98	Tri-level Progressive 23.98, Tri-level Interlaced 47.96
1080PsF23.98	Tri-level Progressive 23.98, Tri-level Interlaced 47.96
1080p24	Tri-level Progressive 24, Tri-level Interlaced 48
1080PsF24	Tri-level Progressive 24, Tri-level Interlaced 48
1080p25	Blackburst 50, Tri-level Progressive 25, Tri-level Interlaced 50
1080PsF25	Blackburst 50, Tri-level Progressive 25, Tri-level Interlaced 50
1080p29.97	Blackburst 59.94, Tri-level Progressive 29.97, Tri-level Interlaced 59.94

Output Format and Frame Rate	Reference Signal
1080PsF29.97	Blackburst 59.94, Tri-level Progressive 29.97, Tri-level Interlaced 59.94
1080p30	Tri-level Progressive 30, Tri-level Interlaced 60
1080PsF30	Tri-level Progressive 30, Tri-level Interlaced 60
1080i50	Blackburst 50, Tri-level Interlaced 50
1080p50	Blackburst 50
1080i59.94	Blackburst 59.94, Tri-level Interlaced 59.94
1080p59.94	Blackburst 59.94
1080i60	Tri-level Interlaced 60
1080p60	Not supported
2K DCI 23.98p	Tri-level Progressive 23.98, Tri-level Interlaced 47.96
2K DCI 23.98PsF	Tri-level Progressive 23.98, Tri-level Interlaced 47.96
2K DCI 24p	Tri-level Progressive 24, Tri-level Interlaced 48
2K DCI 24PsF	Tri-level Progressive 24, Tri-level Interlaced 48
2160p23.98	Tri-level Progressive 23.98, Tri-level Interlaced 47.96
2160p24	Tri-level Progressive 24, Tri-level Interlaced 48
2160p25	Blackburst 50, Tri-level Progressive 25, Tri-level Interlaced 50
2160p29.97	Blackburst 59.94, Tri-level Progressive 29.97, Tri-level Interlaced 59.94
2160p30	Tri-level Progressive 30, Tri-level Interlaced 60
2160p50	Blackburst 50
2160p59.94	Blackburst 59.94
2160p60	Not supported

Pixel Offset

If 'external' has been selected and a valid reference is present, this control will adjust the pixel timing of the output relative to the supplied external reference.

- The 'range' is determined by the current output format selection.

Line Offset

If 'external' has been selected and a valid reference is present, this control will adjust the line timing of the output relative to the supplied external reference.

- The 'range' is determined by the current output format selection.

Ethernet	System Setup	Factory Reset
Processing		Reference
Still Frame		Info
		↺

System Setup>Reference

Type	Pixel Offset	Pixel Offset
	0	Line Offset
		↺

Reference Menu>Pixel Offset

Type	Line Offset	Pixel Offset
	0	Line Offset
		↺

Reference Menu>Line Offset

Generate Menu for Teranex AV only

The Teranex AV can be used as a reference generator via its 'reference output' connection. The type of reference signal, black burst or Tri-level, is dependent on the output video format of the Teranex AV. Some video formats permit the use of specific reference types only. For example, if NTSC is your Teranex output format, only black burst at 59.94Hz will be generated. Similarly, for a 1080p23.98 output, only tri-level sync is possible. Other formats, such as 1080i59.94, allow the use of either type. The different Tri Level reference levels are Tri-level progressive, or TRI-P, and Tri-level interlaced, or TRI-I.

Ethernet	System Setup	Factory Reset	Type	Reference	Pixel Offset
Processing		Reference	Generate	Blackburst	Line Offset
Still Frame		Info		TriLevel	
		↺			↺

System Setup>Reference

Reference>Generate

When your output video format is	Your choices for generated reference signals are:
525i59.94 NTSC	Blackburst 59.94
625i50 PAL	Blackburst 50
720p50	Blackburst 50 or Tri-level Progressive 50
720p59.94	Blackburst 59.94 or Tri-level Progressive 59.94
720p60	Tri-level Progressive 60
1080p23.98	Tri-level Progressive 23.98
1080PsF23.98	Tri-level Interlaced 47.96
1080p24	Tri-level Progressive 24
1080PsF24	Tri-level Interlaced 48
1080p25	Blackburst 50 or Tri-level Progressive 25
1080PsF25	Blackburst 50 or Tri-level Interlaced 50
1080p29.97	Blackburst 59.94 or Tri-level Progressive 29.97
1080PsF29.97	Blackburst 59.94 or Tri-level Interlaced 59.94
1080p30	Tri-level Progressive 30
1080PsF30	Tri-level Interlaced 60
1080i50	Blackburst 50 or Tri-level Interlaced 50
1080p50	Blackburst 50
1080i59.94	Blackburst 59.94 or Tri-level Interlaced 59.94
1080p59.94	Blackburst 59.94
1080i60	Tri-level Interlaced 60

When your output video format is	Your choices for generated reference signals are:
1080p60	Not supported
2K DCI 23.98p	Tri-level Progressive 23.98
2K DCI 23.98PsF	Tri-level Interlaced 47.96
2K DCI 24p	Tri-level Progressive 24
2K DCI 24PsF	Tri-level Interlaced 48
2160p23.98	Tri-level Progressive 23.98
2160p24	Tri-level Progressive 24
2160p25	Blackburst 50 or Tri-level Progressive 25
2160p29.97	Blackburst 59.94 or Tri-level Progressive 29.97
2160p30	Tri-level Progressive 30
2160p50	Blackburst 50
2160p59.94	Blackburst 59.94
2160p60	Not supported

Info Menu

The 'info menu' displays the product model name and the version number of the software currently installed in your Teranex processor.

Ethernet	System Setup	Factory Reset
Processing		Reference
Still Frame		Info
		↩

System Setup>Info

	Teranex AV	
	SW Version: 6.1	
		↩

Info Menu

Output Options Menu for Teranex AV only

The 'output options' menu provides four output selections, which permits you to quickly switch the output of the Teranex AV between the input video signal, internal black, a pre-stored still frame, or a captured 'freeze frame' from the input.

Video	Main Menu	System Setup
Audio		Output Options
Noise Reduction		
Ancillary Data		↩

Main Menu>Output Options

Input	Output Options	Transition Settings
Black		
Still		
Freeze		↩

Output Options>Input

Input	Output Options	Transition Settings
Black		
Still		
Freeze		↩

Output Options>
Transition Settings

TIP If you need quick access to the 'output options' menu, you can assign this menu page to the 'menu 1' or 'menu 2' buttons on the Teranex AV front panel.

Input

'Input' refers to the video input that you currently have selected on the front panel. This may be SDI 1, SDI 2, HDMI or the fiber optic input, if installed. Video test patterns, selected via the 'Home > Video > Test Patterns' menu, are available through the 'input' selection.

Black

Press 'black' to switch the output to the internal black generator. No audio will be output while in this mode.

Still

Press 'still' to display a saved still frame. If no still frame is present in memory, the 'still' button will be grayed out and not selectable. No audio will be output while in this mode.

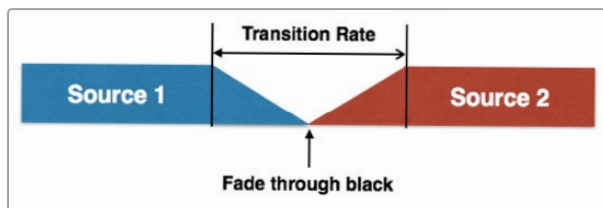
Freeze

Pressing 'freeze' will grab a screen capture of the current live video input. Selecting another button, such as 'input' or 'still,' will switch the output to the newly selected signal and will discard the freeze frame. No audio will be output while in this mode.

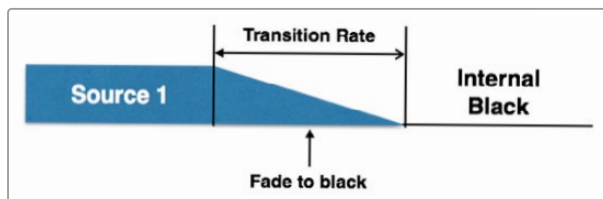
Transition Settings

The Transition Settings menu allows you to select a transition rate between 0 and 5 seconds, allowing you to cut or fade between video selections on the Output Options menu.

- A transition setting of 0 (zero) will perform a cut between selections.
- When switching between 'input' and 'still,' setting a transition rate greater than zero will produce a fade through black. For example, if the transition rate is set to 2 seconds, the fade from Source 1 to black will take 1 second and the fade from black to Source 2 will take one second, producing an overall transition time of 2 seconds. Audio present on Source 1 or Source 2 will fade out or in with the video at the same rate.

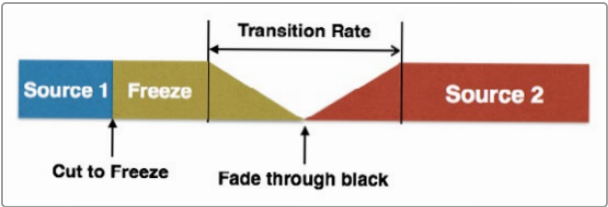


- A transition to 'black' will use the entire time set by the transition rate. If the rate were set to 2 seconds, the fade to black would take the full 2 seconds. Audio present on Source 1 will fade down with the video at the same rate.



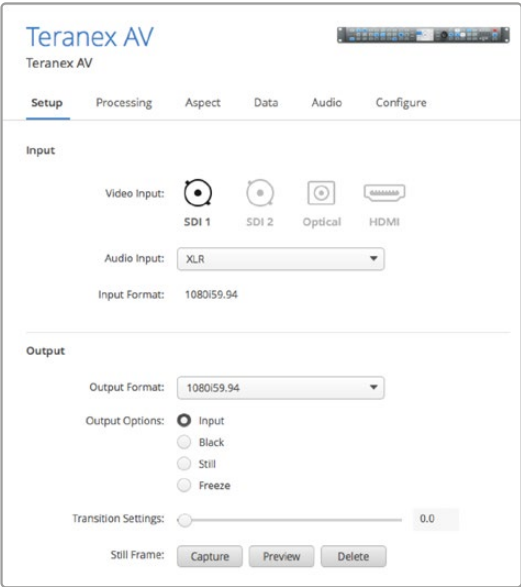
- The transition setting has no effect on a Freeze frame. When freeze is selected, the Teranex AV will immediately cut to the freeze frame regardless of the transition setting. Audio will be muted.

When you're ready to switch from Freeze to Input, Black or Still, the transition will obey the rules of the transition setting described above. In the example below, the audio on Source 2 will fade in with the video at the same rate.



Press the front panel knob or turn it fully counterclockwise to reset the transition rate to zero.

Output options, transition settings and still frame controls are also available via remote control in the Blackmagic Teranex Setup utility.



3D Menu Settings

The ‘3D’ menu is available only in the Teranex 3D processor model. This menu enables the dual internal processors of the Teranex 3D Processor for format or frame rate conversion of stereoscopic inputs and for conversion of 2D sources into simulated 3D outputs.

Video	Main Menu	System Setup
Audio		
Noise Reduction		3D
Ancillary Data		↺

Main Menu>3D

3D Mode	3D	Intensity
Input	Off	Depth
Output	Convert 2D to 3D 3D Align	Camera Align
		↺

3D Menu>3D Mode

3D Mode Menu

In the '3D mode' menu, 'off' implies normal 2D processing. The following selections are available to enable 3D processing:

- **Convert**

This mode enables processing of stereoscopic left and right eye inputs, which may be input via the SDI or HDMI inputs. This mode will also synchronize the incoming stereoscopic signals, which means that two non-synchronous inputs may be input to the Teranex 3D processor and the outputs will be synchronized.

- Connect your 'left and right eye' signals to SDI input A and B, respectively.

- **2D to 3D**

This mode enables the 2D to 3D conversion algorithm. Any 2D video signal may be converted into a simulated 3D output.

- If you're using an SDI input, connect your 2D source to 'SDI Input A'.
- When 2D to 3D is selected, the 'intensity' and 'depth' buttons will become available. Descriptions for these settings are provided a bit later in this manual.

- **3D Align**

This mode enables the 3D alignment tools, including image flip, horizontal and vertical positioning, axial rotation and toe-in.

- Connect your 'left and right eye' signals to SDI input A and B, respectively.

3D Mode	3D	Intensity
Input	Off	Depth
	Convert	
Output	2D to 3D	Camera Align
	3D Align	
		↺

3D Menu>3D Mode>
3D Convert

3D Mode	3D	Intensity
Input	Off	Depth
	Convert	
Output	2D to 3D	Camera Align
	3D Align	
		↺

3D Menu>3D Mode>
2D to 3D

3D Mode	3D	Intensity
Input	Off	Depth
	Convert	
Output	2D to 3D	Camera Align
	3D Align	
		↺

3D Menu>3D Mode>
3D Align

Input Menu

The 3D Input menu allows you to define the input formatting of your 3D source.

- **Full Frame**

Full resolution inputs for left and right eye images on SDI inputs A and B, respectively, or from an HDMI frame packed signal if using the HDMI input.

- **Side by Side**

Decodes a 'side by side' encoded input via SDI input A or the HDMI input.

- **Top/Bottom**

Decodes a 'top and bottom' encoded input via SDI input A or the HDMI input.

- **Line by Line**

Decodes a 'line by line' encoded input via SDI input A or the HDMI input.

3D Mode	Input	Intensity
Input	Full Frame	Depth
	Side by Side	
Output	Top / Bottom	Camera Align
	Line by Line	
		↺

3D Menu>3D Input

3D Mode	Output	Intensity
Input	Full Frame	Depth
	Side by Side	
Output	Top / Bottom	Camera Align
	Line by Line	
		↺

3D Menu>3D Output

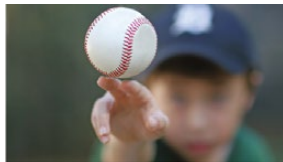
Output Menu

The '3D output' selection determines the output formatting for your 3D image.

- **Full Frame**
Provides full resolution outputs for left and right eyes on SDI outputs A and B respectively, while simultaneously providing a frame packed signal on the HDMI output.
- **Side by Side**
Enables 'side by side' output encoding. SDI outputs A and B and the HDMI output will provide identical side by side output signals.
- **Top / Bottom**
Enables top and bottom output encoding. SDI outputs A and B and the HDMI output will provide identical top/bottom output signals.
- **Line by Line**
Enables 'line by line' output encoding. SDI outputs A and B and the HDMI output will provide identical line by line output signals.



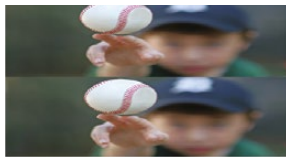
Full Frame Left Eye



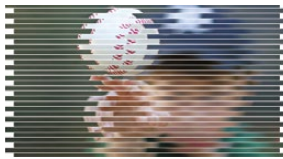
Full Frame Right Eye



Side by Side



Top/Bottom Encoding

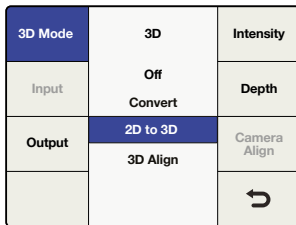


Line by Line Encoding

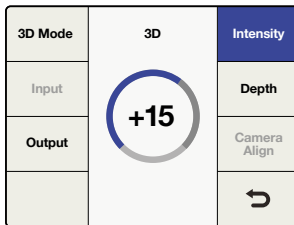
Intensity Menu

The 'intensity' selection will not be available until 2D to 3D has been selected in the '3D mode' menu. The 'intensity' setting allows you to control the overall amount of the 3D effect.

- The range of adjustment is -40 where the image is in front of the screen to +40 where the image is behind the screen. The default setting is +15. A setting of 0 provides a flat, 2D output image.



2D to 3D mode must be active to adjust Intensity and Depth.




3D Menu>2D to 3D>Intensity

Depth Menu

The 'depth' selection will not be available until 2D to 3D has been selected in the '3D mode' menu.

The 'depth' setting pushes the overall image deeper. This can add to the 3D effect but in most cases should be left at the default value.

- The range of adjustment is -12 to +12. The default setting is 0.

3D Mode	3D	Intensity
Input		Depth
Output		Camera Align
		↶

3D Menu>2D to 3D>Depth

Camera Align menu

The 'camera align' button will be enabled only when you select '3D align' in the '3D mode' menu. The camera alignment application performs a variety of processing adjustments to a stereoscopic stream, including image zoom, flip, horizontal & vertical positioning and axial rotation adjustment. Adjustments may be made to the individual eyes or you may link the left and right eye images and simultaneously adjust both eyes of the stereoscopic image by the same amount.

▪ Default Settings

As with other menus in the Teranex Processors, you may push the rotary knob to return the current parameter to its default setting. Use the 'reset all' menu button to return all controls in the current menu to their default settings.

Position Menu

The 'position menu' provides for horizontal and vertical position adjustment of each image. You may individually select the left or right eyes, or adjust both eyes simultaneously.


- The range of values shown in the positioning dial will change depending on the output format you have chosen; however, the range will always be -50% to +50% of the picture size, horizontally and vertically. For 1080 outputs, the range of positioning is -959 to +959 pixels horizontally and -539 to +539 lines vertically. For 720 outputs, the range is -639 to +639 pixels and -359 to +359 lines.
- A positive horizontal value indicates a shift to the right.
- A negative horizontal value indicates a shift to the left.
- A positive vertical value indicates a shift upward.
- A negative vertical value indicates a shift downward.

3D Mode	3D	Intensity
Input	Off	Depth
Output	Convert	Camera Align
	2D to 3D	
	3D Align	↶


3D Menu>Camera Align

Position	Camera Align	Zoom
Rotation		Trim
Flip		
Reset All		↶

Camera Align Menu

Horizontal	Position	Left Eye
Vertical		Right Eye
		Both Eyes
Reset All		↶

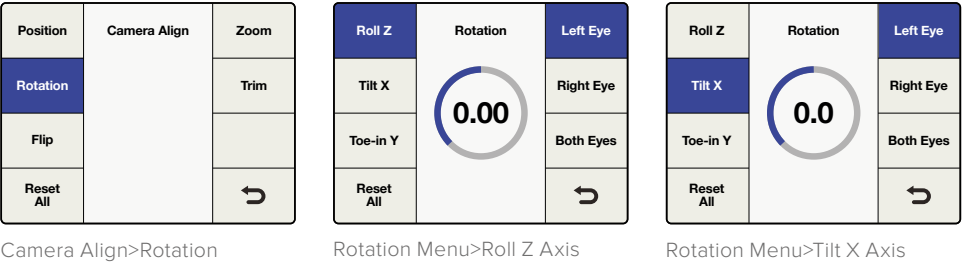
Camera Align >Left Eye Horizontal

Horizontal	Position	Left Eye
Vertical		Right Eye
		Both Eyes
Reset All		↶

Camera Align >Left Eye Vertical

Rotation Menu

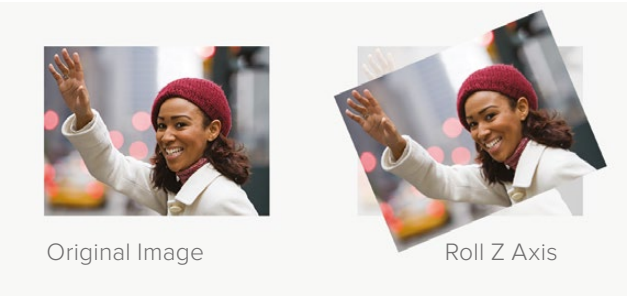
The ‘rotation menu’ of the ‘camera align’ application permits axial rotation adjustment of the image along the X, Y, and Z axis, either independently or in any combination of the three dimensions. Axial rotational adjustment can be used to compensate for 3D camera rigs that have mechanical misalignments.



Roll Adjustment - Z Axis

The ‘roll Z’ adjustment provides image rotation on the Z axis.

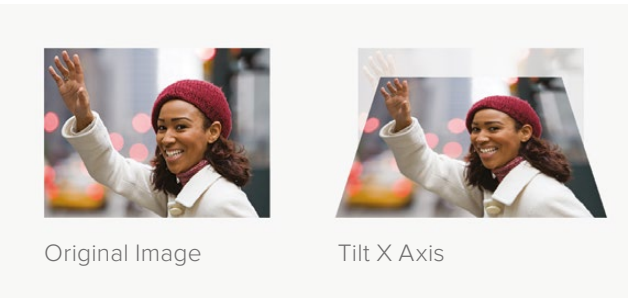
- The range of adjustment on the Z axis is -8 to +8 degrees, with a granularity of 0.02 degrees. The default setting is 0.



Tilt Adjustment - X Axis

The ‘tilt X’ adjustment provides image rotation on the X axis.

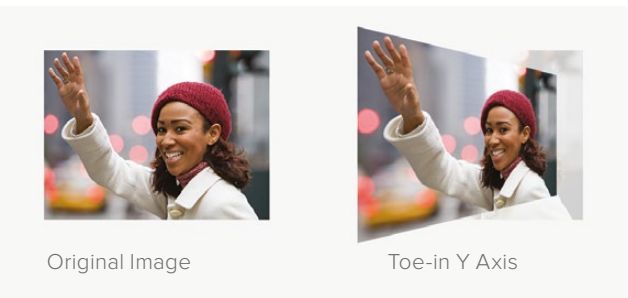
- The range of adjustment on the X axis is -8 to +8 degrees, with a granularity of 0.2 degrees. The default setting is 0.



Toe-In Adjustment - Y Axis

The ‘toe-in Y’ adjustment provides image rotation on the Y axis.

- The range of adjustment on the Y axis is -8 to +8 degrees, with a granularity of 0.2 degrees. The default setting is 0.



Position	Camera Align	Zoom
Rotation		Trim
Flip		
Reset All		↶

Camera Align>Rotation

Roll Z	Rotation 0.0	Left Eye
Tilt X		Right Eye
Toe-in Y		Both Eyes
Reset All		↶

Rotation Menu>Toe In Y Axis

Position	Camera Align	Zoom
Rotation		Trim
Flip		
Reset All		↶

Camera Align>Flip

Flip	Flip Off Horizontal Vertical Both	Left Eye
		Right Eye
		Both Eyes
Reset All		↶

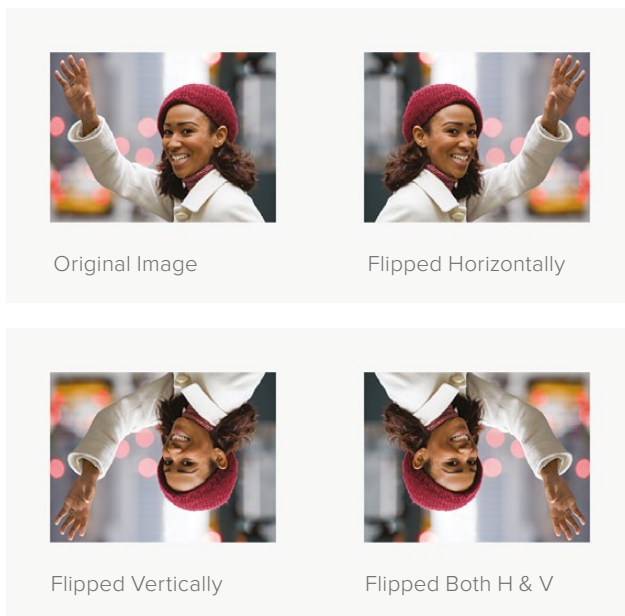
Flip Menu>Left Eye / Horizontal

Flip Menu

The 'camera align flip' menu permits you to flip an incoming image horizontally, vertically or in both dimensions simultaneously.

This feature may be used to compensate for inverted cameras mounted in 3D camera rigs that use mirrors or prisms.

- The 'left and right eye' signals may be flipped independently.
- Selecting the 'both eyes' button in the 'flip' menu will simultaneously flip both eyes.
- Pressing 'reset all' will set 'flip' to 'off'.



Zoom Menu

The 'camera align zoom' menu permits you to zoom the left and right images in the horizontal and vertical directions independently, or in both directions simultaneously.

- A negative parameter indicates zooming out on the image, while a positive parameter indicates zooming in on the image.
- Pressing 'both' will link the horizontal and vertical zoom parameters, which will maintain the correct aspect ratio while zooming.
- Selecting 'both eyes' will simultaneously zoom both eyes of the stereoscopic image by the same amount.

Position	Camera Align	Zoom
Rotation		Trim
Flip		
Reset All		↶

Camera Align Menu>Zoom

Horizontal	Zoom	Left Eye
Vertical	0	Right Eye
Both		Both Eyes
Reset All		↶

Zoom Menu>Horizontal

Horizontal	Zoom	Left Eye
Vertical	0	Right Eye
Both		Both Eyes
Reset All		↶

Zoom Menu>Vertical

Horizontal	Zoom	Left Eye
Vertical	0	Right Eye
Both		Both Eyes
Reset All		↶

Zoom Menu>Both

Trim Menu

The 'camera align trim' menu permits you to trim the image in the horizontal and vertical directions independently or in both directions simultaneously.

- The range of the trim is dependent on the video format in use.
- In the horizontal direction, the left and right edges will be trimmed simultaneously.
- In the vertical direction, the top and bottom edges will be trimmed simultaneously.
- Pressing 'both' will link the horizontal and vertical trim parameters, which will maintain the correct aspect ratio while trimming.
- Selecting 'both eyes' will allow you to simultaneously trim both eyes of a stereoscopic image by the same amount.

Position	Camera Align	Zoom
Rotation		Trim
Flip		
Reset All		↶

Camera Align Menu>Trim

Horizontal	Trim	Left Eye
Vertical	0	Right Eye
Both		Both Eyes
Reset All		↶

Trim Menu>Horizontal

Horizontal	Trim	Left Eye
Vertical	0	Right Eye
Both		Both Eyes
Reset All		↶

Trim Menu>Vertical

Horizontal	Trim	Left Eye
Vertical	0	Right Eye
Both		Both Eyes
Reset All		↶

Trim Menu>Both

Connections and Other Important Information for 3D Modes

Let's detail some of the connections and ancillary data handling that will affect your workflows.

Video Connections

Stereoscopic left and right video inputs should be connected to SDI inputs A and B respectively. Similarly, left and right processed outputs will be available at SDI outputs A and B respectively. The HDMI input and output connections support full frame 'frame packed' signals.

Video Formats Supported

The 2D to 3D feature supports SD and HD inputs, and converts to an HD output. The '3D convert' and '3D camera align' features support all 3D-centric video formats that are supported by the Teranex 3D. For '3D align', both input streams, left and right, must be of the same format and frame rate. The following video format conversions are supported:

- Input and output video signals up to 1.5Gb/s.
- Pass-through, where the output format is the same as the input format.
- 1080i 50/59.94/60 to 1080p/PsF 23.98/24/25/29.97/30
- 1080p/PsF 23.98/24/25/29.97/30 to 1080i 50/59.94/60
- 1080i 50/59.94/60 to 1080i 50/59.94/60 Frame Rate Conversion
- 1080i 50/59.94/60 to 720p 50/59.94/60
- 720p 50/59.94/60 to 1080i 50/59.94/60
- 720p 50/59.94/60 to 720p 50/59.94/60 Frame Rate Conversion

Independent Channel Processing

Image alignment for each video channel is possible via the 'camera align' application. Proc amp, timecode and noise reduction settings are applied simultaneously to both video streams.

Audio Support

Embedded, AES and Analog audio is supported for 'channel A'. When selecting 'embed', the embedded audio on input A will be processed and outputted via output A.

Ancillary Data Support

Ancillary data such as timecode and AFD is supported on input A and output A only.

External Reference

The output streams may be synchronized to either Input A or to an external reference of black burst or Tri-level sync supplied to the REF connector. Select the type of reference, internal or external, using Home>Reference>Type.

When using an external reference, the interface controls both channel A and B, enabling both output streams to remain pixel locked, even when adjusted relative to the selected reference source.

Capture and Playback

When your Teranex 2D or 3D Processor is connected to a computer via Thunderbolt technology it can be used as a powerful editing solution for video capture, conversion and playback. This is an efficient way to capture virtually any SD or HD video format for your edit project, whether it is analog, SDI or HDMI. Similarly, you can play back your edit through Teranex for immediate viewing on a monitor or television.

Using your Favorite Editing Software

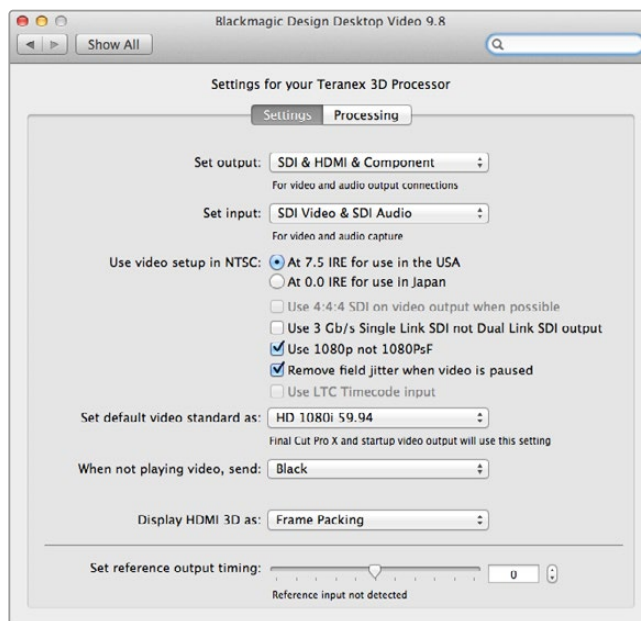
Some editing software will install plug ins to automatically work with your Teranex, but for others you may need to download and install the latest Blackmagic Design Desktop Video software. This can be downloaded from the Blackmagic Design support center at www.blackmagicdesign.com/support/family/capture-and-playback.

Video Capture

When an application is capturing video, the Teranex LCD will show the word 'capture' followed by the video format of the input signal. For example, 'capture: 1080p24'. Applications including DaVinci Resolve, Avid Media Composer, Apple Final Cut Pro 7, Adobe Premiere Pro CC and Adobe Photoshop CC can all capture video from your Teranex Processor.

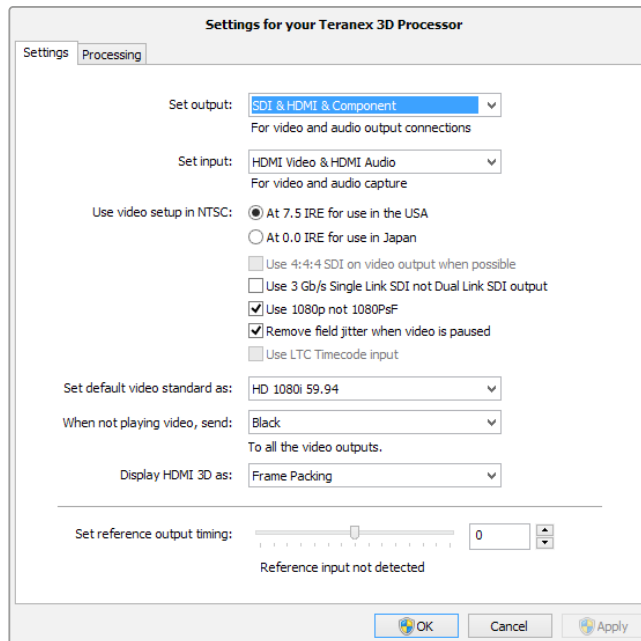
Teranex captures the converted video output. Press the 'out' button on your Teranex and check your project or capture preferences match the video format, frame type and frame rate shown by the illuminated buttons.

Batch captures with RS-422 deck control may not be exactly frame accurate because of the conversion processing delay. Accordingly, it is a good idea to use an offset or add handles to your captures. Of course you can also capture without deck control.



Video Playback

When any video application is in playing back a clip, the Teranex Processor LCD will show the word 'playback' followed by the video format. For example, 'playback: 1080p24'. The only illuminated buttons will be those that match the video format being played. All other buttons will be unlit and unavailable as the playback format is set by the clip and so no conversions are allowed. Some applications including Adobe After Effects and Apple Final Cut Pro X are always in playback mode.



The Teranex Installer software installs the Blackmagic Design Desktop Video Control Panel in Mac OS X and Windows.

DaVinci Resolve

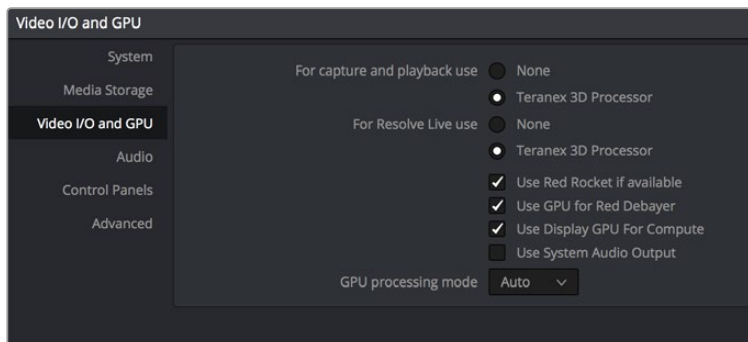
You can use DaVinci Resolve to capture both video and audio from your Teranex processor. For example, you could use Teranex to upconvert an old analog videotape and simultaneously capture the HD output with Resolve. Once the clips are captured into Resolve's Media Pool, it's easy to use the powerful editing and color grading tools to further enhance your material.

To capture video using your Teranex processor, you may need to install Blackmagic Design's latest Desktop Video software. You can download the Desktop Video software from the Blackmagic Design website at www.blackmagicdesign.com/support/family/capture-and-playback.



Setting Up

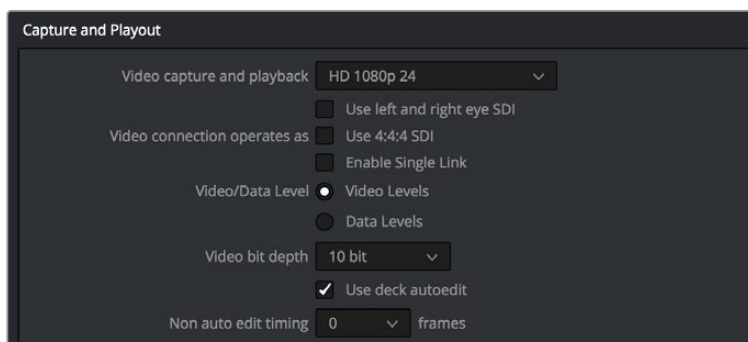
- 1 Launch 'DaVinci Resolve' and from the 'preferences' menu, select the 'video I/O and GPU' tab and select your Teranex from the 'for capture and playback use' option. Save your preferences and restart DaVinci Resolve to apply your changes.
- 2 Start a project and from within the 'project settings' window, set your desired 'timeline' and 'monitoring' resolution and frame rate. Your Teranex processor will automatically set its output to match.
- 3 While you are still in the 'project settings' window, go to the 'capture and playback' tab and select your desired format from the 'video capture and playback' menu.
- 4 If you are capturing audio, be sure to tick the 'enable audio input' box.
- 5 In the 'save clips to' option, 'browse' to a location to save your captured media. Click 'save' to confirm your new project settings.



From Preferences select the "Video I/O and GPU" tab and select your Teranex from the "For capture and playback use" option.

Capture

- 1 From within the 'media' page, click on the 'capture icon' which is located near the top right corner of the software interface.
- 2 In the 'capture info' window below the 'capture' icon, enter a name for your clip in the 'file name prefix' section. If necessary you can also enter additional information such as 'roll/card', 'reel number', 'clip number', 'program name' or 'good take'.
- 3 To begin capturing click the 'capture now' button which is located at the bottom of the 'capture info' window. You may need to scroll the window down to reveal the 'capture now' button if you are working on a laptop with a smaller monitor. While capturing, the 'capture info' window will display a 'capture in progress' indicator with a running timecode counter. To stop capturing, click the 'stop' button.



Select your desired format from the "Video capture and playback" menu.

Playback

To playback your clips from the 'media' page, click the 'capture' icon again to close the 'capture info' window. Click on a clip that you have captured to display it in the viewer, then simply click on the viewer transport controls to play your clip.

Editing and Color Grading

Once you've captured your clips, simply click the 'edit' page to begin using DaVinci Resolve's extensive editing features. Then jump to the 'color' page to color grade your clips. You can refer to the DaVinci Resolve manual for detailed information on these features.

Avid Media Composer

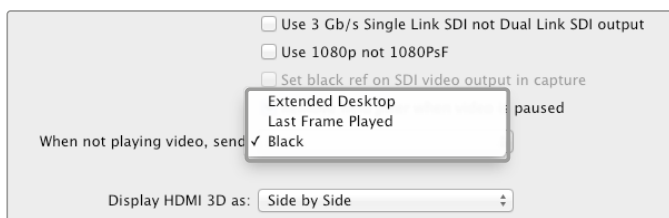
Avid Media Composer captures and plays back standard definition and high definition video and audio with Teranex Processor hardware and also supports RS-422 deck control.

For this example, the converted output from Teranex will be 1080i59.94 and we will be capturing from a non-controllable device.

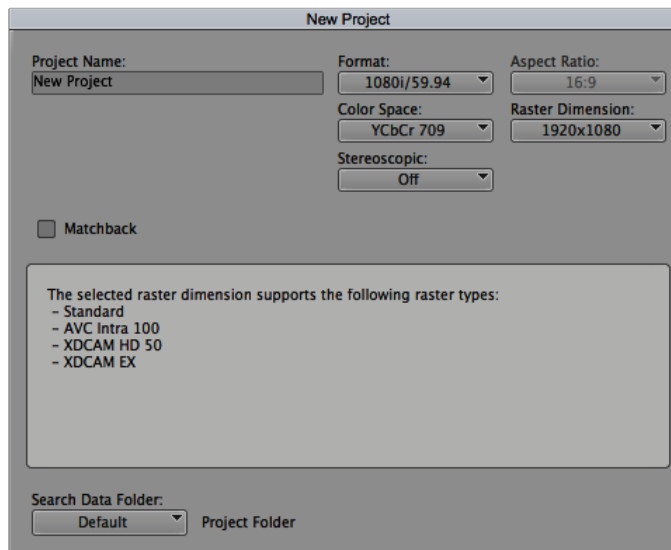


Setting Up

- 1 Launch Media Composer and the 'select project' window will appear. Click the 'new project' button.
- 2 In the 'new project' window, name your project.
- 3 Go to the 'format' dropdown menu and select 1080i/59.94.
- 4 Go to the 'color space' dropdown menu and select YCbCr 709.
- 5 Go to the 'raster dimension' dropdown menu and select 1920x1080. Click OK.



If using a single computer monitor with Media Composer, open the Blackmagic Design system preferences and choose to send Black when not playing video.



Type a project name and set the project options.

Capture

- 1 Choose Tools > Capture to open the capture tool.
- 2 Click the 'toggle source' button so that the button's icon of a deck shows a red circle-slash symbol.
- 3 Set the 'video and audio' input menus to 'Blackmagic'.
- 4 Select your video and the audio source tracks.
- 5 Use the 'bin' menu to select a target bin.
- 6 From the 'res' dropdown menu, choose your codec.
- 7 Select the 'disk storage' for your captured video and audio.
- 8 Click the 'tape name' button and select the desired tape and click 'ok'
- 9 Ensure your video and audio source is ready or playing and then click the 'capture' button.
- 10 Click the 'capture' button again to stop capturing and close the 'capture' tool.

Playback

You can use the Avid Media Composer timeline to display video on a monitor or TV connected to the output of your Teranex Processor. 'output video' can be toggled on and off by using the 'toggle client monitor' button which is located at the bottom of the timeline window.

Apple Final Cut Pro 7

Blackmagic video hardware is fully compatible with Apple's RT Extreme™ real time effects.

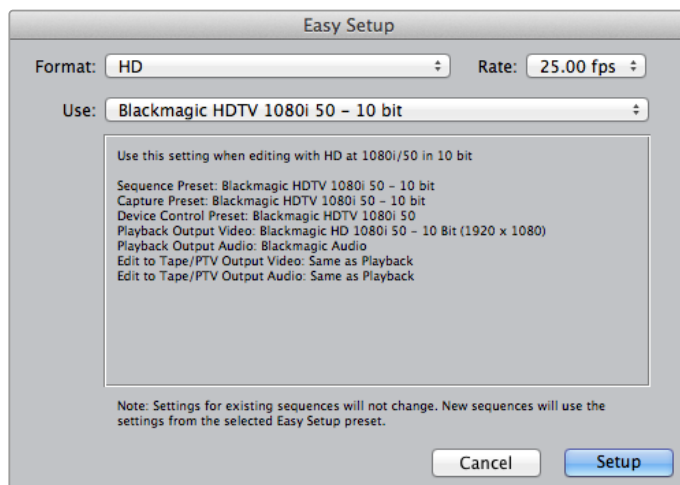
For this example, the converted output from the Teranex will be 1080i50 and we will be capturing from a non-controllable device.



Apple Final Cut Pro 7

Setting Up

- 1 Launch Final Cut Pro 7 and select File>New Project.
- 2 Select File>Save Project As... and name your project.
- 3 From the Final Cut Pro menu, select 'easy setup'...to open the 'easy setup' window.
- 4 Choose 'HD' for the 'format' and '25.00 fps' for the 'rate'. Select 'Blackmagic HDTV 1080i 50 - 10 bit' from the 'use' menu. Click 'setup' to close the window.
- 5 From the Final Cut Pro menu, select 'system settings' and with the 'scratch disks' tab highlighted, select 'set' and choose the drive or drives for your scratch disks. Click 'ok'.



Select a Blackmagic Easy Setup

Capture

- 1 Choose File > Log and Capture to open the 'log and capture' window.
- 2 Press 'play' on your video source and then press the 'now' button which is under the 'capture' heading to begin the capturing.
- 3 Press the 'esc' key at the top left of your keyboard to stop capturing.
- 4 Choose File > Log and Capture to close the window.

Playback

You can use the Final Cut Pro timeline to display video on a monitor or TV connected to the output of your Teranex Processor. If you can't see any video on your Blackmagic output, check the connections again and ensure you have the correct output settings configured within Final Cut Pro by going to the View > External Video and ensuring 'all frames' is selected.

Apple Final Cut Pro X

If you want to use Final Cut Pro X to play back video on an external video monitor or TV, you can use the broadcast monitoring feature of Final Cut Pro X 10.0.4 and newer to output your video through Teranex Processor hardware.

For this example, clips are Uncompressed 10 bit 4:2:2 1080i59.94 with 2 channels of audio.



Final Cut Pro X

Setting Up

- 1 Open the 'system preferences' and click on the 'Blackmagic Desktop Video' icon. Click on the round 'setup' icon to open the 'desktop video settings' screen. Set the 'output format' to HD 1080i59.94 and click 'save'.
- 2 Launch Final Cut Pro X and go to the 'menu' bar and select 'file/new project'. A window will open containing the project setting parameters.
- 3 Name your project and click the 'use custom settings' button.
- 4 Under 'video properties', select the 'custom' radio button and set the following: 'format' to HD 1080i, 'resolution' to 1920x1080 and 'rate' to 29.97.
- 5 Set the 'audio and render properties', by selecting the 'custom' button and set the following: 'audio channels' to stereo, 'audio sample rate' to 48kHz and 'render format' to uncompressed 10 bit 4:2:2. Click 'OK'.
- 6 Go to the Final Cut Pro menu, choose 'preferences' and then click the 'playback' tab. Ensure the 'A/V output' menu has selected 'Blackmagic' and the same video standard as your project. Close the 'preferences'.
- 7 Go to the 'window' menu and select 'A/V output' to enable video output via your Teranex processor.

Adobe Premiere Pro CC

For this example, the converted output from the Teranex will be 1080i50 and we will be capturing from a non-controllable device.



Premiere Pro CC 2015.

Setting Up

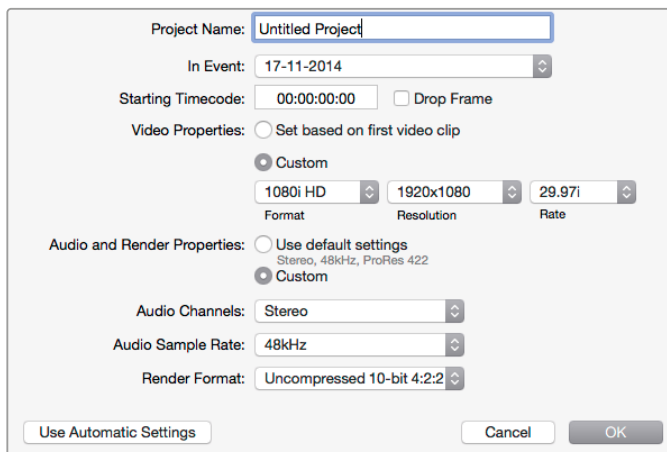
- 1 Launch Premiere Pro CC. In the Welcome window select 'create new/new project'. A window will open containing project settings.
- 2 Name your project. Choose the location for your project by clicking 'browse' and selecting your desired folder.
- 3 If your graphics card is supported by Premiere Pro CC's Mercury Playback Engine, the 'renderer' option will be available and you should switch it to Mercury Playback Engine GPU Acceleration.
- 4 Set the 'capture format' to 'Blackmagic capture' and click on the 'settings' button. Set 'video standard' to 1080i50 and select a 'video format' according to your requirements. Click 'OK'.

Playback

- 1 Import clips into your new project.
- 2 You can now use the Final Cut Pro X timeline to display video on the monitor or TV connected to the output of your Teranex processor.

Video Output	
Output Format:	1080i59.94 ⓘ
SDI Settings:	<input checked="" type="checkbox"/> 4:4:4 RGB <input checked="" type="checkbox"/> Enable Single Link
	<input type="checkbox"/> Use SDI Level A
	<input type="checkbox"/> 1080PsF On <input checked="" type="checkbox"/> Remove Field Jitter On Pause
Idle Output:	<input checked="" type="radio"/> Black <input type="radio"/> Last Frame Shown

Set the Output Format in System Preferences to match your Final Cut Pro X project.



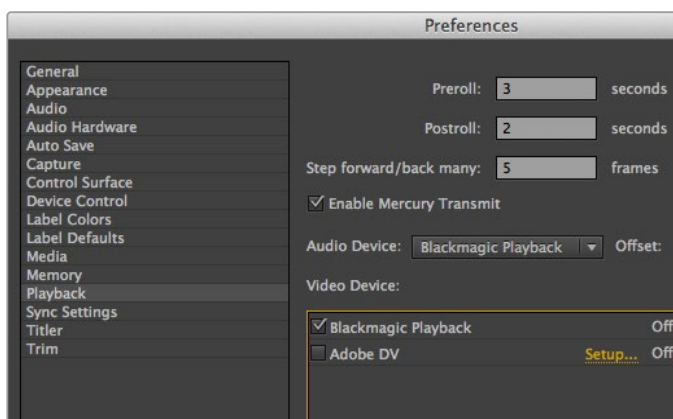
Set the Audio and Render Properties to Custom.

Capture

- 1 Select File > Capture.
- 2 Click the 'red record' button to begin capture.
- 3 Click the 'stop' button to stop capture.

Playback

- 1 Playback settings need to be selected each time a new project is created. Go to Preferences > Playback and under 'video device', enable the checkbox for 'Blackmagic playback' and ensure the other checkboxes are empty.
- 2 For audio playback, select 'Blackmagic playback' from the 'audio device' dropdown menu.
- 3 Click on a clip and you should now see the image on your Teranex Processor.



Set preferences for Playback.

Adobe After Effects CC

How to use Blackmagic as a preview output frame buffer

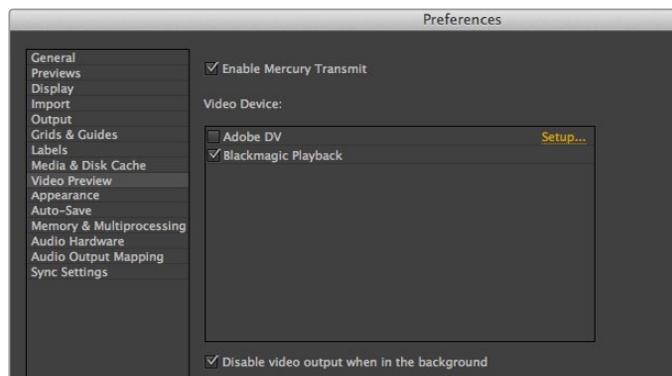
To display your composition in real-time through your Blackmagic hardware, go to Preferences > Video Preview. Mercury Transmit must be enabled in order to use your Blackmagic hardware with After Effects CC. Under Video Devices, select 'Blackmagic playback'.

You can now use a broadcast monitor to view your After Effects compositions in the correct video colorspace. You will always see the correct color and interlace when working, and you don't have to wait until your composition is rendered to see what it looks like when output as video.

If you also want to listen to audio through your Teranex Processor, set the 'default device' to 'Blackmagic audio' in Preferences > Audio Hardware or Preferences > Audio Output Mapping.



After Effects CC 2015.



'Video Preview' preferences

Rendering

When you have completed your composition, you will need to render to a pixel format supported by your Teranex Processor hardware. You can render to a DPX image sequence or any of the following supported codecs:

QuickTime codecs on Mac OS X

- Blackmagic RGB 10 bit uncompressed
- Apple Uncompressed YUV 10 bit 4:2:2
- Apple Uncompressed YUV 8 bit 4:2:2
- Apple Photo - JPEG compressed
- Apple DV - NTSC compressed
- Apple DV - PAL compressed

Other codecs including ProRes and DVCPRO HD will be available if you have Final Cut Pro installed.

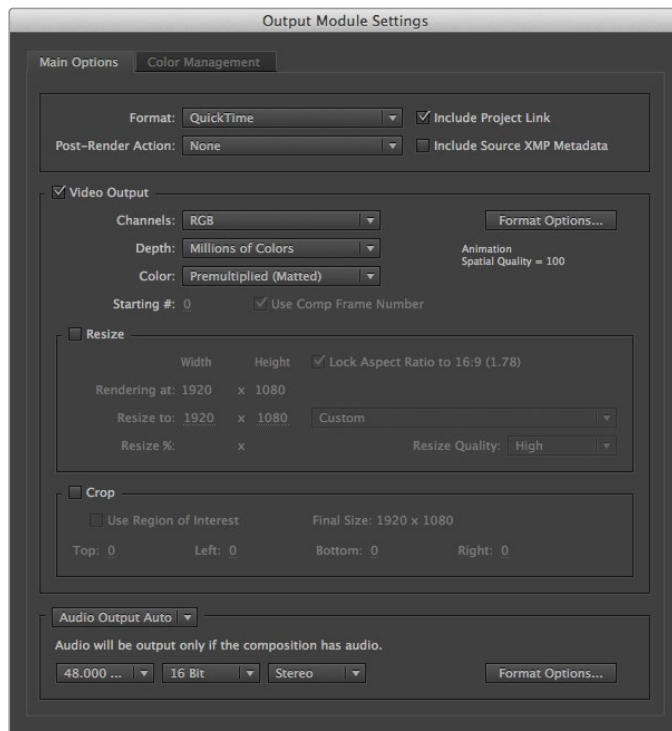
AVI codecs on Windows

- Blackmagic 10 bit 4:4:4 uncompressed
- Blackmagic 10 bit 4:2:2 uncompressed
- Blackmagic HD 8 bit 4:2:2 uncompressed
- Blackmagic SD 8 bit 4:2:2 uncompressed
- Blackmagic 8 bit MJPEG compressed

Other codecs including DVCPRO HD and DVCPRO50 will be available if you have Premiere Pro CC installed.

QuickTime codecs on Windows

- Blackmagic RGB 10 bit uncompressed
- Blackmagic 10 bit uncompressed
- Blackmagic 8 bit uncompressed
- Apple Photo-JPEG compressed
- Apple DV - NTSC compressed
- Apple DV - PAL compressed



'Output Module Settings' rendering options

Adobe Photoshop CC

How to grab and output video frames

Import an image into Photoshop

- 1 From Photoshop select File > Import > Blackmagic Image Import.
- 2 Select the 'video input format' and the 'image bit depth' and then click 'import image'.

Export an image from Photoshop

- 1 Select File > Export > Blackmagic Image Export.
- 2 Select 'video output format' and then click 'output image'.

Once you have set the options in the 'import' or 'export' windows, each subsequent 'import' and 'export' will not display the window, so you can grab and output frames much faster. However if you would like to change your import or export formats, hold the 'option' [Mac] or 'ctrl' [Win] key, when selecting import or export.



Photoshop CC 2015.

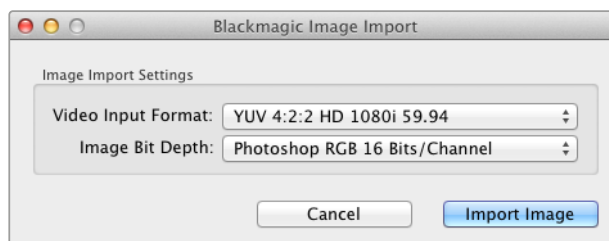


Image Capture

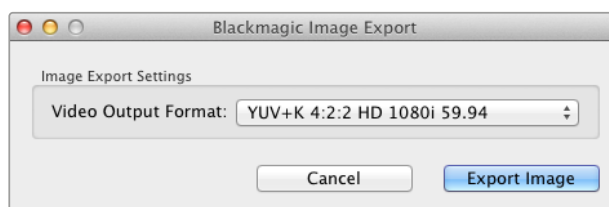


Image Export

Waveform Monitoring with Blackmagic UltraScope

When Teranex 2D or 3D is connected to a compatible Mac OS X or Windows computer via Thunderbolt, you can use Blackmagic UltraScope to monitor the output levels of your video conversion.

Blackmagic UltraScope software is available to download from the Blackmagic Design support center at www.blackmagicdesign.com/support.

TIP Blackmagic UltraScope is perfect for quality control checks of your converted output no matter which SDI, HDMI, component analog or composite analog video input you use. Simply connect a Thunderbolt cable between your Teranex Processor and your computer and launch Blackmagic UltraScope!

Installation Requirements

The Blackmagic UltraScope software interface requires a computer display with a minimum resolution of 1280 x 800 pixels to view two scopes simultaneously. Blackmagic Design recommends viewing all 6 scopes simultaneously by using a computer display resolution of 1920 x 1200 or 1920 x 1080 pixels.

Please see the support pages at www.blackmagicdesign.com for a comprehensive list of the latest minimum system requirements for Blackmagic UltraScope.

Understanding Blackmagic UltraScope Views

Blackmagic UltraScope has two different views available depending on your workflow needs and screen resolution. You have the choice of viewing six displays in 'full screen' view, or for more compact viewing, choose any 2 displays in '2-up' view.

The display view can be selected from the 'view' menu.

Choose 'full screen' to enter full screen view. If this option is unchecked, 2-up view will be displayed. You can quickly switch between full screen view and '2-up' view by using the hot key 'command F' on Mac OS X.

In '2-up' view, select the desired left and right scopes by opening the 'view' menu or by right-clicking anywhere in the UltraScope window. Make your selections from the 'left view' and 'right view' menu options.

If you want the scopes to swap sides, select the left or right view and set it to be the same as the other view. The scopes will swap sides because the 2-up view never displays the same scope in both the left and right views.

Screen Resolution Requirements for Display Views

- **Full Screen view:**
1920 x 1200 pixels or 1920 x 1080 pixels. If your monitor doesn't support these resolutions, then 'full screen' view will not be available.
- **2-up view:**
minimum resolution of 1280 x 800 pixels.



Blackmagic UltraScope - Full Screen View



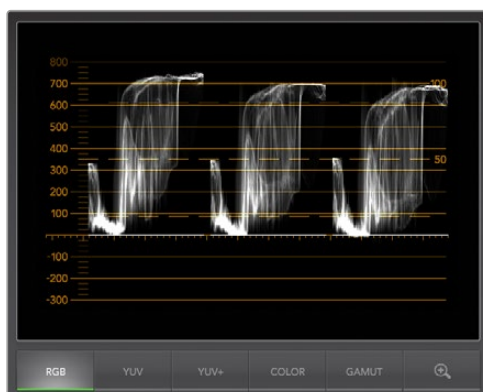
2-Up view

Blackmagic UltraScope Displays

Blackmagic UltraScope software is a great tool for maintaining accurate broadcast legal video and audio levels from your Teranex's converted output. Scopes used to monitor your levels include 'RGB parade', 'waveform', 'vectorscope', 'histogram' and 'audio metering display'.

RGB Parade Display

'RGB parade' displays the red, green and blue channels of your converted output. If one of the color channels appears taller, it usually indicates the presence of a color cast. This may not be desirable and you may want to try minimizing the color cast during post production using color correction software, such as Blackmagic DaVinci Resolve.



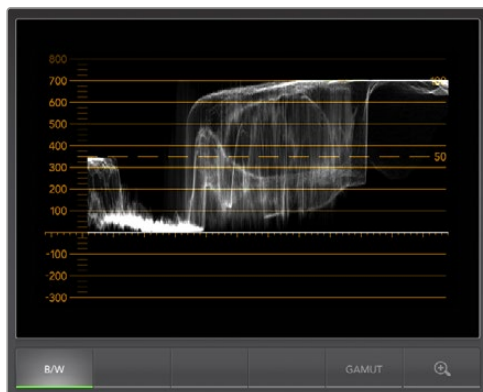
RGB Parade Display

Waveform Display

The waveform is great for seeing your black and white levels and overall image contrast. An image with good contrast will display information from 0 IRE to 100 IRE. An image with poor contrast will have the majority of information centered in the display, with little information in the top or bottom areas.

If you are seeing 'milky' or 'gray blacks' on your video display, then they will appear elevated above the 0 IRE line. To adjust the black level, press the 'blk' button on the front of the Teranex and use the rotary knob to lower the black level. If you lower the black level below 0 IRE you will "crush" the image and you risk eliminating shadow detail. Adjust the black level and observe the change on both the monitor and the waveform.

Likewise, if your highlights appear muted or dull, they will appear below the 100 IRE line. To adjust the white level, press the 'gain' button on the front of the Teranex and use the rotary knob to increase the white level. If you raise the level above 100 IRE you will "clip" the image and you risk eliminating highlight detail. Adjust the white level and observe the change on both the monitor and the waveform.



Waveform Display

Vectorscope Display

The Vectorscope is useful for monitoring the color balance and saturation of your Teranex's converted video output. For instance, if your signal has a dominant green color cast then the majority of image information will be located towards the green area of the vectorscope. In comparison, an image with a neutral color balance will have information evenly distributed around the center.



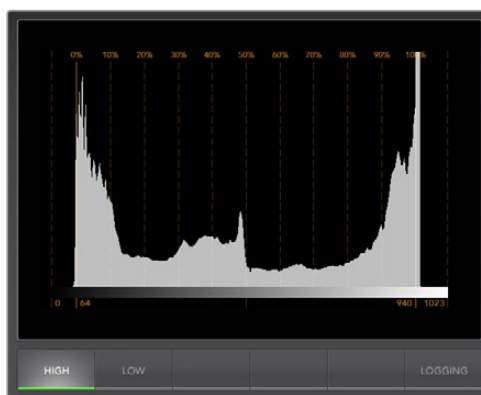
Vectorscope Display

The center of the vectorscope represents zero saturation. The further an object is from the center, the more saturated it appears. If your material appears under or over saturated, press the 'sat' button on your Teranex processor and use the rotary knob to either increase or decrease saturation.

Teranex's 'hue' button can be used if the overall image color appears skewed. As you turn the rotary knob you will see the color information rotate around the vectorscope's center point. Unless the original image has a dramatic color skew, small adjustments will usually be better.

Histogram Display

Using the Histogram is another way to check image contrast. The horizontal axis represents the luminance range with black on the left or 0 in a 10 bit image, and white on the right or 1023 in a 10 bit image. An image with good contrast will display information covering the entire horizontal axis, whereas a low contrast image will display information predominantly in the middle. Use your Teranex processor's 'blk' and 'gain' button settings to make the necessary adjustments.



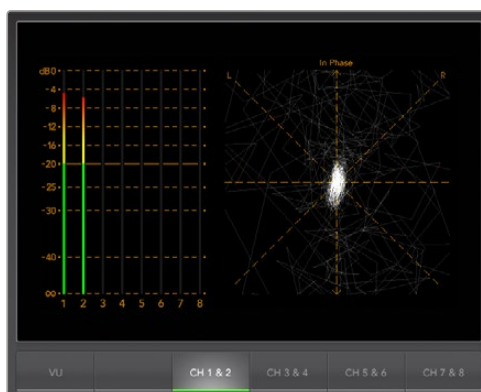
Histogram Display

Audio Metering Display

Audio metering display shows you the audio levels from your Teranex processor. The audio is displayed in either dBFS or VU format. dBFS is essentially a meter of the overall digital audio signal and is common on modern digital equipment. The VU meter shows average signal levels, is easy to use and very common on older equipment.

To monitor your audio levels, watch the VU meter and ensure the levels never peak above 0dB. Peaking above 0dB means your audio is clipping.

You can also monitor audio phase and balance using the audio metering display.



Audio Metering Display

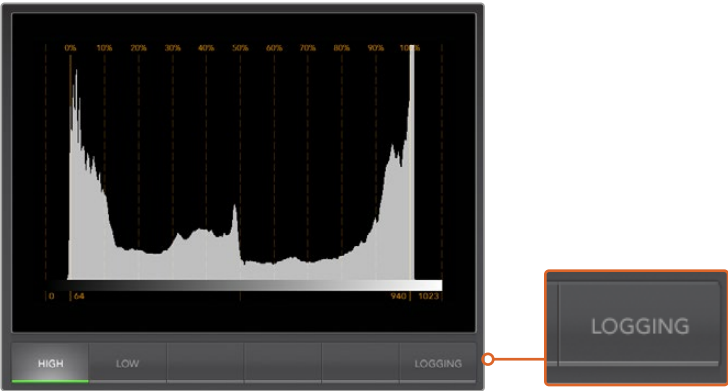
Error Logging Display

‘Error logging’ records errors in video and audio and is indispensable for unattended operation, such as during long conversions. Errors may be logged for color, brightness or audio threshold levels as well as loss of video signal, change of video format or audio silence. After setting the parameters which define when an error should be logged, you can choose to start or stop error logging, save the log to a file, or clear the log. These functions can be selected from the buttons in the ‘error logging display’ or from the ‘error logging’ pulldown menu.

Errors are recorded against timecode and time of day to make them easy to find. If the timecode is not present, errors can be found by reviewing the time of day at which they were recorded.

In the ‘full screen’ view, ‘histogram’ and ‘error logging displays’ share the same area of the UltraScope interface. Select the ‘logging’ button, below the ‘histogram display’, to switch to ‘error logging display’. Select the ‘histogram’ button to switch back to the ‘histogram display’.

In ‘2-up’ view, ‘histogram’ and ‘error logging displays’ can be viewed on two panels simultaneously.



From the Histogram Display, select the Logging button to switch to the Error Logging Display.

Select the ‘start’ button to commence logging. In ‘full screen’ view, you can switch back to the ‘histogram display’ and UltraScope will continue to perform error logging until you choose to stop it.

When error logging is being performed, the ‘stop’ button replaces the ‘start’ button. When the ‘stop’ button has been selected, you can choose to start again and any new errors will be appended to the existing log. When error logging stops, you can choose to save the log to a CSV file or alternatively clear the log. If no errors have been recorded, the ‘save’ and ‘clear’ buttons will not appear. The CSV file can be analyzed in many applications including spreadsheet and database software.

By default, error logging is performed using the EBU-R103 standard set by the European Broadcasting Union. This standard is popular worldwide and is commonly used as a template for making new error logging profiles.

START TC	END TC	DUR	DESCRIPTION	VALUE	START TIME
01:28:53.18	01:28:54.05	0.53	Audio Level 1	-1 dBFS	14:03:52.68
01:28:53.26	01:28:54.05	0.28	Audio Level 2	-1 dBFS	14:03:52.93
01:28:54.07	01:28:54.27	0.65	Audio Level 2	0 dBFS	14:03:53.29
01:28:54.07	01:28:54.27	0.65	Audio Level 1	0 dBFS	14:03:53.29
01:28:54.29	01:28:55.22	0.77	Audio Level 1	0 dBFS	14:03:54.03
01:28:54.29	01:28:55.22	0.77	Audio Level 2	0 dBFS	14:03:54.03
01:28:55.24	01:28:56.03	0.28	Audio Level 1	-1 dBFS	14:03:54.88
01:28:55.24	01:28:56.22	0.90	Audio Level 2	0 dBFS	14:03:54.88
01:28:56.05	01:28:56.15	0.33	Audio Level 1	0 dBFS	14:03:55.25
01:28:56.16	01:28:56.28	0.41	Audio Level 1	-2 dBFS	14:03:55.62
01:28:56.23	01:28:57.05	0.41	Audio Level 2	-2 dBFS	14:03:55.82
01:28:57.01	01:28:58.17	1.55	Audio Level 1	0 dBFS	14:03:56.06
01:28:57.07	01:28:58.16	1.26	Audio Level 2	0 dBFS	14:03:56.31
01:28:58.18	01:28:59.01	0.45	Audio Level 1	-0 dBFS	14:03:57.66
01:28:58.18	01:28:59.01	0.45	Audio Level 2	-1 dBFS	14:03:57.66
01:28:59.03	01:29:00.14	1.26	Audio Level 1	0 dBFS	14:03:58.18
01:28:59.03	01:29:00.14	1.26	Audio Level 2	0 dBFS	14:03:58.18
01:29:00.15	01:29:01.20	1.19	Audio Level 1	0 dBFS	14:03:59.49
01:29:00.15	01:29:01.20	1.19	Audio Level 2	0 dBFS	14:03:59.49
01:24:54.18	01:29:01.21	247.04	Red Over	114 IRE	13:59:53.68
01:24:54.18	01:29:01.21	247.04	Luma Under	-2 IRE	13:59:53.68
01:24:54.18	01:29:01.21	247.04	Luma Over	109 IRE	13:59:53.68

Format Conversion Tables

Teranex AV and Teranex Express

[illegible]

Format Conversion Tables

Teranex 2D

IN \ OUT	525i59.94 NTSC	625i50 PAL	720p50	720p59.94	720p60	1080p23.98	1080PsF23.98	1080p24	1080PsF24	1080p25	1080PsF25	1080p29.97	1080PsF29.97	1080p30	1080PsF30	1080i50	1080p50	1080i59.94	1080p59.94	1080i60	1080p60	2K DCI 23.98p	2K DCI 23.98PsF	2K DCI 24p	2K DCI 24PsF	2160p23.98	2160p24	2160p25	2160p29.97	2160p30	2160p50	2160p59.94	2160p60
525i59.94 NTSC	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
625i50 PAL	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
720p50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
720p59.94	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
720p60	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p23.98	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF23.98	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p29.97	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF29.97	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080i50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p50		•	•							•						•	•																
1080i59.94	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p59.94	•			•								•						•	•						•								
1080i60	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p60					•									•							•	•											
2K DCI 23.98p	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
2K DCI 23.98PsF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
2K DCI 24p	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
2K DCI 24PsF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
2160p23.98																																	
2160p24																																	
2160p25																																	
2160p29.97																																	
2160p30																																	
2160p50																																	
2160p59.94																																	
2160p60																																	

Format Conversion Tables

Teranex 3D

IN \ OUT	525i59.94 NTSC	625i50 PAL	720p50	720p59.94	720p60	1080p23.98	1080PsF23.98	1080p24	1080PsF24	1080p25	1080PsF25	1080p29.97	1080PsF29.97	1080p30	1080PsF30	1080i50	1080p50	1080i59.94	1080p59.94	1080i60	1080p60	2K DCI 23.98p	2K DCI 23.98PsF	2K DCI 24p	2K DCI 24PsF	2160p23.98	2160p24	2160p25	2160p29.97	2160p30	2160p50	2160p59.94	2160p60
525i59.94 NTSC	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
625i50 PAL	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
720p50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
720p59.94	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
720p60	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p23.98	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF23.98	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF25	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p29.97	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF29.97	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080PsF30	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080i50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p50	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080i59.94	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p59.94	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080i60	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
1080p60	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
2K DCI 23.98p	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
2K DCI 23.98PsF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
2K DCI 24p	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
2K DCI 24PsF	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•								
2160p23.98																																	
2160p24																																	
2160p25																																	
2160p29.97																																	
2160p30																																	
2160p50																																	
2160p59.94																																	
2160p60																																	

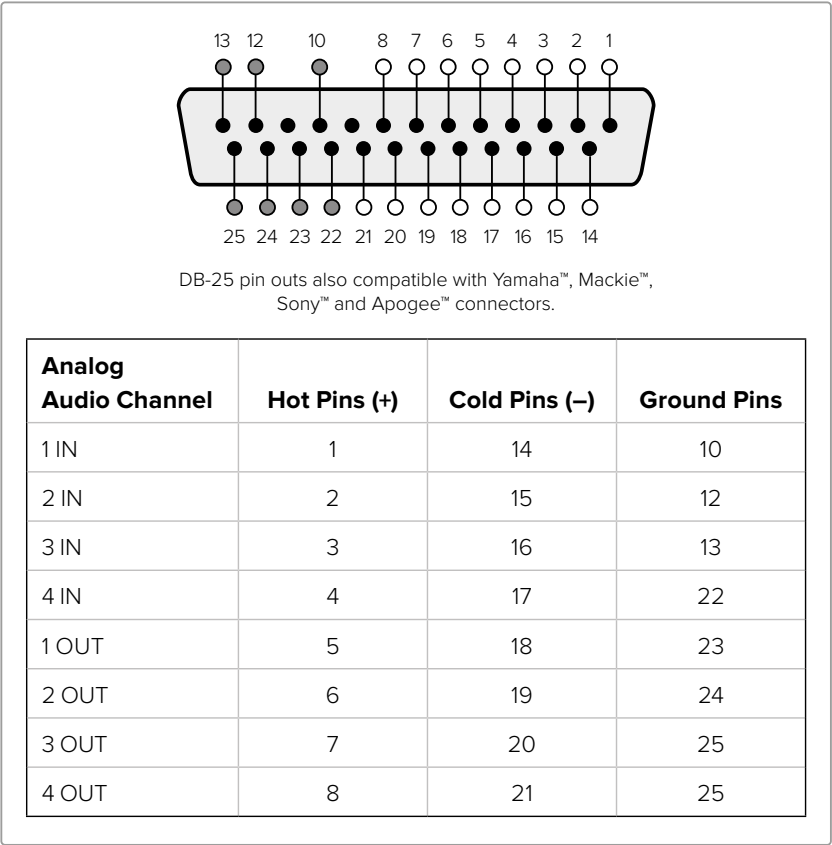
DB-25 Connector Pin-outs for the Teranex 2D

Teranex 2D has a pair of RCA inputs so you can connect 2 channels of analog audio for left and right input, but there is also a DB-25 multi pin connector on the rear panel that lets you connect up to 4 analog audio channels, both input and output.

Analog Audio Inputs/Outputs

When you select the ‘anlg’ button on the front panel as the audio input type, a menu page will appear on the front panel LCD allowing you to choose which of the two analog audio sources you want to use.

When using the DB-25 connector, an optional breakout cable is required, which is a standard Yamaha format cable for balanced XLR connections. This inexpensive breakout cable may be purchased through many vendors, or may be fabricated using off the shelf connectors and cable.



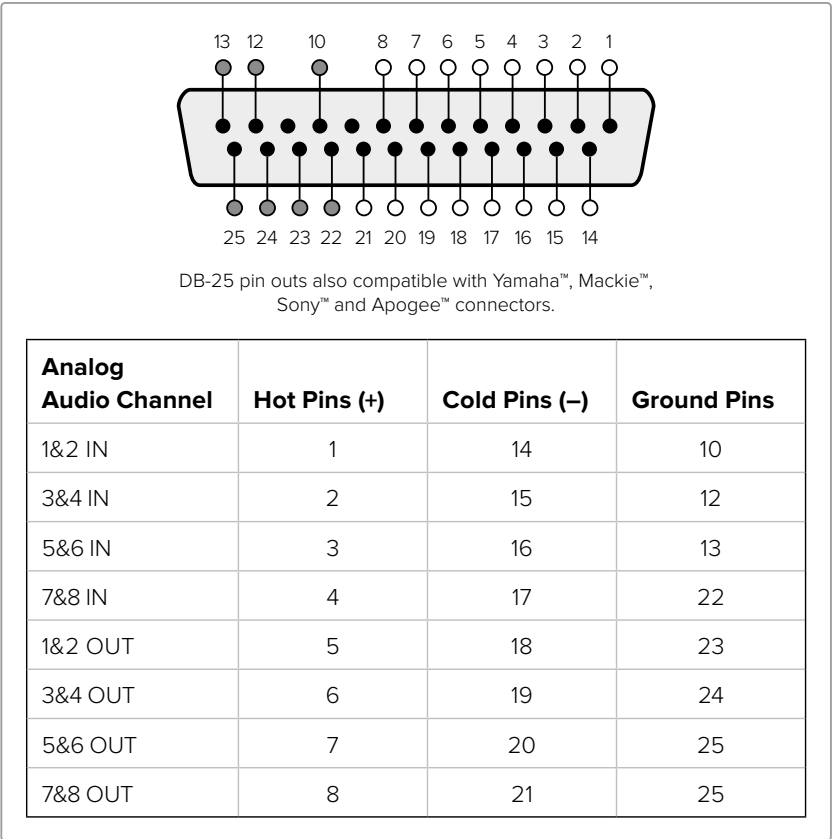
Teranex 2D Processor analog audio pin connections.

AES/EBU Audio Inputs/Outputs

Press the ‘AES’ button on the Teranex 2D front panel to select the AES/EBU digital audio input. The AES/EBU output is always active.

A DB-25 connector is used for connecting up to 8 input channels made up of 4 pairs and 8 output channels made up of 4 pairs of balanced, AES/EBU digital audio to the Teranex 2D Processor.

An optional breakout cable is required, which is a standard Yamaha format cable for balanced XLR connections. This inexpensive breakout cable may be purchased through many vendors, or may be fabricated using off the shelf connectors and cable.



Teranex 2D Processor AES/EBU audio pin connections.

Installing Optional Blackmagic Design Fiber Optic SFP

Blackmagic Teranex AV and Teranex Express have a built in optical fiber cage so you can install an optional optical fiber SFP module. When the SFP module is installed, you can reliably connect video signals up to 12G-SDI over longer distances than coaxial cable can provide.

Installing the optional Blackmagic Design Fiber Optic SFP in your Teranex Express Processor

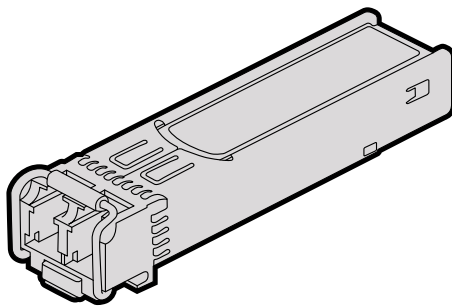
WARNING

Precautions should be taken to reduce the risk of electrostatic discharge while installing the SFP module.

Installing or removing the Module

The Blackmagic Design fiber optic SFP module has a clasp to assist you in removing or installing the module. The module is “hot-pluggable,” meaning that it may be installed or removed without powering down your Teranex.

The Blackmagic Design SFP supports single mode optical fiber with LC connectors. It is bi-directional, supporting video formats up to Ultra HD 2160p60.



Blackmagic Design SFP Module

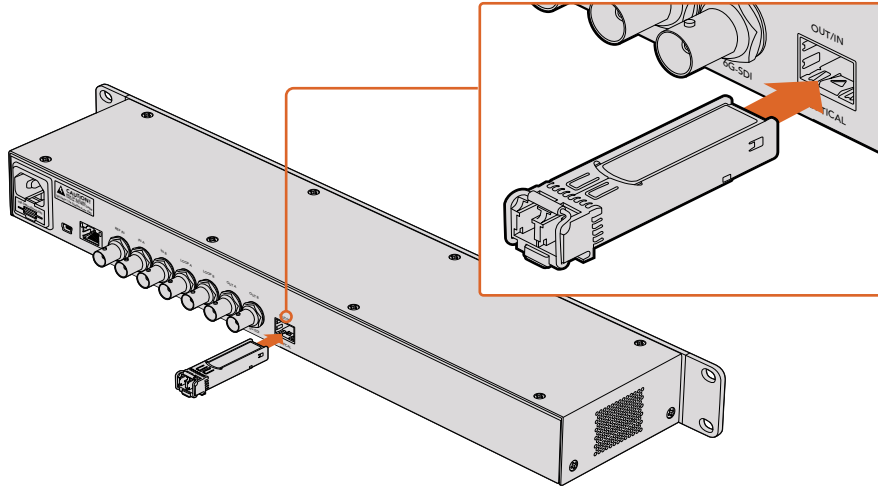
To install the Blackmagic Design SFP Module:

- 1 Close the clasp before inserting the SFP module.
- 2 Remove the cage cover from the optical module cage on the rear panel of your Teranex.
- 3 Line up the SFP module with the optical module cage and slide it into the cage. Verify that the SFP module is completely seated and secured in the cage by firmly pushing on the SFP module.
- 4 If a dust protector is present on the SFP module, leave it in place until you are ready to install your fiber optic cables.

To remove the Blackmagic Design SFP Module:

- 1 Disconnect all fiber optic cables from the SFP.
- 2 Open the clasp on the SFP module with your index finger or a small, flat-blade screwdriver.

- 3 Grasp the SFP module and carefully remove it from the cage.
- 4 Immediately place the SFP module in a static shielding bag.
- 5 Insert an SFP module cage cover into the optical module cage of your Teranex when no SFP module is installed.

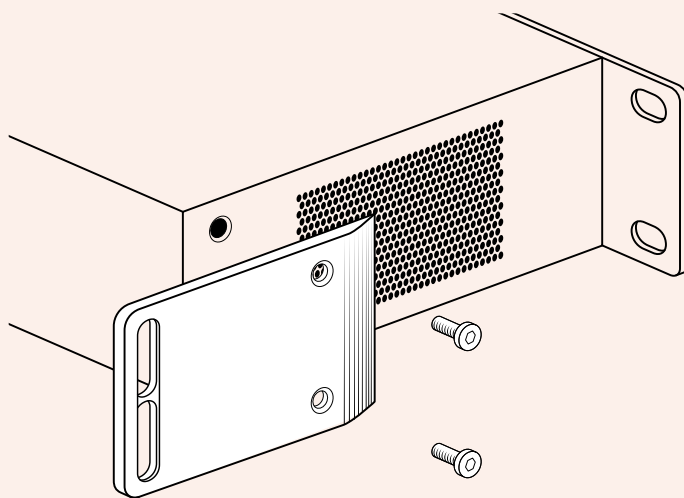


Installing the SFP Module into the Teranex Express.

Teranex AV Chassis Bumpers

Teranex AV is supplied with two chassis bumpers that can be attached to each side of the chassis. These bumpers are designed to protect the connectors on the rear panel from potential damage when using in portable, outside broadcast, or field work. They can also provide strain relief for cables that are connected to the unit.

The chassis bumpers should be attached to the Teranex AV using the four M4 screws included with your unit. A pair of M4 mounting holes is provided on each side of the Teranex AV.



Attach the supplied bumpers to each side of your Teranex AV.

Developer Information

Developing Custom Software using Blackmagic Design Hardware

The DeckLink SDK is available for developers to control Blackmagic video hardware with their own custom software and supports the Teranex, UltraStudio, DeckLink, Multibridge and Intensity families of products. The SDK provides both low level control of hardware and high level interfaces to allow developers to easily perform common tasks.

The DeckLink SDK supports the following technologies:

- Apple QuickTime
- Apple Core Media
- Microsoft DirectShow
- DeckLink API

Downloading the Free Blackmagic Design SDK

The DeckLink SDK can be downloaded from the 'capture and playback' section of the Blackmagic Design support center at www.blackmagicdesign.com/support.



Joining the Blackmagic Design Software Developers Forum

If you're looking for answers, feedback or suggestions regarding technologies used by Blackmagic Design, such as codecs, core media, APIs, SDK and more, visit the Blackmagic Design Software Developers forum. The forum is a helpful place for you to engage with both Blackmagic Design support staff and other forum members who can answer developer specific questions and provide further information. The Software Developers forum can be found within the Blackmagic Design Forum at: <https://forum.blackmagicdesign.com>

Contacting Blackmagic Design Developer Assistance

If you wish to ask questions outside of the Blackmagic Design Software Developers forum, please contact us at: developer@blackmagicdesign.com

Blackmagic Teranex Ethernet Protocol

Protocol Details

Overview

The Blackmagic Teranex Ethernet Protocol is a line-oriented, text-based protocol. Lines from the Teranex Ethernet server will be separated by an ASCII CR LF sequence.

Messages from the user may be separated by LF or CR LF.

New lines are represented in this document by the "↵" symbol.

Connection

The Blackmagic Teranex Ethernet Server listens on TCP port 9800. In a Telnet session, type in “telnet” and a space, followed by the IP address of your Teranex, another space and “9800”. For example: telnet 192.168.90.236 9800

Connection Response

Upon connection, the Teranex Server sends a complete dump of the state of the device.

The Teranex Server sends information in blocks, with each having an identifying header in all-caps, followed by a full-colon. A block spans multiple lines and is terminated by a blank line. Each line in the protocol is terminated by a newline character.

The protocol preamble block is always the first block sent by the Teranex Server, followed by the device block:

```
PROTOCOL PREAMBLE:↵
Version: 1.13↵
↵
TERANEX DEVICE:↵
Model name: Teranex 2D↵
↵
```

After the initial status dump, status updates are sent each time the status changes in the Teranex device.

Legend

↵	carriage return
...	and so on
Orange text	Client generated
Grey Text	Server generated

Command Syntax

To initiate a change, the user should send the appropriate block header, followed by a full-colon and LF, which is then followed by the specific command requested, a full-colon, the value required, a LF, followed by a blank line. For example, to change the output video format to 1080i59.94, the user should send the following block of commands:

```
VIDEO OUTPUT:↵
Video mode: 1080i5994↵
↵
```

Response Syntax

If the command is accepted by the Teranex Server, it will respond with an ACK message. If the request was not understood, it will respond with a NACK message.

After a positive response, the user should expect to see a status update from the Teranex Server showing the status change. This is likely to be the same as the command that was sent, sometimes followed by other blocks providing data specific to the change. For the above example, the following response might be displayed:

```
VIDEO OUTPUT:↵
Video mode: 1080i5994↵
↵
```



```

VIDEO ADJUST:↵
Luma low: 4↵
Luma high: 1019↵
...
↵
ANCILLARY DATA:↵
AFD output line: 11↵
CC enabled: false↵
...
↵
VARIABLE ASPECT RATIO:↵
Variable Aspect Ratio size X left: 0.000000↵
Variable Aspect Ratio size X right: 0.000000↵
...
↵

```

The asynchronous nature of the responses means that a user should never rely on the desired update actually occurring and must simply watch for status updates from the Teranex Server and use only these to update its local representation of the server state.

Timecode Syntax

Timecode values are expressed as HH:MM:SS:FF.

Checking Connection Status

While the connection to the Teranex Server is established, a user may send a special no-operation command to check that the Teranex Server is still responding. In this case, a blank line is not required following the command:

```
PING:↵
```

If the Teranex Server is responding, it will respond with an ACK message as it does for any other recognized command.

Closing Connection

To end a Telnet session in Mac, Windows or Linux, press and hold the Control (Ctrl) key and press the ']' right bracket key, release the Control key, type quit and press the 'Enter' key. For example:

```
<CNTRL>+]
quit↵
```

Status Updates

When any parameter in the Teranex device is changed on the Teranex Server by any user, the Teranex Server resends the applicable status block, containing only the items that have changed. For example, if the output aspect ratio is changed to CentreCut, the following block will be sent:

```

VIDEO OUTPUT:↵
Aspect ratio: CentreCut↵
↵

```

Requesting a Status Dump

The user may request that the Teranex Server resend the complete state of any status block by sending the header of the block, a LF, followed by a blank line. In the following example, the user requests the Teranex Server resend the Video Output status:

```

VIDEO OUTPUT:↵
↵

```

```
ACK↵
↵
VIDEO OUTPUT:↵
Video mode: 1080i5994↵
Aspect ratio: Anamorphic↵
Video demux mode: SingleLink↵
Video pixel format: YCbCr422↵
Analog output: Component↵
↵
```

Retrieving Device Information

The “Teranex Device” command returns information about the connected device:

```
TERANEX_DEVICE:↵
↵
```

The server will respond with:

```
TERANEX_DEVICE:
Model name: (displays the Teranex model name)
Software Version: (displays the checksum of the installed software release)
FPGA Version: (displays the FPGA version of the installed software release)
```

Protocol Commands

Align

The Align commands are available in the Teranex 3D only. They may be used to adjust the alignment between 3D stereoscopic left and right eye signals. In the Teranex 3D LCD menus, these functions are included in the “Camera Align” menus. Size (Zoom), Position and Trim commands are included in this block. Other Camera Align functions, Flip and Rotation, are found in the Mode3D command block.

To use the Align commands, the Teranex 3D must be receiving left and right eye video signals and must be in the 3D Align mode. Enter the commands below and then proceed with adjustments via the Align commands.

```
MODE3D:↵
3D mode: 3DModeAlign↵
↵
ACK↵
↵
MODE3D:↵
3D mode: 3DModeAlign↵
...
↵
```

Size (Zoom), Position and Trim Commands

The commands below permit you to adjust the left and right eye signals independently. For example, the “Align pos X left:” adjusts the horizontal position of the left eye, whereas “Align pos X right:” adjusts the horizontal position of the right eye. For example, to move the position of the left eye 20 pixels to the right enter:

```
ALIGN:↵
Align pos X left: -20↵
↵
ACK↵
↵
ALIGN:↵
Align pos X left: -20.000000↵
Align pos X right: 0.000000↵
Align pos Y left: 0.000000↵
Align pos Y right: 0.000000↵
↵
```

Protocol Commands

Command	Command Description
Align size X left: 0.000000	Set the Horizontal Size (X) (Zoom) value for the Left Eye. Negative values decrease size; positive values enlarge the image. Default = 0
Align size X right: 0.000000	Set the Horizontal (X) Size (Zoom) value for the Right Eye. Negative values decrease size; positive values enlarge the image. Default = 0
Align size Y left: 0.000000	Set the Vertical (Y) Size (Zoom) value for the Left Eye. Negative values decrease size; positive values enlarge the image. Default = 0
Align size Y right: 0.000000	Set the Vertical (Y) Size (Zoom) value for the Right Eye. Negative values decrease size; positive values enlarge the image. Default = 0
Align pos X left: 0.000000	Set the Horizontal (X) Position value for the Left Eye. Negative values move the image to the right; positive values move the image to the left. Default = 0
Align pos X right: 0.000000	Set the Horizontal (X) Position value for Right Eye. Negative values move the image to the right; positive values move the image to the left. Default = 0
Align pos Y left: 0.000000	Set the Vertical (Y) Position value for the Left Eye. Negative values move the image down; positive values move the image up. Default = 0
Align pos Y right: 0.000000	Set the Vertical (Y) Position value for the Right Eye. Negative values move the image down; positive values move the image up. Default = 0
Align trim X left: 0	Set the Horizontal (X) Trim value for the Left Eye; performs symmetrical adjustment on the right and left sides of the image. Default = 0
Align trim X right: 0	Set the Horizontal (X) Trim value for the Right Eye; performs symmetrical adjustment on the right and left sides of the image. Default = 0
Align trim Y left: 0	Set the Vertical (Y) Trim value for the Left Eye; performs symmetrical adjustment on the top and bottom of the image. Default = 0
Align trim Y right: 0	Set the Vertical (Y) Trim value for the Right Eye; performs symmetrical adjustment on the top and bottom of the image. Default = 0

Ancillary Data

Teranex processors support closed captions, timecode and video indexing in the ancillary data.

Closed Captions

Command	Command Description
CC enabled:	Enable Closed Caption processing. True=ON; False=OFF; (Default = False)
CC input line:	Analog CC input line selection. Range is 20 to 22. Default = 21
CC output line:	Analog CC output line selection. Range is 20 to 22. Default = 21
CC service2 source:	CC Service 2 selection; Values are CC2 (default) or CC3
CC service1 language:	Service 1 Language selection. Values are: English (default), French, German, Italian, Spanish
CC service2 language:	Service 2 Language selection. Values are: English (default), French, German, Italian, Spanish

Timecode

Command	Command Description
Timecode mode:	Select the mode of the timecode generator. Values are: Off, Input, InputRegen, Generate, JamSync
Timecode input line:	Set the line on which the input timecode is located. The valid range of values is format dependent. To set the unit to the default automatic input detection mode, enter 0. NTSC: lines 10-20 PAL: lines 6-22 1080 HD: lines 9-20 720 HD: lines 9-25
Timecode output line:	Set the line on which the output timecode is located. The valid range of values is format dependent. To set the unit to the default output line, enter 0. NTSC: lines 10-20 (Default = 14) PAL: lines 6-22 (Default = 19) 1080 HD: lines 9-20 (Default = 9) 720 HD: lines 9-25 (Default = 9)
Timecode drop frame mode:	Change the drop frame mode in valid output formats. Values are: DF, NDF.
Timecode source:	This command is only needed for the Teranex 3D. Values are: VITC, LTC.
Timecode generate value:	Set the start time of the output timecode generator, expressed as HH:MM:SS:FF
Timecode jam sync value:	Set the search value for the Jam Sync generator, expressed as HH:MM:SS:FF
Timecode start source:	Set the source of the timecode number used by the generator. Values are: Input, User (where "User" is equivalent to "Start Value" in the LCD Menu tree).

Video Indexing

Command	Command Description
Index reaction:	Values are: On, Off (Default = Off)
AFD insert type:	Values are: Off, Auto, Bypass, or AFD codes 0000 - 1111. For details, see the AFD Insertion Menu topic in the user manual.
AFD output line:	Range is format dependent. For details, see the AFD Insert Line Menu topic in the user manual.

Audio

Audio output selections and adjustments are made in the Audio block. Please note, however, audio input selection is made in the **Video Input** block via the **Audio source:** command. In Teranex 2D, audio input mapping is available, permitting audio from 'embed', 'AES' and 'anlg' inputs simultaneously, with certain limitations. For details, see 'input mapping' in the 'audio menu settings' section of this manual.

Setup

Command	Command Description
AES output select:	Select between AES or Analog audio output on the Teranex 3D XLR connectors. True=AES; False=Analog
Analog input ref level:	Set the Analog Input Reference Level for Teranex 2D and 3D. Values are: -24 to +24. Default =0. The operational range in dB is -12 to +12dB. e.g. For +4db, enter a value of 8.
Audio meter channels:	This command selects the pair of audio channels to be displayed on the front panel LCD in the Teranex AV only. Values are: MeterChan1&2, MeterChan3&4, MeterChan5&6, MeterChan7&8, MeterChan9&10, MeterChan11&12, MeterChan13&14, MeterChan15&16

Level (Gain) and Delay

Command	Command Description
AudioUserDelay0:	Set audio delay for all channels to same value. Enter value as a whole number in milliseconds. Range is -28 to +1000 msec. Default =0.

In the Teranex 2D and Express:

Command	Command Description
AudiolnLevel0:	Set audio level (gain) for ALL channels to same value. Enter the value as a whole number of gain in dB times 10 (e.g. For +4dB, enter a value of 40). Range is -32dB (-320) to +16dB (160). Default =0.

In the Teranex 3D, you can adjust the level of each channel independently:

Command	Command Description
AudiolnLevel0:	Set audio level (gain) for Channel 1
AudiolnLevel1:	Set audio level (gain) for Channel 2

Command	Command Description
AudiolnLevel2:	Set audio level (gain) for Channel 3
AudiolnLevel3:	Set audio level (gain) for Channel 4
AudiolnLevel4:	Set audio level (gain) for Channel 5
AudiolnLevel5:	Set audio level (gain) for Channel 6
AudiolnLevel6:	Set audio level (gain) for Channel 7
AudiolnLevel7:	Set audio level (gain) for Channel 8
AudiolnLevel8:	Set audio level (gain) for Channel 9
AudiolnLevel9:	Set audio level (gain) for Channel 10
AudiolnLevel10:	Set audio level (gain) for Channel 11
AudiolnLevel11:	Set audio level (gain) for Channel 12
AudiolnLevel12:	Set audio level (gain) for Channel 13
AudiolnLevel13:	Set audio level (gain) for Channel 14
AudiolnLevel14:	Set audio level (gain) for Channel 15
AudiolnLevel15:	Set audio level (gain) for Channel 16

Enter the value as a whole number of gain in dB times 10 (e.g. For +4dB, enter a value of 40). Range is -32dB (-320) to +16dB (160). Default =0.

Output Mapping

You may choose any active audio input channel, Dolby-decoded channel, test tone or mute to be mapped to each discrete audio output channel or Dolby-encoded output channel. Dolby encoding and decoding require optional Dolby modules, which can be installed in the Teranex 3D only.

Available source values are:

Command	Command Description
Inputs:	Audioln1 through Audioln16
Dolby decoded inputs:	AudioDD1 through AudioDD8
Test tones:	TT750 (750kHz), TT1500 (1.5 kHz), TT3000 (3kHz), TT6000 (6kHz), TTMute

Please note: AudioOut0: refers to output channel 1, AudioOut1: refers to output channel 2, etc.

Command	Command Description
AudioOut0:	Select source to be mapped to output Ch 1.
AudioOut1:	Select source to be mapped to output Ch 2.
AudioOut2:	Select source to be mapped to output Ch 3.
AudioOut3:	Select source to be mapped to output Ch 4.

Command	Command Description
AudioOut4:	Select source to be mapped to output Ch 5.
AudioOut5:	Select source to be mapped to output Ch 6.
AudioOut6:	Select source to be mapped to output Ch 7.
AudioOut7:	Select source to be mapped to output Ch 8.
AudioOut8:	Select source to be mapped to output Ch 9.
AudioOut9:	Select source to be mapped to output Ch 10.
AudioOut10:	Select source to be mapped to output Ch 11.
AudioOut11:	Select source to be mapped to output Ch 12.
AudioOut12:	Select source to be mapped to output Ch 13.
AudioOut13:	Select source to be mapped to output Ch 14.
AudioOut14:	Select source to be mapped to output Ch 15.
AudioOut15:	Select source to be mapped to output Ch 16.
AudioEncode0:	Select source to be mapped to Ch 1 of Dolby Encoder
AudioEncode1:	Select source to be mapped to Ch 2 of Dolby Encoder
AudioEncode2:	Select source to be mapped to Ch 3 of Dolby Encoder
AudioEncode3:	Select source to be mapped to Ch 4 of Dolby Encoder
AudioEncode4:	Select source to be mapped to Ch 5 of Dolby Encoder
AudioEncode5:	Select source to be mapped to Ch 6 of Dolby Encoder
AudioEncode6:	Select source to be mapped to Ch 7 of Dolby Encoder
AudioEncode7:	Select source to be mapped to Ch 8 of Dolby Encoder

Input Mapping for Teranex 2D

You may choose audio pairs from embedded, AES, analog DB25 or analog RCA inputs to be mapped to the 16 input channels of the Teranex 2D. You may also mute audio pairs.

Available source values are:

Inputs:	EmbedPair1 through EmbedPair8
	AESPair1 through AESPair4
	DB25Pair1 through DB25Pair2
	RCAPair
	MutePair

Please note: AudioInPair0: refers to input pair 1, AudioInPair1: refers to input pair 2, etc.

Command	Command Description
AudioInPair0:	Select source to be mapped to input pair 1
AudioInPair1:	Select source to be mapped to input pair 2
AudioInPair2:	Select source to be mapped to input pair 3
AudioInPair3:	Select source to be mapped to input pair 4
AudioInPair4:	Select source to be mapped to input pair 5
AudioInPair5:	Select source to be mapped to input pair 6
AudioInPair6:	Select source to be mapped to input pair 7
AudioInPair7:	Select source to be mapped to input pair 8

Metadata Commands for Teranex 3D

Available source values are:

Command	Command Description
Metadata channel mode:	Values are: 32 (3/2 (L,C,R,Ls,Rs)), 20 (2/0 (L/R))
Metadata lfe select:	Enables LFE. False=OFF; True=ON

Genlock

Command	Command Description
Gen reference:	For Teranex AV only. Select the Reference Output signal. The type of output allowed is dependent on the currently selected output format, the values are: Blackburst, TriLevel.
Line offset:	Set line timing adjustment for external genlock. Values are within the range set by the current output video format. (Default = 1)
Pixel offset:	Set pixel timing adjustment for external genlock. Values are within the range set by the current output video format. (Default = 0)
Signal locked:	Indicate genlock status. Cannot be changed by the end user. True indicates that the Teranex processor is locked to the external reference. False indicates that it is not locked.
Type:	Select the Genlock (Reference) source for the device. For Teranex 2D, 3D and Express, values are: Input, External. For Teranex AV, values are: Input, External and Internal.

MODE3D

The MODE3D commands are available in the Teranex 3D only. See the “3D Menu Settings” section of this user manual for details.

Example:

```
MODE3D:↵
3D MODE: 3DModeAlign↵
↵
ACK↵
↵
MODE3D:↵
3D mode: 3DModeAlign↵
3D roll left: 0↵
...
↵

ALIGN:↵
Align size X left: 0.000000↵
Align size X right: 0.000000↵
...
↵
```

Mode, Input and Output Commands

Command	Command Description
3D mode:	Enable the 3D processing modes of the Teranex 3D. Values are: 3DModeOff, 3DModeConvert, 3DMode2Dto3D, 3DModeAlign
2D3D intensity:	Adjust the Intensity level when 3D Mode is set to 2D to 3D. Range is --40 to +40. (Default = 15)
2D3D depth:	Adjust the Depth level when 3D Mode is set to 2D to 3D. Range is -12 to +12. (Default = 0)
3D output:	Select the 3D output signal format: Values are: 3DFullFrame, 3DSideBySide, 3DTopBottom, 3DLinebyLine
3D input:	Select the 3D input signal format: Values are: 3DFullFrame, 3DSideBySide, 3DTopBottom, 3DLinebyLine

Rotation and Tilt Commands

The commands below may be used to adjust the alignment between the left and right eye signals of a 3D stereoscopic source. In the Teranex 3D LCD menus, these functions are part of the “Camera Align” menu.

Rotation (Roll, Tilt and Toe-in) and Flip commands are included in this block. Other Camera Align functions, Size, Position and Trim, are found in the Align block.

First, enter the “MODE3D:” block command, then use the “3D mode:” command to select “3DModeAlign” and proceed with the adjustment commands below.

Example:

```
MODE3D:↵
3D roll left: 20↵
↵
```

```

ACK ↵
↵
MODE3D: ↵
3D roll left: 20 ↵
3D roll right: 0 ↵
↵

```

Command	Command Description
3D roll left:	Adjust the Left Eye Z axis image rotation. Range is -400 to +400 units. (Default = 0) 50 units = 1 degree. (1 unit = 0.02 degree)
3D roll right:	Adjust the Right Eye Z axis image rotation. Range is -400 to +400 units. (Default = 0) 50 units = 1 degree. (1 unit = 0.02 degree)
3D tilt left:	Adjust the Left Eye X axis image tilt. Range is -40 to +40 units. (Default = 0) 5 units = 1 degree. (1 unit = 0.2 degree)
3D tilt right:	Adjust the Right Eye X axis image tilt. Range is -40 to +40 units. (Default = 0) 5 units = 1 degree. (1 unit = 0.2 degree)
3D toIn left:	Adjust the Left Eye Y axis image toe-in. Range is -40 to +40 units. (Default = 0) 5 units = 1 degree. (1 unit = 0.2 degree)
3D toIn right:	Adjust the Right Eye Y axis image toe-in. Range is -40 to +40 units. (Default = 0) 5 units = 1 degree. (1 unit = 0.2 degree)
3D flip left:	Flip the Left Eye image. Values are: Off, Horizontal, Vertical, Both
3D flip right:	Flip the Right Eye image. Values are: Off, Horizontal, Vertical, Both

Network Config

Command	Command Description
Friendly name:	Displays the current user-defined name assigned to the device. Command is used to assign a new name to the device.
DHCP enabled:	Although not advised, user may enable/disable DHCP. True = enabled; False = disabled
IP address:	Displays current IP address as an integer. Cannot be changed by the user.
Gateway:	Displays current gateway as an integer. Cannot be changed by the user.
Subnet:	Displays current subnet mask as an integer. Cannot be changed by the user.

Noise Reduction

Command	Command Description
Enabled:	Enable Noise Reduction. False = OFF; True = ON
Bias:	Adjust the Bias level. Range is -3 to +3
Split screen:	Enable NR before/after split screen. False = OFF; True = ON
Red overlay:	Enable NR Red Overlay. False = OFF; True = ON

Ping

Determine if the Teranex Server is responding.

Preset

Please note: PresetName0: refers to Preset 1, PresetName1: refers to Preset 2, etc.

Command	Command Description
PresetName0:	Displays all current user-defined preset names. Command is used to assign a new name to Preset 1.
PresetName1:	Displays all current user-defined preset names. Command is used to assign a new name to Preset 2.
PresetName2:	Displays all current user-defined preset names. Command is used to assign a new name to Preset 3.
PresetName3:	Displays all current user-defined preset names. Command is used to assign a new name to Preset 4.
PresetName4:	Displays all current user-defined preset names. Command is used to assign a new name to Preset 5.
PresetName5:	Displays all current user-defined preset names. Command is used to assign a new name to Preset 6.
Recall:	Recalls a previously saved preset, 1-6. (e.g. Recall: 1)
Save:	Saves a new set of parameters to the designated preset, 1-6. (e.g. Save: 1)

Protocol Preamble

The Teranex Server will respond with the current protocol version.
This information cannot be changed by the user.

PROTOCOL PREAMBLE:
Version: 3.18

Teranex Device

Command	Command Description
Model name:	Display the Teranex model name.
Software Version:	Display the checksum of the installed software release.
FPGA Version:	Display the FPGA version of the installed software release.
Panel lock:	Remotely lock the front panel of the device, preventing local operation. Values are: true (locks the panel), false (unlocks the panel).
Remote lock:	Manage remote connections to the Teranex processor. When locked, the Teranex Setup utility cannot access the device via Ethernet; however, a Telnet connection is permitted. Values are: true (locks the device), false (unlocks the device).

Test Pattern

Command	Command Description
Output:	Enable video output Test Pattern. Values are: None, Black, SMPTEBars, Bars, Multiburst, Grid
No signal:	Define whether Black or Colorbars will be output when there is a loss of input video. Values are Black, Bars
Test tone:	This command enables and sets the frequency for the audio test tone in the Teranex AV only. This command is only valid when a video test pattern is enabled. Values are: None, Tone750Hz, Tone1500Hz, Tone3KHz, Tone6KHz
Motion:	For Teranex AV only. Enable test pattern motion. True = ON; False = OFF
Horizontal rate:	For Teranex AV only. Set motion direction and rate. 0 = no motion (default) Range is -3 to 3, where: Positive values = left to right motion Negative values = right to left motion

Variable Aspect Ratio

The Variable Aspect Ratio block performs the functions of the ADJ menu in the Teranex LCD menu. Ranges for these numeric values are defined by the current output video format. Horizontal values are expressed in pixels; vertical values are in lines.

The Variable Aspect Ratio commands ending in “left” will affect the conventional 2D outputs of the Teranex AV, Teranex Express, Teranex 2D and Teranex 3D, while the “right” commands perform no operation. When these commands are used in a Teranex 3D set to 3DModeConvert or 3DMode2Dto3D, the “left” commands will affect the Left Eye output, while the “right” commands will affect the Right Eye output.

Command	Command Description
Variable Aspect Ratio size X left:	Adjust horizontal image size. Negative values decrease size; positive values enlarge the image. Default = 0
Variable Aspect Ratio size X right:	Adjust horizontal image size of the Teranex 3D right eye output. Negative values decrease size; positive values enlarge the image. Default = 0
Variable Aspect Ratio size Y left:	Adjust vertical image size. Negative values decrease size; positive values enlarge the image. Default = 0
Variable Aspect Ratio size Y right:	Adjust vertical image size of the Teranex 3D right eye output. Negative values decrease size; positive values enlarge the image. Default = 0
Variable Aspect Ratio pos X left:	Adjust horizontal position of the image. Negative values move the image to the left; positive values, to the right. Default = 0
Variable Aspect Ratio pos X right:	Adjust horizontal position of the Teranex 3D right eye output. Negative values move the image to the left; positive values, to the right. Default = 0
Variable Aspect Ratio pos Y left:	Adjust vertical position of the image. Negative values move the image upward; positive values, downward. Default = 0
Variable Aspect Ratio pos Y right:	Adjust vertical position of the Teranex 3D right eye output. Negative values move the image upward; positive values, downward. Default = 0
Variable Aspect Ratio trim X left:	Trim the sides of the image. Default = 0
Variable Aspect Ratio trim X right:	Trim the sides of the Teranex 3D right eye output. Default = 0
Variable Aspect Ratio trim Y left:	Trim the top and bottom of the image. Default = 0
Variable Aspect Ratio trim Y right:	Trim the top and bottom of the Teranex 3D right eye output. Default = 0
Variable Aspect Ratio zoom/crop:	Enables Zoom/Crop. False=OFF; True=ON (Default = False)

Video Adjust

Command	Command Description
Red:	Set value of Red color correction control. Range is -200 to +200 (Default = 0)
Green:	Set value of Green color correction control. Range is -200 to +200 (Default = 0)
Blue:	Set value of Blue color correction control. Range is -200 to +200 (Default = 0)
Luma low:	Set luminance low level value to clip undershoots. Range is 4 to 1018 (Default = 4)

Command	Command Description
Luma high:	Set luminance high level value to clip overshoots. Range is 5 to 1019 (Default = 1019)
Chroma low:	Set chrominance low level value to clip undershoots. Range is 4 to 1018 (Default = 4)
Chroma high:	Set chrominance high level value to clip overshoots. Range is 5 to 1019 (Default = 1019)
Aspect fill luma:	Set luminance (Y) value for letterbox or pillarbox fill color. Range is 64 to 940 (Default = 64)
Aspect fill Cb:	Set B-Y value for letterbox or pillarbox fill color. Range is 64 to 960 (Default = 512)
Aspect fill Cr:	Set R-Y value for letterbox or pillarbox fill color. Range is 64 to 960 (Default = 512)

Video Advanced

Command	Command Description
Clean cadence:	Enable Clean Cadence processing. False = OFF; True = ON (Default = False)
Scenecut detect:	Enable scene cut detection. False = OFF; True = ON (Default = True)
Source type:	Values are: Auto, Video, Film
FRC aperture:	Values 0, 1, 2, 3.
Processing:	This command sets the processing latency in the Teranex AV only. Values are: Lowest Latency, Highest Quality.

Video Input

Command	Command Description
Auto detection enabled:	Provides auto-detection of the input video format. Must ALWAYS be set to True. A setting of False will produce incorrect operation of the device.
Auto detection prefer PsF:	Cannot be changed by the user.
Video source:	Select the video input type. Values are model dependent. Teranex 2D: SDI, HDMI, Composite, Component. Teranex 3D: SDI, HDMI, Composite, Component Teranex Express: SDI, Optical. Teranex AV: SDI1, SDI2, HDMI, Optical.
Video mode:	Displays the current input video format. Cannot be changed by the user.

Command	Command Description
Audio source:	Select the audio input type. Values are model dependent. Teranex 2D: Embedded, AES, RCA, DB25. Teranex 3D: Embedded, AES, RCA, DB25. Teranex Express: Embedded. Teranex AV: Embedded, AES, RCA, DB25.
PCIe mode:	For Teranex 2D and 3D: Display the status of the Thunderbolt connection. Values are: Capture, Playback, None. Cannot be changed by the user.
Signal present:	True indicates presence of input video. False indicates no input video is present. Cannot be changed by the user.
Timecode present:	Detected indicates presence of timecode. None indicates no timecode is present. Cannot be changed by the user.
Closed captioning present:	Detected indicates presence of closed captions. None indicates no closed captions are present. Cannot be changed by the user.
Wide SD aspect:	Values are: True or False. False indicates the SD source is 4:3. True indicates the SD source is widescreen and should be displayed in an SD output in a Letterbox mode.
Optical module present:	Indicates the presence of an installed fiber optic SFP module. True=Installed; False=Not installed
Video pixel format:	Displays input pixel format, e.g. YCrCb422. Cannot be changed by the user.

Video Output

Command	Command Description
Video mode:	The Video Mode may be set to any available output video format. Refer to the format conversion table for output formats available in your Teranex. For example, 2160p59.94.
Aspect ratio:	The Aspect Ratio value may be set to an aspect ratio appropriate for the current conversion. Values are based on availability in the device and the current conversion: Anamorphic, Letterbox, CentreCut, 14x9, Smart.
Video demux mode:	The Video demux mode applies to the Teranex 3D and Teranex Express. Values are: SingleLink, DualLink, QuadLink. This command corresponds with the 'SDI Output' LCD menu.
Output SDI mode:	For Teranex AV and Teranex Express only, select the 3G-SDI output type. Values are LevelA, LevelB. This command corresponds with the '3G-SDI Output' LCD menu.
Video pixel format:	The Video pixel format applies to the Teranex 3D only. Values are: YCbCr422, RGB422, RGB444.
Analog output:	Select the analog video output type. Values are: Composite, Component

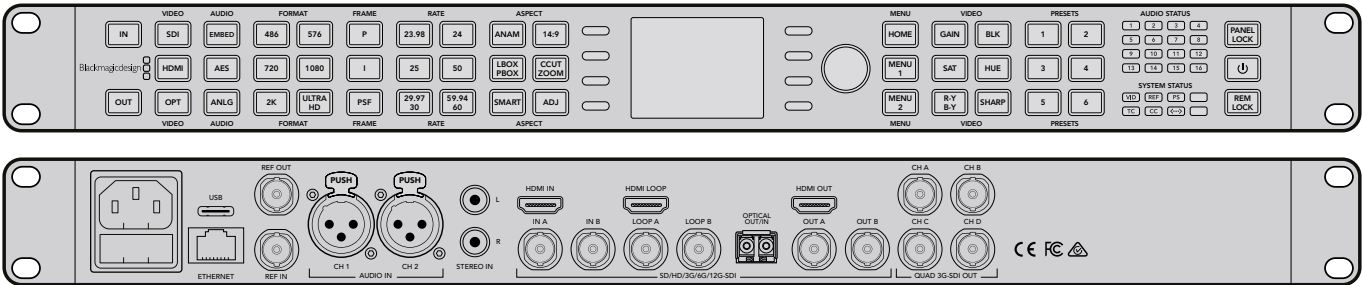
Command	Command Description
HDMI Output:	For Teranex AV only. Select the color space for the HDMI output. Values are: YCbCR422, RGB444
Output option:	For Teranex AV only. Select one of four signals to be used as the output of the unit. Values are: Input, Black, Still, Freeze. The "Transition setting" command controls the transition rate.
Quad ancillary replication:	For Teranex AV and Express. True = replicate the ancillary data on all four quad link outputs. False = ancillary data on quad output A only.
Quad SDI output:	For Teranex AV only. Select the quad SDI output mode. Values are: QuadLink, QuadHDSplit.
Still frame present:	For Teranex AV only. True = still frame has been stored at the current output format. False = no still frame has been stored at the current output format. Cannot be changed by the user.
Still load complete:	For Teranex AV only. True = loading of still frame data from the internal non-volatile flash drive has completed. Cannot be changed by the user.
Still store complete:	For Teranex AV only. True = transfer of still frame data to the internal non-volatile flash drive has completed. Cannot be changed by the user.
Transition setting:	For Teranex AV only. Set the transition rate between the choices made in the Output Options menu. Range is: 0 (cut) to 50 (50 = 5 seconds, where 1 unit = 0.1 second)

Video Proc Amp

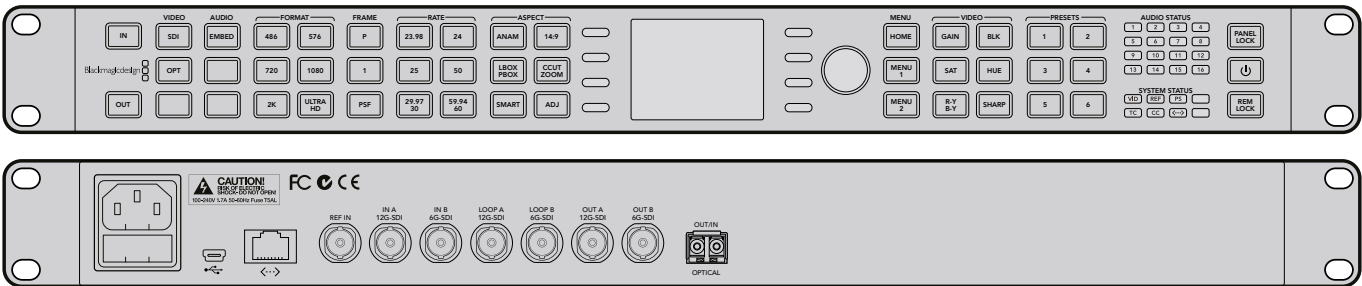
Command	Command Description
Gain:	Set the output video level. Range is -60 to +60 (Default = 0)
Black:	Set the black level of the video output. Range is -30 to +30 (Default = 0)
Saturation:	Set the saturation of the video output. Range is -60 to +60 (Default = 0)
Hue:	Set the hue of the video output. Range is -179 to +180 (Default = 0)
RY:	Set the R-Y color difference level of the video output. Range is -200 to +200 (Default = 0)
BY:	Set the B-Y color difference level of the video output. Range is -200 to +200 (Default = 0)
Sharp:	Set the sharpness of the video output. Range is -50 to +50 (Default = 0)

Front and Rear Diagrams

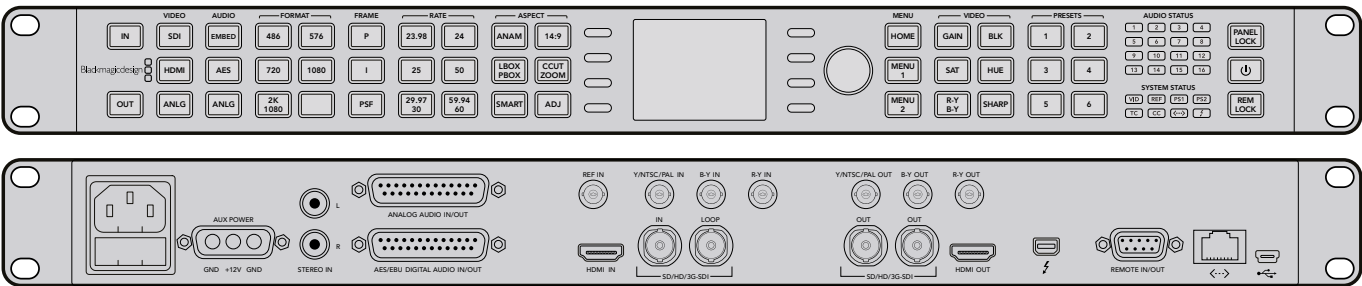
Teranex AV



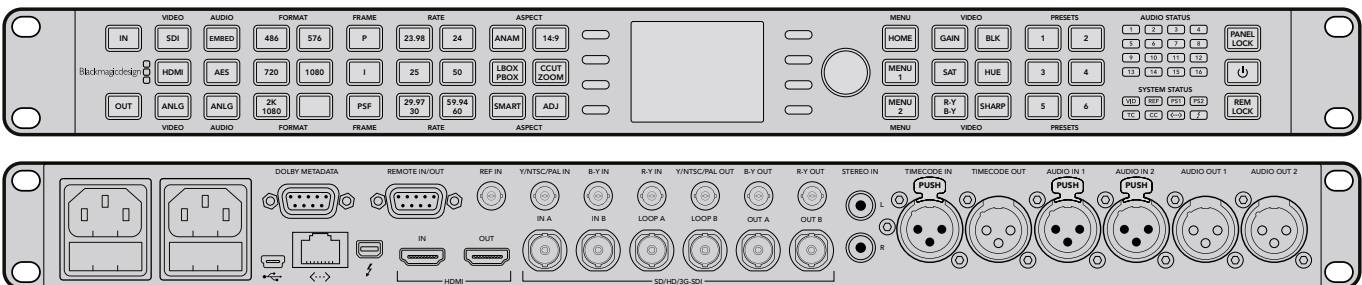
Teranex Express



Teranex 2D



Teranex 3D



Help

Getting Help

The fastest way to obtain help is to go to the Blackmagic Design online support pages and check the latest support material available for your Teranex Processor hardware.

Blackmagic Design online support pages

The latest manual, software and support notes can be found at the Blackmagic Design support center at www.blackmagicdesign.com/support

Blackmagic Design Forum

The Blackmagic Design forum on our website is a helpful resource you can visit for more information and creative ideas. This can also be a faster way of getting help as there may already be answers you can find from other experienced users and Blackmagic Design staff which will keep you moving forward. You can visit the forum at <https://forum.blackmagicdesign.com>

Contacting Blackmagic Design Support

If you can't find the help you need in our support material or on the forum, please use the "Send us an email" button on the support page to email a support request. Alternatively, click on the "Find your local support team" button on the support page and call your nearest Blackmagic Design support office.

Checking the version currently installed

To check which version of Blackmagic Teranex software is installed on your computer, open the About Teranex Setup utility window.

- On Mac OS X, open the Blackmagic Teranex Setup utility from the Applications folder. Select About Blackmagic Teranex Setup from the title bar to reveal the version number.
- On Windows 7, open Blackmagic Teranex Setup from your Start menu. Click on the Help menu and select About to reveal the version number.
- On Windows 8, open Blackmagic Teranex Setup from the Blackmagic Teranex tile on your Start page. Click on the Help menu and select About to reveal the version number.

How to get the latest updates

After checking the version of Blackmagic Teranex software installed on your computer, please visit the Blackmagic Design support center at www.blackmagicdesign.com/support to check for the latest updates. While it is usually a good idea to run the latest updates, it is wise to avoid updating any software if you are in the middle of an important project.

Warnings

Caution: Risk of Electric Shock

On the Teranex Processor enclosure you will see a yellow warning label marked 'Caution: Risk of Electric Shock'. This is intended to warn users that there may be the presence of uninsulated "dangerous" voltage within the Teranex Processor enclosure which may be of sufficient magnitude to constitute a risk of electric shock to the user. Blackmagic Design advises you not to open the Teranex Processor unit, but rather contact your nearest Blackmagic Design service center should assistance be required. Any devices that connect to the data ports must comply with clause 4.7 of AS/NZS 60950.1.

Achtung: Stromschlaggefahr

Auf dem Teranex Processor-Gehäuse befindet sich ein gelbes Warnetikett mit der Aufschrift 'Caution: Risk of Electric Shock'. Dieses warnt den Benutzer vor einer möglichen, nicht isolierten, "gefährlichen" Spannung innerhalb des Teranex Processor-Gehäuses, die einen Elektroschock verursachen kann. Blackmagic Design empfiehlt das Gehäuse des Teranex Processor nicht selbst zu öffnen, sondern bei Hilfebedarf das nächstgelegene Blackmagic Design Servicecenter zu kontaktieren. Alle Geräte, die an die Datenports angeschlossen werden, müssen der Norm AS/NZS 60950, Kausel 4.7 entsprechen.

Attention: Risque de choc électrique

Sur le boîtier du Teranex Processor, vous verrez une étiquette d'avertissement de couleur jaune sur laquelle est inscrit « Attention : Risque de choc électrique ». Cette mise en garde est destinée à avertir les utilisateurs de la présence possible d'une tension « dangereuse » non isolée à l'intérieur du boîtier du Teranex Processor, laquelle tension pouvant avoir une amplitude suffisante pour constituer un risque de choc électrique à l'utilisateur. Blackmagic Design vous déconseille donc d'ouvrir l'unité Teranex Processor, et vous recommande de contacter votre centre de service Blackmagic Design le plus proche en cas de nécessité. Tout matériel connecté à des ports de données doit être conforme à la clause 4.7 de la norme AS/NZS 60950.



Caution label

Warnetikett

Avertissement

Warranty

12 Month Limited Warranty

Blackmagic Design warrants that the Teranex family products will be free from defects in materials and workmanship for a period of 12 months from the date of purchase. If a product proves to be defective during this warranty period, Blackmagic Design, at its option, either will repair the defective product without charge for parts and labor, or will provide a replacement in exchange for the defective product.

In order to obtain service under this warranty, you the Customer, must notify Blackmagic Design of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. The Customer shall be responsible for packaging and shipping the defective product to a designated service center nominated by Blackmagic Design, with shipping charges pre paid. Customer shall be responsible for paying all shipping changes, insurance, duties, taxes, and any other charges for products returned to us for any reason.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. Blackmagic Design shall not be obligated to furnish service under this warranty: a) to repair damage resulting from attempts by personnel other than Blackmagic Design representatives to install, repair or service the product, b) to repair damage resulting from improper use or connection to incompatible equipment, c) to repair any damage or malfunction caused by the use of non Blackmagic Design parts or supplies, or d) to service a product that has been modified or integrated with other products when the effect of such a modification or integration increases the time or difficulty of servicing the product. THIS WARRANTY IS GIVEN BY BLACKMAGIC DESIGN IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED. BLACKMAGIC DESIGN AND ITS VENDORS DISCLAIM ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. BLACKMAGIC DESIGN'S RESPONSIBILITY TO REPAIR OR REPLACE DEFECTIVE PRODUCTS IS THE WHOLE AND EXCLUSIVE REMEDY PROVIDED TO THE CUSTOMER FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES IRRESPECTIVE OF WHETHER BLACKMAGIC DESIGN OR THE VENDOR HAS ADVANCE NOTICE OF THE POSSIBILITY OF SUCH DAMAGES. BLACKMAGIC DESIGN IS NOT LIABLE FOR ANY ILLEGAL USE OF EQUIPMENT BY CUSTOMER. BLACKMAGIC IS NOT LIABLE FOR ANY DAMAGES RESULTING FROM USE OF THIS PRODUCT. USER OPERATES THIS PRODUCT AT OWN RISK.

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