Installation and Operation Manual

Teranex Mini Converters

April 2020

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

Languages

To go directly to your preferred language, simply click on the hyperlinks listed in the contents below.

Welcome

Thank you for purchasing Teranex Mini Converters.

Teranex Minis are 12G-SDI converters that let you convert video and audio for broadcast and production work in the field, on your desk, or mounted in a rack.

With an efficient, compact design, they are not much bigger than Mini Converters and can be placed into any production environment, from single operator post production studios, to large rack based SDI workflows. We're excited to introduce Teranex Mini SDI to DisplayPort 8K HDR to complement Teranex Mini SDI to HDMI 8K HDR. Both of these 8K Mini Converters feature dual on screen scopes and monitor calibration for color accurate monitoring.

This instruction manual contains all the information you need to start using your Teranex Mini Converters.

Please check the support page on our website at www.blackmagicdesign.com for the latest version of this manual and for updates to your Teranex Mini converter's software. Keeping your software up to date will ensure you get all the latest features as well as support for any new SDI formats that might be invented in the future! When downloading software, please register with your information so we can keep you updated when new software is released or you can follow us on twitter to get notifications of any software updates. We are continually working on new features and improvements, so we would love to hear from you!

Grant Petty
CEO Blackmagic Design

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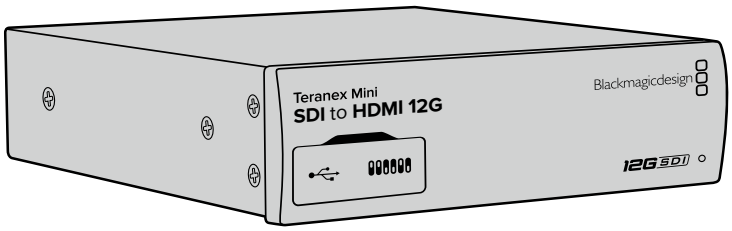
Teranex Mini Converters

Getting Started

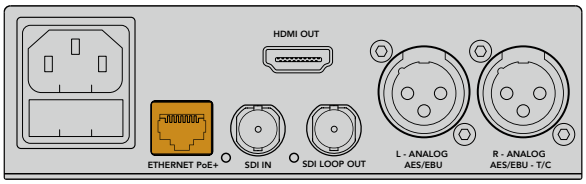
Plugging in Power

Getting started is as simple as plugging in power and connecting your signal input and output.

To supply power, plug in a standard IEC power cable to your Teranex Mini converter's power input on the rear panel. You can also power your Teranex Mini via Ethernet by plugging into a compatible Ethernet switch that supports PoE+, or 'power over Ethernet plus'.



Teranex Mini Converters support 12G-SDI data rates so will automatically switch between SD, HD and Ultra HD all the way up to 2160p60.



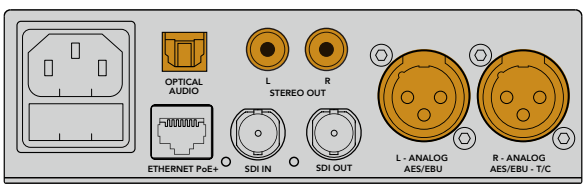
Connect power to your Teranex Mini converter using a standard IEC power cable. Power can also be supplied via a PoE+ compatible Ethernet switch.

Plugging in Video

Plug your source video into your Teranex Mini converter's video input and plug the video output into your destination equipment. Video input and output varies by converter. Depending on your Teranex Mini model, you may have the option of SDI, HDMI, component, composite or S-video input or output.

Plugging in Audio

If you're using embedded audio in SDI or HDMI, audio is already transported via the video input. If using external digital or analog audio, plug into the XLR connectors. The 'R' channel XLR connector can be used for timecode. Some Teranex Mini devices support RCA analog audio or optical audio. Refer to the individual converters detailed in this manual for more information.



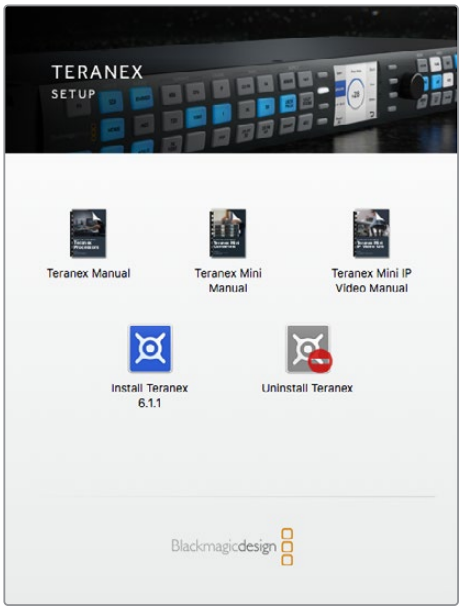
Connect analog or digital audio to your Teranex Mini converter's optical audio, RCA, or balanced XLR connectors.

That's all there is to getting started! Now you can change your conversion settings and start using your Teranex Mini. See the 'changing settings' section to learn more.

Installing Administration Software

Installing Blackmagic Teranex Setup

The Teranex setup software is used to update your Teranex Mini and to change video, audio and network settings.



Blackmagic Teranex Setup can be installed on Mac and Windows computers.

Installation on Mac

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.

The Teranex setup utility is now installed.

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

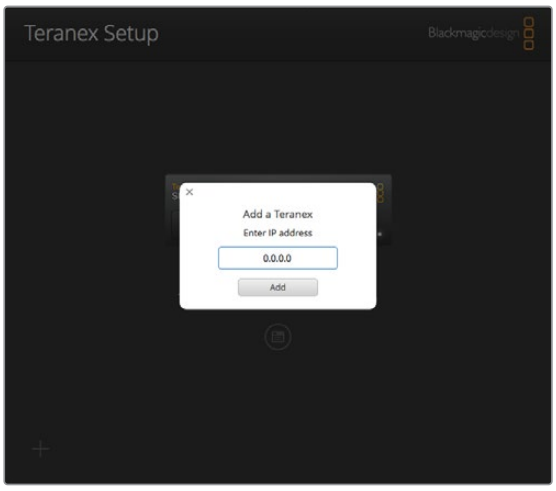
Updating the Internal Software

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

1. Power your converter.
2. Attach a USB cable from the computer to the converter or connect via Ethernet launch the Teranex setup utility.

If the converter is missing or not detected, Blackmagic Teranex Setup will report, “No converter connected” in the title bar. Otherwise, it will report the model name of your Teranex Mini.

If Blackmagic Teranex Setup contains newer internal software than that currently installed in your Teranex Mini, it will prompt you to update. Just follow the on screen instructions to complete the update. Once the internal software update is complete, you will be able to make adjustments to your Teranex Mini using the Teranex setup utility.



If you have previously set your Teranex Mini to use a static IP address, you can find it on your network by entering the IP Address from the Teranex setup utility home screen.

Installing Teranex Mini Smart Panel

You can also change settings using the optional Teranex Mini Smart Panel. This control panel mounts to the front of your Teranex Mini and replaces the original basic panel that shipped with the converter. You get fast access to your settings using buttons and a rotary knob and you can see the input on the built in LCD.

Installing your optional Smart Panel is easy and because the panels are hot swappable you don’t even need to turn off your Teranex Mini converter when installing it.

1. Remove the two M3 screws on each side of your converter’s basic front panel using a Pozidriv 2 screwdriver and gently pull the panel away from the front of your Teranex Mini.
2. On the inside of the basic panel, you’ll notice a small clear plastic tube attached to the bottom corner. This tube directs light from the LED inside the unit to illuminate the status indicator on the basic panel. This tube should stay attached to the basic front panel.

TIP If reattaching the basic front panel, make sure the light tube is aligned with the slot in the front of the unit.

3 Align the connector on the rear of the Smart Panel with the adjoining connector on the face of your Teranex Mini converter and gently push the Smart Panel towards your converter until the connectors are firmly seated. The Smart Panel should make a firm connection and fit neatly inside the face of your Teranex Mini converter.

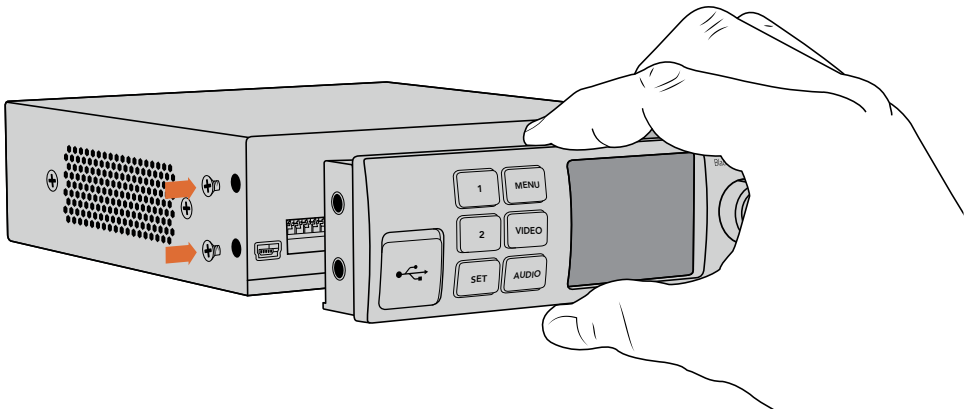
4 Re-insert the M3 screws from the original panel.

If your Teranex Mini is installed in a Teranex Mini Rack Shelf, you will need to remove the mini converter from the rack shelf to access the front panel screws.

See the 'Teranex Mini Rack Shelf' section for more information.

The Teranex Mini's USB port is still accessible with the Smart Panel attached. To access the port, simply open the rubber USB dust cover. With the Smart Panel installed, the front panel small switches are covered up and no longer used and this is because all the switch settings and more are now in the menu on the Teranex Smart Panel and can be set using the LCD. The settings available will vary between Teranex Mini's because the features are different between models, but navigation layout on screen is the same, so it's easy to move between models to make changes to settings.

Refer to the 'changing settings' section for information on changing settings using an optional Teranex Mini Smart Panel. The original basic panel is very strong, so if you need to mount your Teranex Mini in the back of a rack system or in areas where there are lots of cables or activity, you can always reinstall the original basic panel.



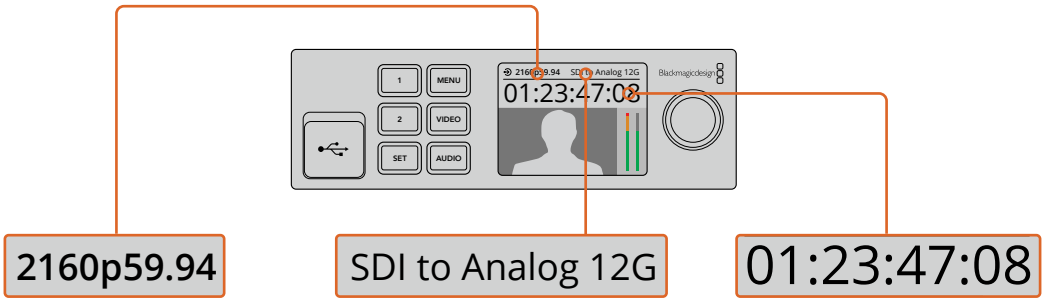
When installing the Teranex Mini Smart Panel to your Teranex Mini, holding the panel with your fingers and thumb aligned with the panel's rear connector will help guide it into place.

NOTE Some models of Teranex Mini have an integrated Smart Panel preinstalled instead of a basic panel with a set of small switches. The integrated Smart Panel is not detachable, though it functions just like an optional Teranex Mini Smart Panel.

Smart Panel Features

LCD Display

The home screen is the first feature you'll see on your Teranex Mini Smart Panel's LCD display. The home screen shows you important information, including:



Input video format – The format and frame rate of your video source connected to your Teranex Mini converter.

Converter model – The model of Teranex Mini converter currently connected to the Teranex Mini Smart Panel.

Timecode – The timecode embedded in the video input, or external timecode via the Teranex mini converter's XLR connector.

Control Buttons and Rotary Knob

Your Teranex Mini Smart Panel has a set of buttons and a rotary knob that are used to navigate your Teranex Mini Converter's settings menu.

1 and 2 buttons

Press these buttons to increase or decrease numeric setting values, or to move up or down through menu settings.

Set

After changing a setting using the 1 and 2 buttons, press the 'set' button to confirm your setting.

Menu

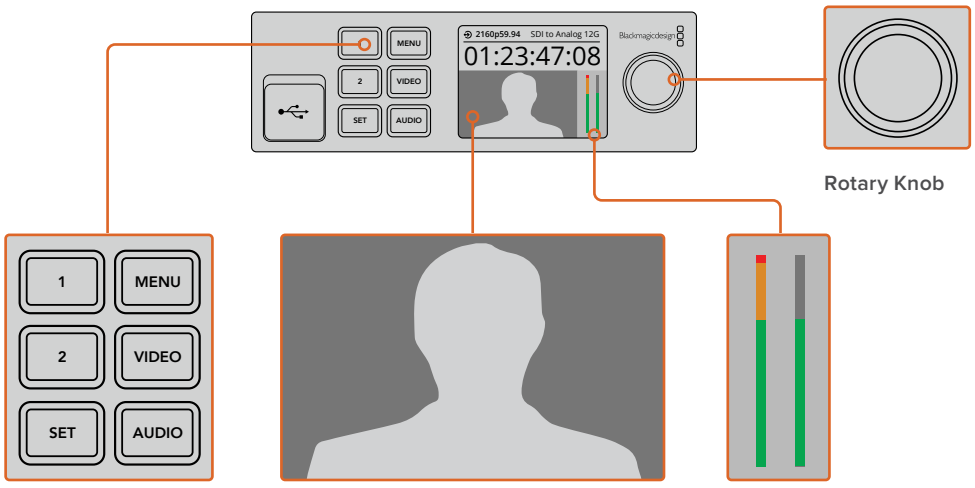
Press to enter the settings menu for your Teranex Mini converter. You can also press the menu button to step back through menu items.

Video and Audio Buttons

Press the 'video' and 'audio' buttons to take you directly to your Teranex Mini converter's video or audio settings. The settings available will depend on which model your Smart Panel is connected to.

Rotary Knob

Turn the rotary knob clockwise or counter clockwise to navigate through the menu settings and adjust numeric setting values.



Control Buttons

Video monitor – displays the input video format so you can instantly see your conversion.

Audio meters – Displays the audio levels of your video source connected to your Teranex Mini converter.

Changing Settings

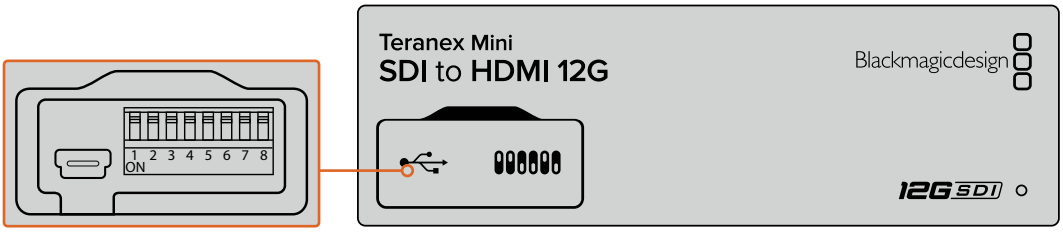
There are three ways to change settings on your Teranex Mini. You can use the switches on the front panel, the Blackmagic Teranex Setup utility, or by mounting a Teranex Mini Smart Panel which lets you change settings using control buttons, a rotary knob and LCD.

Changing Settings using Switches

On the original basic panel of your Teranex Mini you'll see a rubber dust cover which protects a set of small switches used for settings on your converter. The 'on/off' switches are used to configure internal settings and you can easily change them using the tip of a pen.

You'll find a switch settings diagram printed on the base of your converter. Ensure your switch settings correspond to the legend by observing the switch numbers from 1 to 8, left to right. When using the optional Teranex Mini Smart Panel, the switch settings will be overridden by the Smart Panel settings. Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Blackmagic Teranex Setup software. If reverting to switch control after removing the Smart Panel or updating your converter's settings via software, you may need to toggle individual switches for new settings to take effect.

For a full description of the switches and their settings, refer to your converter model in this manual. Even though switch settings are printed on the base of your converter, new features in later updates can add new settings so it's worth checking the latest version of this manual for the most up to date information. You can download the latest version from the Blackmagic Design support center at www.blackmagicdesign.com/support



Change settings by adjusting the switches with a pen.

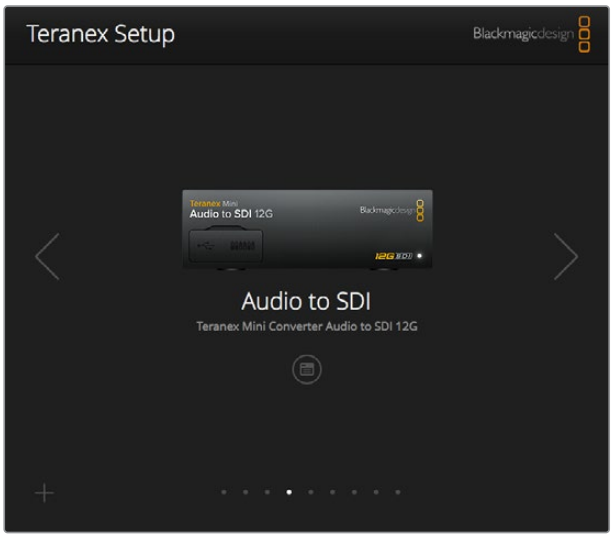
Changing Settings using Blackmagic Teranex Setup

Once installed on your computer, connect the setup utility to your Teranex Mini via USB or Ethernet. If you can't find your Teranex Mini via Ethernet, you may first need to configure it using a USB connection as detailed in the section 'changing network settings.'

The first thing you'll see when launching the software is the home page. Here you can select the Teranex Mini you want to configure. To change settings, click on the 'settings' icon below the image of your Teranex Mini.

If you have more than one Teranex Mini connected to your network, only the relevant settings for your selected Teranex Mini will be visible. Select your desired converter by clicking the arrows on the left and right side of the Blackmagic Teranex Setup home page.

Adjustments will be immediately saved to your Teranex Mini. This means if power is lost, your settings will be re-established as soon as power is restored.

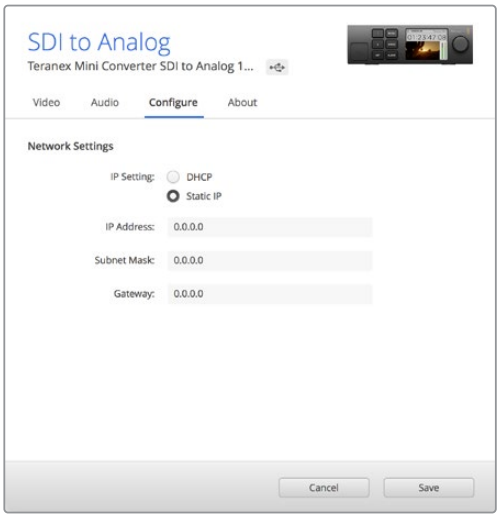


The Teranex setup utility lets you update your Teranex Mini's internal software and adjust your settings using a Mac or Windows computer.

The configure and about tabs in Blackmagic Teranex Setup are common across all Teranex Mini models.

Configure Tab

The 'configure' tab is the same for all Teranex Minis and contains your converter's network settings. Here you can toggle your converter between dynamic and static network addresses, as well as set up the IP address, subnet mask, and gateway for your Teranex Mini. See the 'changing network settings' section for more detail.

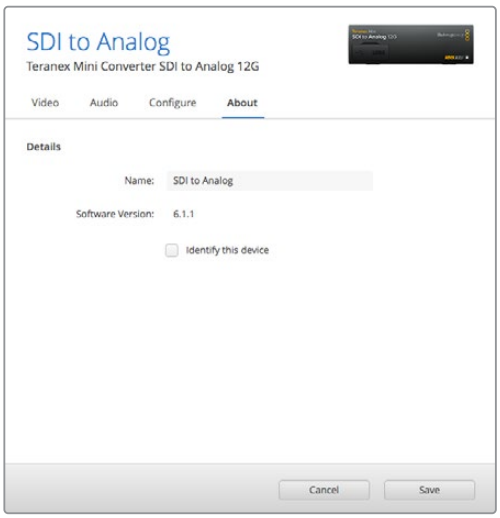


Use the 'configure' tab in Blackmagic Teranex Setup to access network settings.

About Tab

You can use the settings in this tab to name your Teranex Mini, and to identify individual converters. To name your Teranex Mini converter, simply click in the ‘name’ text box and type your desired converter name. Click ‘save’ to confirm the change. To easily identify your selected Teranex Mini converter, click on the ‘identify’ checkbox. This will flash the multi use indicator on your converter’s basic Teranex Mini panel. If you have a Teranex Mini Smart Panel installed, you will see the model name in the LCD turn from grey to red. Deselect the checkbox to turn off the identification indicators.

The ‘software settings’ menu in the ‘about’ tab identifies which software version your Teranex Mini is running. If your converter’s internal software is older than the current version that comes with Blackmagic Teranex Setup, an update button will be present here that allows you to bring your converter’s software up to date.

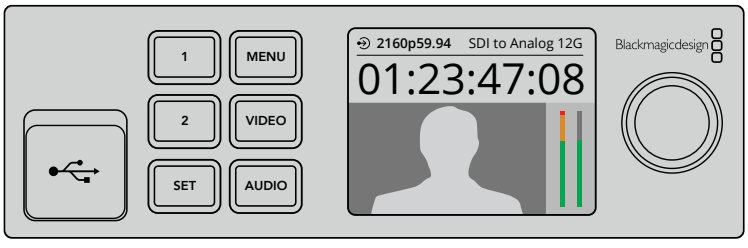


The ‘about’ tab in Blackmagic Teranex Setup is used to name and identify your Teranex Mini. You can also check the version of the setup software.

Changing Settings using Teranex Mini Smart Panel

You can also change settings using the optional Teranex Mini Smart Panel. This control panel mounts to the front of your Teranex Mini and replaces the original basic front panel that shipped with the converter. You get fast access to your settings using buttons and a rotary knob and you can see the input on the built in LCD.

The converter’s USB port is still accessible with the Teranex Smart Panel attached. To access the port, simply open the rubber USB dust cover. With the Teranex Smart Panel installed, the front panel small switches are covered up and no longer used and this is because all the switch settings and more are now in the menu on the Teranex Smart Panel and can be set using the LCD. The settings available will vary between Teranex Mini converters because the features are different between models, but navigation layout on screen is the same, so it’s easy to move between models to make changes to settings.



You can quickly check your settings and set new ones using an optional Teranex Mini Smart Panel. The Smart Panel easily mounts to the front of your Teranex Mini converter.

Changing Network Settings

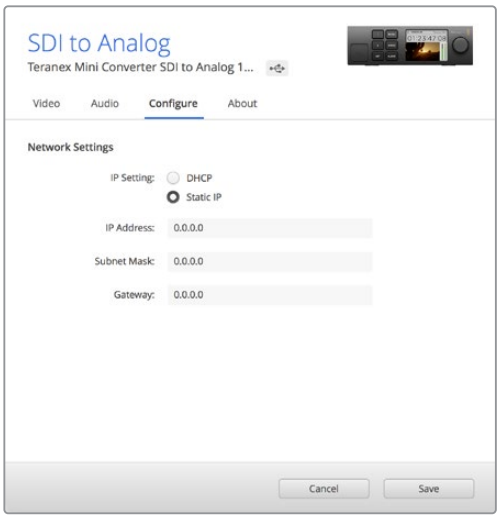
Accessing your Teranex Minis over a network is the easiest way to manage multiple converters. You can do this using Blackmagic Teranex Setup. By default, your Teranex Minis are configured to automatically acquire a network address, making it easy to immediately select them from the Blackmagic Teranex Setup splash screen, as detailed in the section ‘changing settings using Blackmagic Teranex Setup.’

If you are having trouble finding a Teranex Mini on your network, or you have previously set it to use a static address incompatible with your current network, you may need to change its network settings locally. You can do this via USB or the Teranex Mini Smart Panel.

Changing Network Settings via USB

To change network settings via USB, connect your Teranex Mini to a computer running the Teranex setup utility with a USB cable. You can find your Teranex Mini’s USB connector on its front panel, regardless of whether you are using the original basic panel or the Smart Panel.

Once connected, select your Teranex Mini from the Teranex setup utility splash screen, and navigate to the ‘configure’ tab. Here you can toggle your converter between dynamic and static network addresses. If you select a static IP, you can manually configure your converter’s IP address, subnet mask, and gateway.

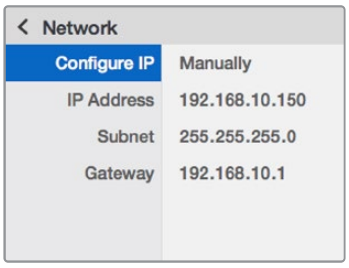


Use the ‘configure’ tab in Blackmagic Teranex Setup to change network settings via USB

Changing Network Settings using Teranex Mini Smart Panel

A useful feature of Teranex Mini Smart Panel is locally changing network settings. To do this:

1. Press the ‘menu’ button to open the settings menu.
2. Select ‘network’ using the rotary knob or 1 and 2 buttons, and press ‘set.’
3. Select ‘configure IP’ by using the rotary knob or 1 and 2 buttons, and press ‘set.’
4. Select ‘manually’ by using the rotary knob or 1 and 2 buttons, and press set. Then follow the same procedure to select ‘IP address.’
5. Use the rotary knob or 1 and 2 buttons to cycle through the available numbers for your IP address and confirm them by pressing ‘set.’ Repeat the procedure for ‘subnet’ and ‘gateway’ settings.

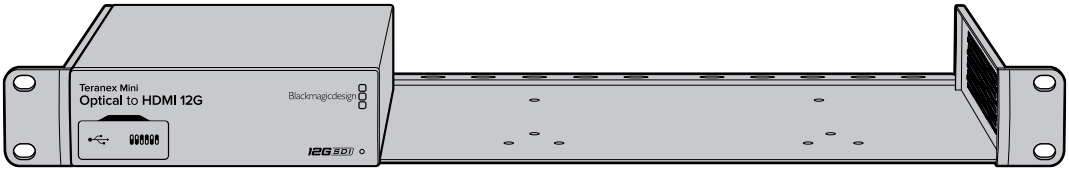


Use the network menu on Teranex Mini Smart Panel to change network settings on your mini coverter.

Teranex Mini Rack Shelf

If you're running multiple Teranex Minis, you can use Teranex Mini Rack Shelf to install your converters into a broadcast rack or road case. Up to three Teranex Minis can fit neatly onto each 1RU Teranex Mini Rack Shelf. Installing your converters into a Teranex Mini Rack Shelf is as easy as removing your converter's rubber feet, if installed, and screwing each converter into the base of the shelf using the mounting holes on bottom of your converters. The Teranex Mini Rack Shelf ships with two original blank panels which you can use to cover gaps if you don't need to install additional Teranex Minis.

For more information check the Blackmagic Design website at www.blackmagicdesign.com



Teranex Mini Models

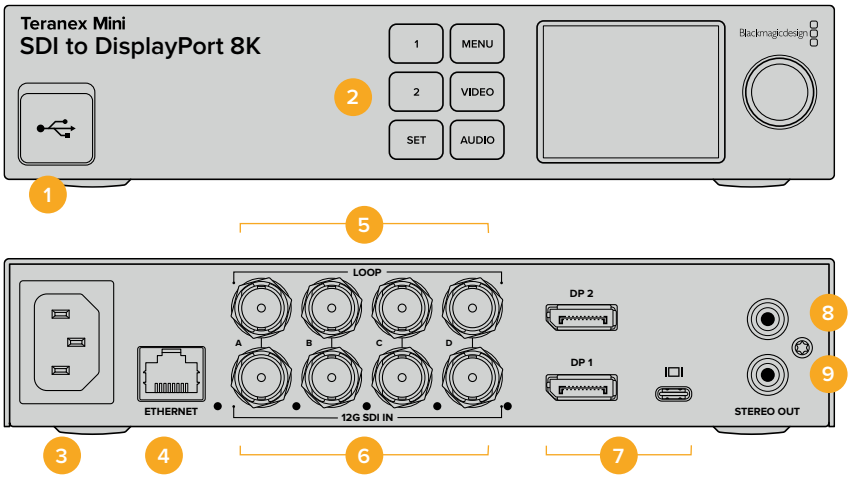
There is a broad range of Teranex Mini converters with specific features for each conversion type and different settings between models.

In the following sections in this manual, you can find the latest information for your Teranex Mini model including any new settings that may have been added in the latest version of your Teranex Mini's internal software.

Teranex Mini – SDI to DisplayPort 8K HDR

Teranex Mini SDI to DisplayPort 8K HDR converts 8K SDI signals to DisplayPort for connecting to DisplayPort monitors, televisions and projectors. It scales 8K SDI inputs to the native resolution of DisplayPort monitors that don't support 8K. Two on screen scopes can be overlaid on the DisplayPort output so you monitor the waveform, vectorscope, histogram or parade.

The monitor calibration feature helps you generate 3D LUTs for accurate reference monitoring on DisplayPort monitors. You can also load 3D LUTs for adding looks to your converted output.



Connectors

1 USB-C Port

Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software. Plug your monitor calibration probe into the USB-C port.

2 Front Panel

The LCD display shows important information, and you can use the control buttons and rotary knob to navigate settings menus.

3 Power

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

4 Ethernet

Connects to a network switch or computer so you can change settings using the Teranex setup utility. A white 'link' LED is to the right of the Ethernet port.

5 SDI Loop Out

SDI video loop output BNC connectors.

6 SDI In

Use these BNC connectors to plug in your SDI source video. A white LED to the right of each 'SDI IN' BNC connector indicates video input lock. 8K inputs can be quad square division or quad 2SI 12G-SDI up to 8Kp60 or dual link 12G-SDI up to 8Kp30 on SDI In A and B. HD and Ultra HD video up to 2160p60 can be input to SDI In A by single link 12G-SDI.

7 DisplayPort Outputs

Teranex SDI to DisplayPort 8K outputs to one monitor and has three DisplayPort connections for compatibly with 8K standards on a variety of monitors. DisplayPort 1 and DisplayPort 2 are full size DisplayPort connectors. The USB-C port is for DisplayPort over USB-C. It is important to note that this requires a certified DisplayPort over USB-C cable, which is different to a generic USB-C cable or a Thunderbolt cable.

When connecting your monitor to Teranex SDI to DisplayPort 8K, consult the specifications for your monitor. Most 8K monitors can use a single DisplayPort connection to DP1 or DisplayPort over USB-C. Some 8K monitors require a dual DisplayPort connection to the DP1 and DP2 connectors to show 8K content. Dual link high frame rate 8K content is shown in 8 bit color to be compatible with your DisplayPort monitor. For 4K or HD video, you can use DP1 or DisplayPort over USB-C.

8 **L – Analog**

Left channel analog audio output RCA connector.

9 **R – Analog**

Right channel analog audio output RCA connector.

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the front panel, plus additional settings. You can access these settings by moving between the ‘video’, ‘scopes’, audio’, ‘configure’ and ‘about’ tabs.

The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.

Blackmagic Teranex Setup lets you adjust settings such as DisplayPort instant lock to instantly resync the video signal when changing or routing sources, load 3D LUT files, changing the RCA analog audio output levels and more.

Video Tab

DisplayPort Instant Lock

Select this checkbox to enable DisplayPort instant lock so changing sources using the same format is clean and glitch free. When DisplayPort instant lock is enabled, the DisplayPort output signal is kept active even when changing sources. This means your converter does not have to wait for the DisplayPort television or monitor to lock before displaying the video output as the DisplayPort signal is already locked. It’s important to note that this feature only works when changing sources using the same video standard.

The DisplayPort instant lock feature can introduce a small delay in video and audio, so if you need zero delay in your converted output you can bypass the DisplayPort instant lock feature by deselecting the checkbox.

Clip to Legal Levels

‘Clip to legal levels’ describes the converter’s input range because DisplayPort monitors always display full range video. When ‘normal’ is selected, Teranex Mini SDI to DisplayPort 8K expands the input to match the monitor. If you select ‘show illegal’ the input range is sent to your monitor unexpanded.

Dynamic Range Override

This setting lets you select a color profile for your monitor, such as Rec. 709, or choose ‘auto’ to keep the original dynamic range of the source.

33 Point 3D LUT

Your Teranex Mini SDI to DisplayPort 8K HDR supports .cube 3D LUT files that can be created in any color correction software such as DaVinci Resolve. DaVinci Resolve can save color grades as 3D LUTs.

You can load two separate 3D LUTs by clicking on the 'load' button for each 3D LUT slot, selecting the desired .cube file from your computer, and clicking 'Open'. Click 'save' to confirm your settings. The 3D LUT filename will appear above each 'load' button so you know which 3D LUT is being used for 3D LUT 1 or 3D LUT 2.

To turn a 3D LUT on, simply click the 'use 3D LUT 1' or 'use 3D LUT 2' options. To turn the 3D LUT off, click the 'bypass 3D LUT' option.

TIP You can also enable a 3D LUT by pressing the 1 or 2 buttons on the unit's front panel. Press the buttons again to turn a 3D LUT off.

Bypass 3D LUT

Click on this button disable all 3D LUTs so the DisplayPort output does not have a 3D LUT applied.

Clear

Click on this button to remove 3D LUT 1 or 3D LUT 2 from your converter's internal memory.

Load

Click on the 'load' button to load a 3D LUT from your computer.

Save As

Click on the 'save as' button to save a loaded 3D LUT to a folder on your computer. After you generate a calibration 3D LUT, it is important to save it your computer.

What is a 3D LUT?

A 3D LUT, or '3D Lookup Table', is a file containing table of values that are used to modify the video colorspace to a new set of RGB values in a 3D cube space.

The color cube contains all the variations between the mix of each primary color, defined within three x, y, z spatial dimensions. This means the RGB channels in the SDI input video can be remapped to any other RGB output color in the DisplayPort video output.

This is very powerful as it means any color can be mapped to any other color so you can perform very precise color adjustments for calibrating displays, or loading log gamma curves for display when working with different types of raw camera files on set where you want to see linear gamma.

To show how powerful 3D LUTs can be, one of the default LUTs loaded can convert your input video to black and white. This shows that all the input RGB colors are remapped via the 3D LUT to black and white RGB output values via the DisplayPort output.

You can create your own 3D LUTs and upload them via the admin software and DaVinci Resolve even allows you to convert a color grade setting to a 3D LUT that you can then upload to your Teranex Mini SDI to DisplayPort 8K. The 3D LUT on the DisplayPort output is optional, and the SDI video loop output is a clean feed.

For more information on how to create a 3D LUT .cube file, refer to the DaVinci Resolve manual which you can download from the Blackmagic Design website at www.blackmagicdesign.com/support.

Scopes Tab

Configure Scope Overlays

Teranex Mini SDI to DisplayPort 8K can show up to two scopes as overlays on the footage on the DisplayPort output. In the ‘scopes’ menu, select the ‘large’ option to make a scope occupy 1/16 of the screen area, or select the ‘small’ option to set the scope size to 1/64 of the screen.

You can use Teranex Setup software to configure the scopes, or use the ‘scopes’ menu and rotary knob on the front panel. Options include scope types, size, horizontal and vertical position, background opacity and scope brightness. When you select the types of scopes, you can choose waveform, vectorscope 100%, vectorscope 75%, histogram, RGB parade or YUV parade. Note that the vectorscope is available only on scope 1.

Audio Tab

Set RCA Output

The ‘audio output’ settings let you adjust the gain for the left and right channel of analog audio together or independently. In the ‘stereo de-embed’ menu, select a pair of audio channels, such as channels 1 & 2, to output from the RCA ports.

Your Teranex Mini retains its last settings applied using the control panel or Teranex setup utility.

Disable the channel link icon if you want to decrease or increase the level of each channel independently.

Configure Audio Meter

The ‘audio meters’ option lets you select the type of audio meter to display. Choose from VU -18dBFS, VU -20dBFS, PPM -18dBFS or PPM -20dBFS reference levels.

Monitor Calibration Procedure

If you have a supported monitor and monitor calibration probe, you can use your Teranex Mini SDI to DisplayPort 8K HDR to generate a calibration 3D LUT for your DisplayPort monitor. Teranex Mini SDI to DisplayPort 8K supports Klein Instruments K10-A, SpectraCal C6 and X-Rite i1Display Pro. This process can allow you to display accurate color and luminance even on consumer DisplayPort televisions.

A calibration probe is a small device that contains a light sensor. When facing the screen of your monitor or television, the probe scans color and luminance data so your Teranex Mini can optimize the DisplayPort output for your monitor.

Display settings on your television, monitor, or computer's display settings will need to be adjusted in steps as you progress through the calibration process. It's very simple and doesn't take long. If at any time a mistake is made, you can easily select 'back' and repeat a step.

1 Optimizing Monitor Settings

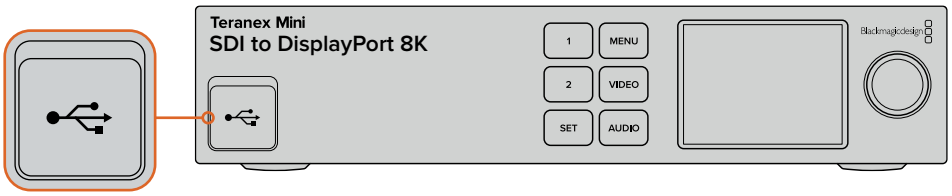
Before starting the calibration procedure, you will need to open your monitor or television's display settings and change a few settings.

1.1 In the settings for your monitor, switch off all options for dynamic contrast and brightness. Many TV manufacturers include a mode called motion smoothing, motion flow or motion interpolation. Please disable this mode.

1.2 Set the gamma to 2.4 for Rec. 709 or 2.6 for DCI-P3. These two color spaces are designed for standard home television viewing and digital cinema distribution, so your choice will depend on your project's delivery requirements. For example, if you are delivering to YouTube for home television viewing, set the gamma to 2.4. If monitoring for cinema distribution via DCP delivery, set the gamma to 2.6.

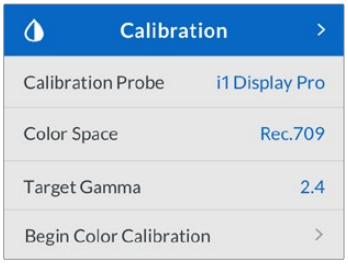
2 Connecting the Calibration Probe

Now that your monitor or television has its settings optimized for calibration, connect the calibration probe to your Teranex Mini SDI to DisplayPort 8K HDR's USB-C port. Lift the rubber dust cover to access the USB-C port.



3 Starting the Calibration Process

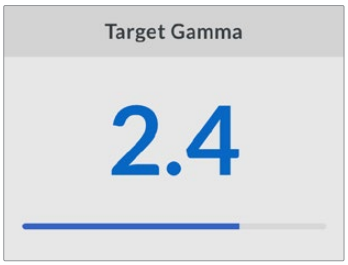
3.1 On the 'home' screen, press the 'menu' button. Use the rotary knob to scroll to the 'calibration' menu and press 'set'.



3.2 Press 'set' to see the list of supported calibration probes. Options are 'i1 Display Pro', 'SpectraCal C6' and 'Klein K-10-A'. Use the rotary knob to scroll through the list and highlight your probe, then press 'set' to confirm your selection.

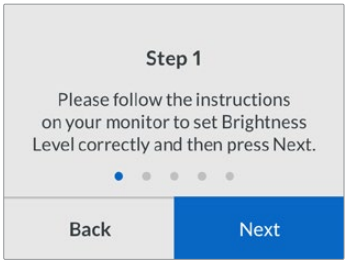
3.3 On the 'calibration' menu, use the rotary knob to highlight 'color space' and press 'set'. Select a color space based on your monitor type and press 'set'.

3.4 On the 'calibration' menu, scroll down to the 'target gamma' option and press 'set'. Specify the 'target gamma' value to match your monitor or TV and press 'set'. Gamma 2.4 is recommended for Rec. 709 and 2.6 is recommended for DCI-P3.

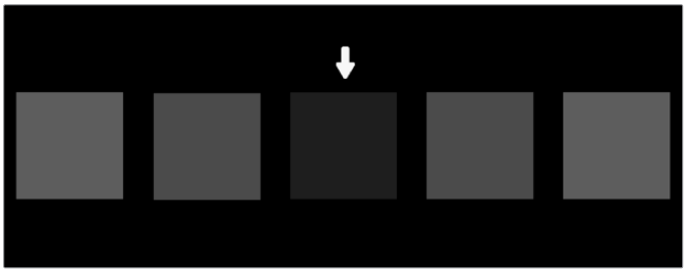


3.5 On the ‘calibration’ menu, scroll to ‘begin color calibration’ and press ‘set’.

3.6 This step adjusts your monitor’s brightness to show shadow detail without crushing the blacks. If your system doesn’t have an option to adjust the brightness, select ‘next’ and press ‘set’ to skip this step. Increase the brightness level so all the dark squares become visible. Decrease the brightness level so the indicated square just blends into the background. Press ‘next’ on your Teranex Mini SDI to DisplayPort 8K HDR.

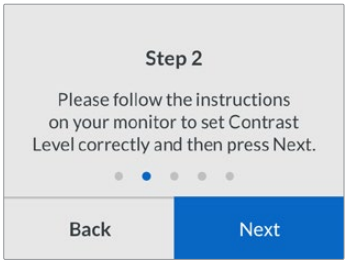


Brightness level calibration instructions on the LCD

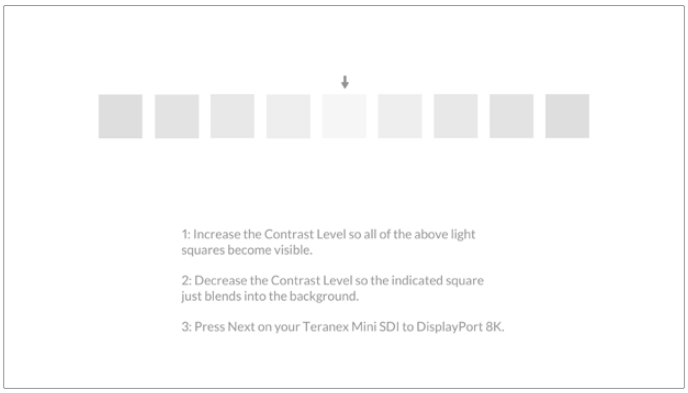


Test pattern on your DisplayPort monitor for calibrating shadow detail.

3.7 This step adjusts your monitor’s contrast to show highlight detail without clipping the whites. If your system doesn’t have an option to adjust the contrast, select ‘next’ and press ‘set’ to skip this step. Increase the contrast level so all the light squares become visible. Decrease the contrast level so the indicated square just blends into the background. Press ‘next’ on your Teranex Mini SDI to DisplayPort 8K HDR.



Contrast level calibration instructions on the Teranex LCD.



Test pattern on your DisplayPort monitor for calibrating highlight detail.

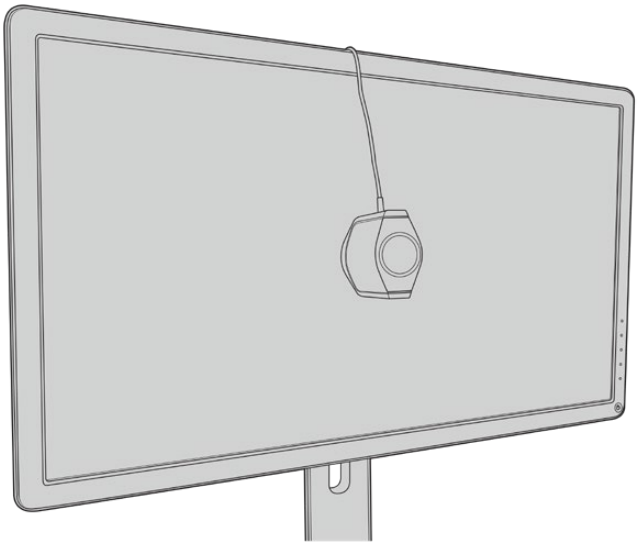
3.8 It's important to note that these two steps are repeated to verify your monitor's settings for brightness and contrast and make further fine adjustments if necessary.

3.9 The LCD on your Teranex Mini SDI to DisplayPort 8K HDR should say 'calibration probe detected'. Select 'choose' and press 'set'. The LCD shows a list of preconfigured spectral profiles of supported display types. Select a profile to match your display. If you are unsure or your screen type is not on the list, select 'generic'. Press 'set'.

If the status message on the Teranex LCD says 'no calibration probe detected', confirm your probe is a compatible model and is connected properly to the USB-C port on the front panel.

3.10 If your probe has a protective cover, remove it. Place the calibration probe in front of the monitor with the opening of the probe's sensor parallel to the screen and gently touching the middle of the white square displayed in the center of the screen.

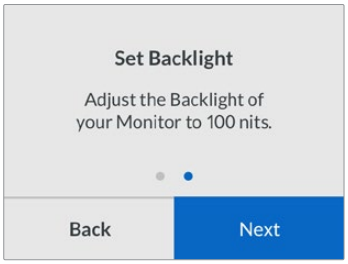
We recommend you stabilize the calibration probe with a small tripod or mounting method provided with the probe.



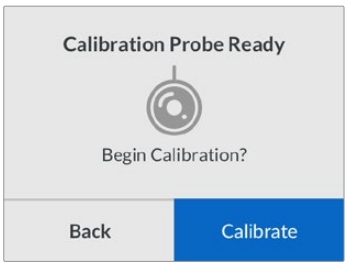
3.11 Consult the specifications in the manual for your monitor and use the monitor settings to select the widest color space setting available. Manufacturers use different terminology for this setting such as ‘native’, ‘extended’ or ‘wide’. This makes the 3D LUT fully and accurately cover the target color space you selected in the ‘color space’ menu.

3.12 A white test patch is shown so the probe can measure the color temperature of the display. Use your monitor’s display settings to set the color temperature so the reading is as close as possible to 6500K. Select ‘next’ and press ‘set’ to continue.

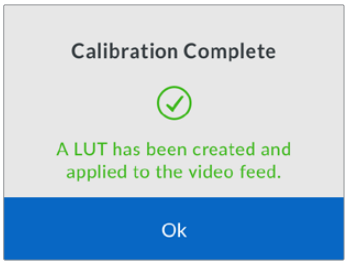
3.13 Your DisplayPort monitor now shows the luminous intensity of the test patch in nits. Use your monitor’s display settings to set its backlight or contrast so the reading is as close as possible to 100 nits for SDR or 400 nits for HDR. Select ‘next’ and press ‘set’.



3.14 When your Teranex Mini SDI to DisplayPort 8K HDR says ‘calibration probe ready’, select ‘Calibrate’ and press ‘set’ to start the automated color calibration sequence.



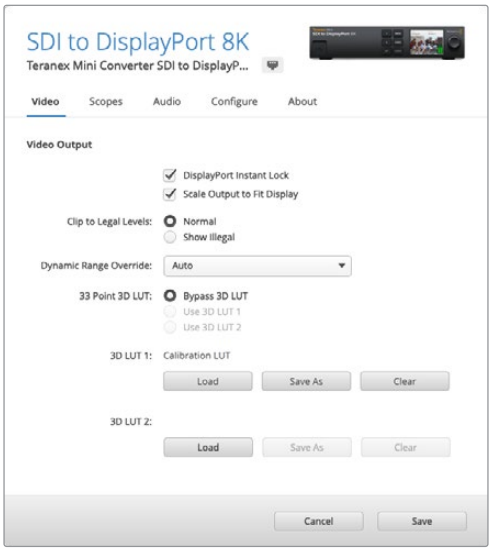
3.15 The calibration process takes 10-15 minutes. Teranex Mini SDI to DisplayPort 8K HDR generates and measures a wide range of colors at varying luminance values, comparing the measured results against the expected values. When the procedure concludes, it generates a calibration 3D LUT and shows a confirmation message.



Press ‘set’ to return to the ‘calibration’ menu. Press ‘menu’ to return to the home screen.

The generated 3D LUT is assigned ‘3D LUT 1’ and enabled. By default, the 3D LUT is named ‘calibration LUT’.

NOTE This 3D LUT is stored in your converter’s internal memory, and we recommend you use Blackmagic Teranex Setup to save it to your computer. For more information on how to manage 3D LUTS, see the ‘Blackmagic Teranex Setup Settings’ section.



The monitor calibration 3D LUT is always assigned to ‘3D LUT 1’ by default.

Control Panel Settings

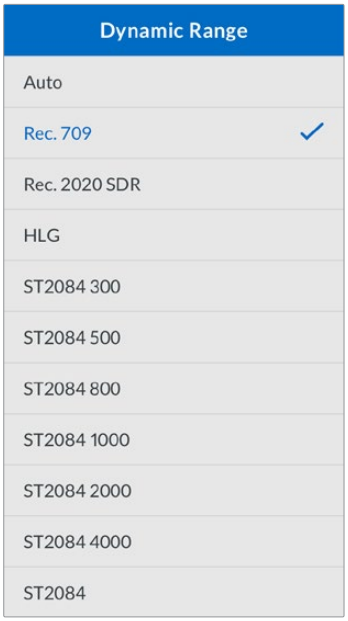
The ‘home’ screen shows a video preview of the SDI input with format and frame rate information.

The LCD menu lets you change settings for ‘video’, ‘audio output’, ‘scopes’, ‘network’, ‘calibration’ and ‘setup’. Keep reading for information about each setting.

Video Menu

The ‘video’ menu has options for ‘dynamic range’, ‘DisplayPort instant lock’ and ‘clip to legal levels’.

‘Dynamic range’ lets you select a color profile for your monitor, such as Rec. 709.



DisplayPort instant lock keeps the DisplayPort signal active when changing sources so the converter does not have to wait for the DisplayPort television or monitor to lock before displaying the video output.

‘Clip to legal levels’ describes the converter’s input range because DisplayPort monitors always display full range video. When ‘normal’ is selected, Teranex Mini SDI to DisplayPort 8K expands the input to match the monitor. If you select ‘show illegal’ the input range is sent to your monitor unexpanded.

Display Menu

The ‘display’ menu has settings for ‘scale to fit’, ‘brightness’, ‘contrast’ and ‘preset’.

‘Scale to fit’ scales the input resolution to the native resolution of the monitor to display it full screen. When ‘scale to fit’ is switched off, the monitor displays a pixel for pixel representation of the input. For example, if you send HD or 4K video to Teranex Mini SDI to DisplayPort 8K and output to an 8K monitor, you can scale up the video to fill the screen. If you switch off ‘scale to fit’, the video is presented at its original resolution in the middle of the screen and surrounded by a black border.

‘Brightness’ and ‘contrast’ settings, when available, let you adjust shadow detail and highlight detail.

‘Preset’ options are available for Apple Pro Display XDR and include a range of display profiles.

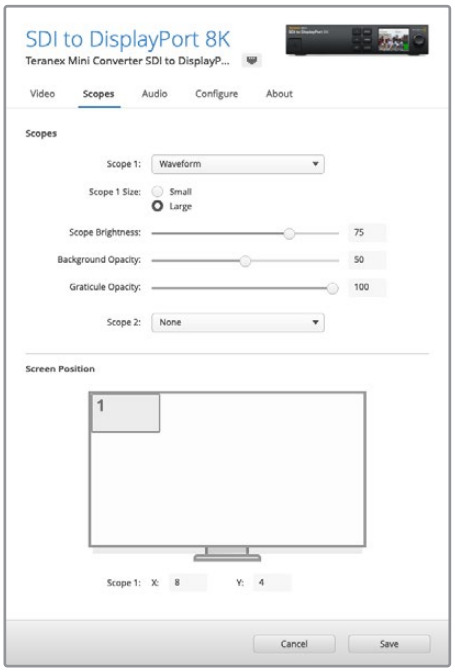
Audio Menu

The ‘audio’ menu lets you select a stereo pair of channels to de-embed and adjust the gain.

Scopes Menu

The ‘scopes’ menu lets you enable one or two scope overlays. You can set the type of scopes, as well as their size, position, brightness and the opacity of the scope background and graticule. When you select the types of scopes, you can choose waveform, vectorscope 100%, vectorscope 75%, histogram, RGB parade or YUV parade.

The front panel gives you access to the same settings provided in the Blackmagic Teranex Setup utility.



Network Menu

The ‘network’ menu configures Teranex Mini SDI to DisplayPort 8K to connect and communicate on your LAN. For more information, see the ‘Changing Network Settings using Teranex Mini Smart Panel’ section.

Calibration Menu

The ‘calibration’ menu is for initiating and controlling the monitor calibration process. For more information see the ‘monitor calibration procedure’ section.

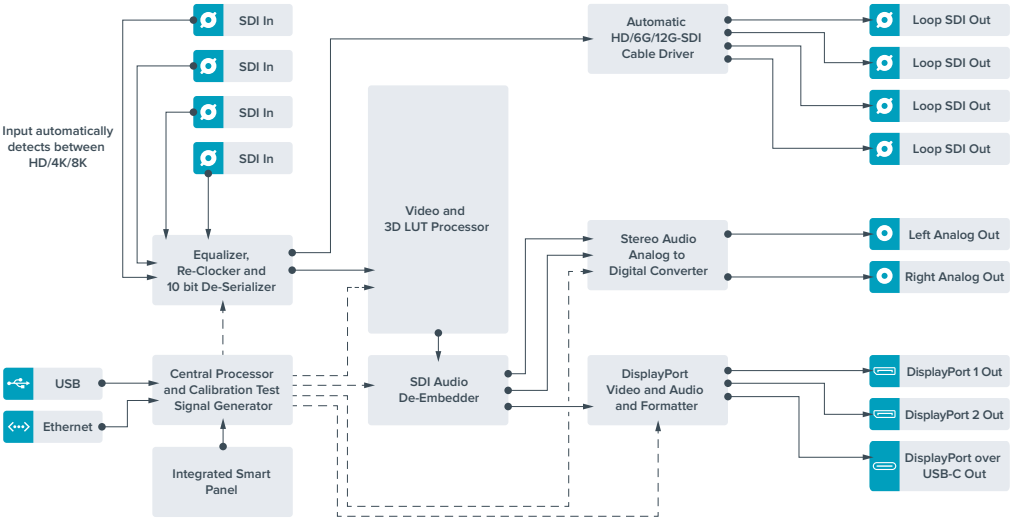
Setup Menu

The ‘setup’ menu lets you configure audio and set the language for the LCD menus.
The ‘audio meters’ menu lets you select the type of audio meter to display. Choose from VU -18dBFS, VU -20dBFS, PPM -18dBFS or PPM -20dBFS reference levels. You can use the ‘language’ menu to select the language for menus on the control panel LCD. Teranex Mini SDI to DisplayPort 8K supports 11 popular languages: English, Chinese, Japanese, Korean, Spanish, German, French, Russian, Italian, Portuguese and Turkish. The language menu also appears on initial start up.

Warnings Menu

If your monitor sends a warning to Teranex Mini SDI to DisplayPort 8K, a warning icon appears on the LCD on the front panel. If you see the warning icon, go to the ‘warnings’ menu for more information.

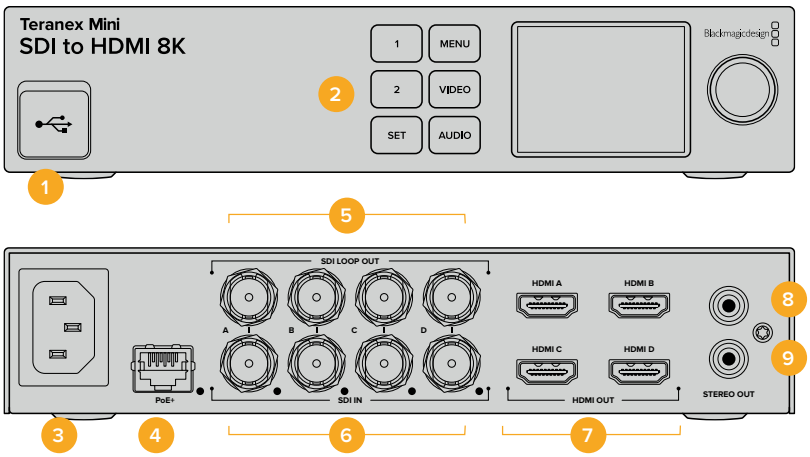
Teranex Mini – SDI to DisplayPort 8K Block Diagram



Teranex Mini – SDI to HDMI 8K HDR

Teranex Mini SDI to HDMI 8K HDR converts 8K SDI signals to HDMI for connecting to 8K HDMI monitors, televisions and projectors. Two on screen scopes can be overlaid on the HDMI output so you monitor the waveform, vectorscope, histogram or parade.

The monitor calibration feature helps you generate 3D LUTs for accurate reference monitoring on HDMI televisions. You can also load 3D LUTs for adding looks to your converted output.



Connectors

1 USB-C Port

Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software. Plug your monitor calibration probe into the USB-C port.

2 Front Panel

The LCD display shows important information, and you can use the control buttons and rotary knob to navigate settings menus.

3 Power

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

4 Ethernet PoE+

Connects to a network switch or computer so you can change settings using the Teranex setup utility. A white 'link' LED is to the right of the Ethernet port. The Ethernet port also supports Power over Ethernet Plus.

5 SDI Loop Out

SDI video loop output BNC connectors.

6 SDI In

Use these BNC connectors to plug in your SDI source video. A white LED to the right of each 'SDI IN' BNC connector indicates video input lock. 8K inputs can be quad square division or quad 2SI 12G-SDI up to 8Kp60 or dual link 12G-SDI up to 8Kp30 on SDI In A and B. HD and Ultra HD video up to 2160p60 can be input to SDI In A by single link 12G-SDI.

7 HDMI Out

HDMI outputs support quad square division HDMI in 8K. HD and Ultra HD video up to 2160p60 is sent from HDMI A. If you have an HD or Ultra HD monitor or TV connected to the HDMI A output and an Ultra HD or 8K input, the source video is automatically frame rate converted and down scaled to HD or Ultra HD to match the capabilities of your display. Frame rate conversion is a factor of the source frame rate, for example 60 to 30 frames per second or 59.94 to 29.97 frames per second.

8 **L – Analog**

Left channel analog audio output RCA connector.

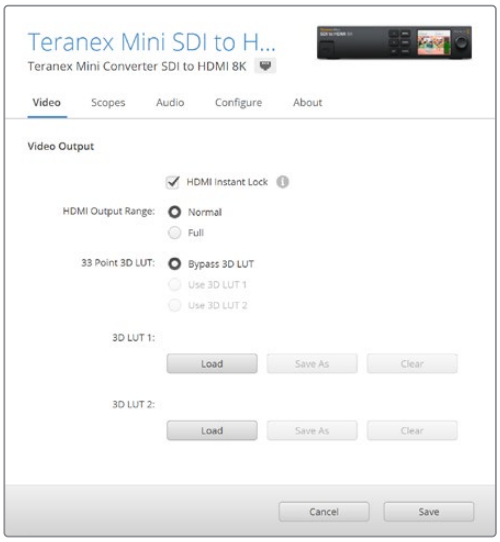
9 **R – Analog**

Right channel analog audio output RCA connector.

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the front panel, plus additional settings. You can access these settings by moving between the ‘video’, ‘scopes’, audio’, ‘configure’ and ‘about’ tabs.

The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.



Blackmagic Teranex Setup lets you adjust settings such as HDMI instant lock to instantly resync the video signal when changing or routing sources, load 3D LUT files, change the RCA analog audio output levels and more.

Video Output Tab

HDMI Instant Lock

Select this checkbox to enable HDMI instant lock so changing sources using the same format is clean and glitch free. When HDMI instant lock is enabled, the HDMI output signal is kept active even when changing sources. This means your converter does not have to wait for the HDMI television or monitor to lock before displaying the video output as the HDMI signal is already locked. It’s important to note that this feature only works when changing sources using the same video standard.

The HDMI instant lock feature can introduce a small delay in video and audio, so if you need zero delay in your converted output you can bypass the HDMI instant lock feature by deselecting the checkbox.

HDMI Output Range

This option controls the HDMI output so it stays within HDMI legal levels and should be kept on by default. Select 'normal' to set the HDMI output to legal limits.

33 Point 3D LUT

Your Teranex Mini SDI to HDMI 8K HDR supports .cube 3D LUT files that can be created in any color correction software such as DaVinci Resolve. DaVinci Resolve can save color grades as 3D LUTs.

You can load two separate 3D LUTs by clicking on the 'load' button for each 3D LUT slot, selecting the desired .cube file from your computer, and clicking 'Open'. Click 'save' to confirm your settings. The 3D LUT filename will appear above each 'load' button so you know which 3D LUT is being used for 3D LUT 1 or 3D LUT 2.

To turn a 3D LUT on, simply click the 'use 3D LUT 1' or 'use 3D LUT 2' options. To turn the 3D LUT off, click the 'bypass 3D LUT' option.

TIP You can also enable a 3D LUT by pressing the 1 or 2 buttons on the unit's front panel. Press the buttons again to turn a 3D LUT off.

Bypass 3D LUT

Click on this button disable all 3D LUTs so the HDMI output does not have a 3D LUT applied.

Clear

Click on this button to remove 3D LUT 1 or 3D LUT 2 from your converter's internal memory.

Load

Click on the 'load' button to load a 3D LUT from your computer.

Save As

Click on the 'save as' button to save a loaded 3D LUT to a folder on your computer. After you generate a calibration 3D LUT, it is important to save it your computer.

What is a 3D LUT?

A 3D LUT, or '3D Lookup Table', is a file containing table of values that are used to modify the video colorspace to a new set of RGB values in a 3D cube space.

The color cube contains all the variations between the mix of each primary color, defined within three x, y, z spatial dimensions. This means the RGB channels in the SDI input video can be remapped to any other RGB output color in the HDMI video output.

This is very powerful as it means any color can be mapped to any other color so you can perform very precise color adjustments for calibrating displays, or loading log gamma curves for display when working with different types of raw camera files on set where you want to see linear gamma.

To show how powerful 3D LUTs can be, one of the default LUTs loaded can convert your input video to black and white. This shows that all the input RGB colors are remapped via the 3D LUT to black and white RGB output values via the HDMI output.

You can create your own 3D LUTs and upload them via the admin software and DaVinci Resolve even allows you to convert a color grade setting to a 3D LUT that you can then upload to your Teranex Mini SDI to HDMI 8K. The 3D LUT on the HDMI output is optional, and the SDI video loop output is a clean feed.

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Scopes Tab

Configure Scope Overlays

Teranex Mini SDI to HDMI 8K can show up to two scopes as overlays on the footage on the HDMI outputs. In the ‘scopes’ menu, select the ‘large’ option to make a scope occupy 1/16 of the screen area, or select the ‘small’ option to set the scope size to 1/64 of the screen.

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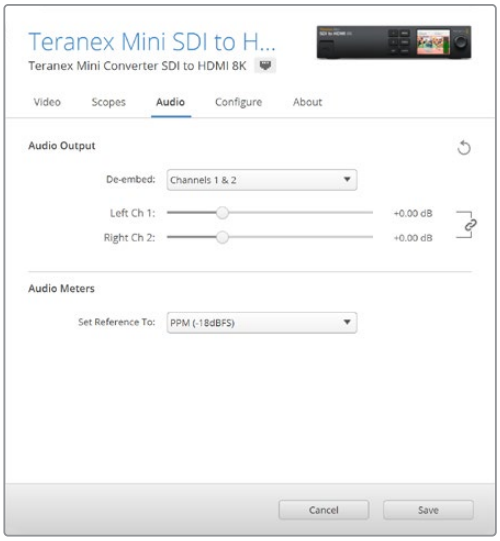

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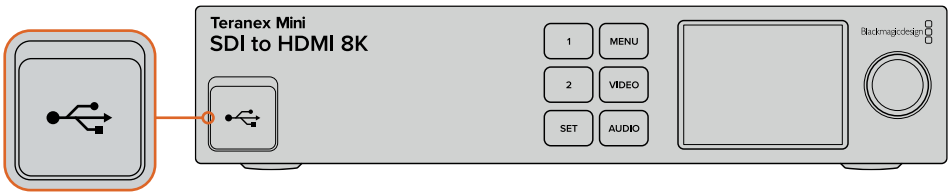
1.2 Set the gamma to 2.4 for Rec. 709 or 2.6 for DCI-P3. These two color spaces are designed for standard home television viewing and digital cinema distribution, so your choice will depend on your project's delivery requirements. For example, if you are delivering to YouTube for home television viewing, set the gamma to 2.4. If monitoring for cinema distribution via DCP delivery, set the gamma to 2.6.

2 Connecting the Calibration Probe

Now that your monitor or television has its settings optimized for calibration, connect the calibration probe to your Teranex Mini SDI to HDMI 8K HDR's USB-C port. Lift the rubber dust cover to access the USB-C port.



3 Starting the Calibration Process

3.1 On the 'home' screen, press the 'menu' button. Use the rotary knob to scroll to the 'color calibration' menu and press 'set'.

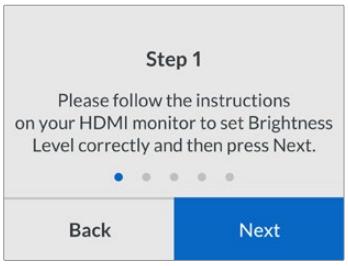
3.2 Press 'set' to see the list of supported calibration probes. Options are 'i1 Display Pro', 'SpectraCal C6' and 'Klein K-10-A'. Use the rotary knob to scroll through the list and highlight your probe, then press 'set' to confirm your selection.

3.3 On the 'color calibration' menu, use the rotary knob to highlight 'color space' and press 'set'. Select a color space based on your monitor type and press 'set'.

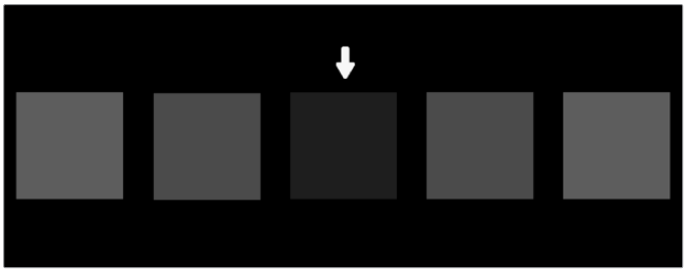
3.4 On the 'color calibration' menu, scroll down to the 'target gamma' option and press 'set'. Specify the 'target gamma' value to match your monitor or TV and press 'set'. Gamma 2.4 is recommended for Rec. 709 and 2.6 is recommended for DCI-P3.

3.5 On the ‘color calibration’ menu, scroll to ‘begin color calibration’ and press ‘set’.

3.6 This step adjusts your monitor’s brightness to show shadow detail without crushing the blacks. Increase the brightness level so all the dark squares become visible. Decrease the brightness level so the indicated square just blends into the background. Press ‘next’ on your Teranex Mini SDI to HDMI 8K HDR.

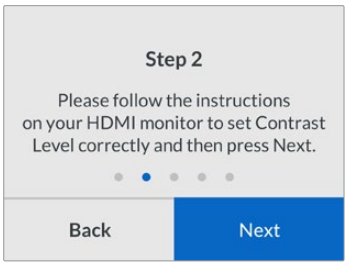


Brightness level calibration instructions on the LCD

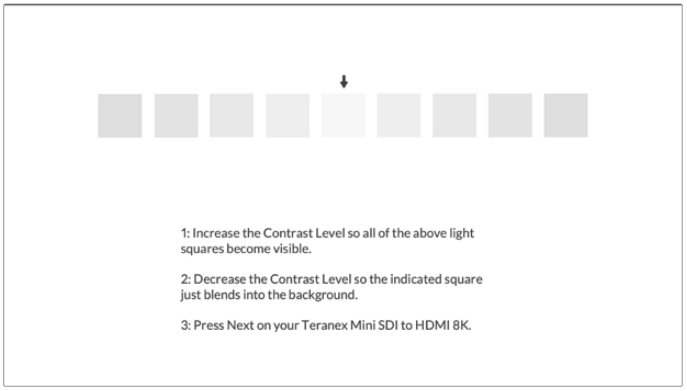


Test pattern on your HDMI monitor for calibrating shadow detail.

3.7 This step adjusts your monitor’s contrast to show highlight detail without clipping the whites. Increase the contrast level so all the light squares become visible. Decrease the contrast level so the indicated square just blends into the background. Press ‘next’ on your Teranex Mini SDI to HDMI 8K HDR.



Contrast level calibration instructions on the Teranex LCD.

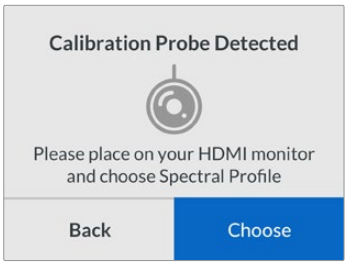


Test pattern on your HDMI monitor for calibrating highlight detail.

3.8 It's important to note that these two steps are repeated to verify your monitor's settings for brightness and contrast and make further fine adjustments if necessary.

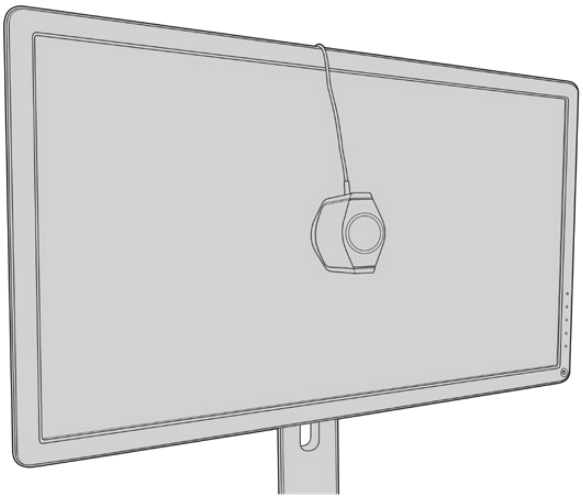
3.9 The LCD on your Teranex Mini SDI to HDMI 8K HDR should say 'calibration probe detected'. Select 'choose' and press 'set'. The LCD shows a list of preconfigured spectral profiles of supported display types. Select a profile to match your display. If you are unsure or your screen type is not on the list, select 'generic'. Press 'set'.

If the status message on the Teranex LCD says 'no calibration probe detected', confirm your probe is a compatible model and is connected properly to the USB-C port on the front panel.



3.10 If your probe has a protective cover, remove it. Place the calibration probe in front of the monitor with the opening of the probe's sensor parallel to the screen and gently touching the middle of the white square displayed in the center of the screen.

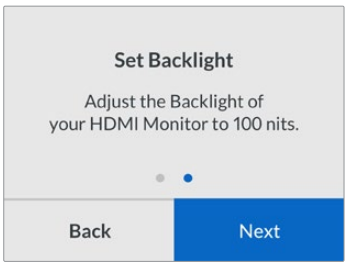
We recommend you stabilize the calibration probe with a small tripod or mounting method provided with the probe.



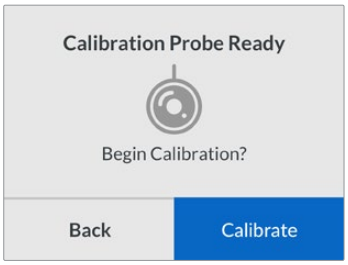
3.11 Consult the specifications in the manual for your monitor and use the monitor menu to select the widest color space setting available. Manufacturers use different terminology for this setting such as 'native', 'extended' or 'wide'. This makes the 3D LUT fully and accurately cover the target color space you selected in the 'color space' menu.

3.12 A white test patch is shown so the probe can measure the color temperature of the display. Use your monitor's menu to set the color temperature so the reading is as close as possible to 6500K. Select 'next' and press 'set' to continue.

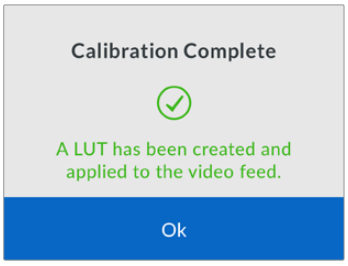
3.13 Your HDMI monitor now shows the luminous intensity of the test patch in nits. Use your monitor's menu to set its backlight or contrast so the reading is as close as possible to 100 nits for SDR or 400 nits for HDR. Select 'next' and press 'set'.



3.14 When your Teranex Mini SDI to HDMI 8K HDR says ‘calibration probe ready’, select ‘Calibrate’ and press ‘set’ to start the automated color calibration sequence.



3.15 The calibration process takes 10-15 minutes. Teranex Mini SDI to HDMI 8K HDR generates and measures a wide range of colors at varying luminance values, comparing the measured results against the expected values. When the procedure concludes, it generates a calibration 3D LUT and shows a confirmation message.



Press ‘set’ to return to the ‘color calibration’ menu. Press ‘menu’ to return to the home screen.

The generated 3D LUT is assigned ‘3D LUT 1’ and enabled. By default, the 3D LUT is named ‘calibration LUT’.

NOTE This 3D LUT is stored in your converter’s internal memory, and we recommend you use Blackmagic Teranex Setup to save it to your computer. For more information on how to manage 3D LUTS, see the ‘Blackmagic Teranex Setup Settings’ section.

The monitor calibration 3D LUT is always assigned to '3D LUT 1' by default.

Control Panel Settings

The 'home' screen shows a video preview of the SDI input with format and frame rate information.

The LCD menu lets you change settings for 'video', 'audio output', 'scopes', 'network', 'color calibration' and 'setup'. Keep reading for information about each setting.

Video Menu

The 'video' menu has options for 'HDMI instant lock' and 'HDMI output range'. HDMI instant lock keeps the HDMI signal active when changing sources so the converter does not have to wait for the HDMI television or monitor to lock before displaying the video output. HDMI output range keeps the output within HDMI legal levels.

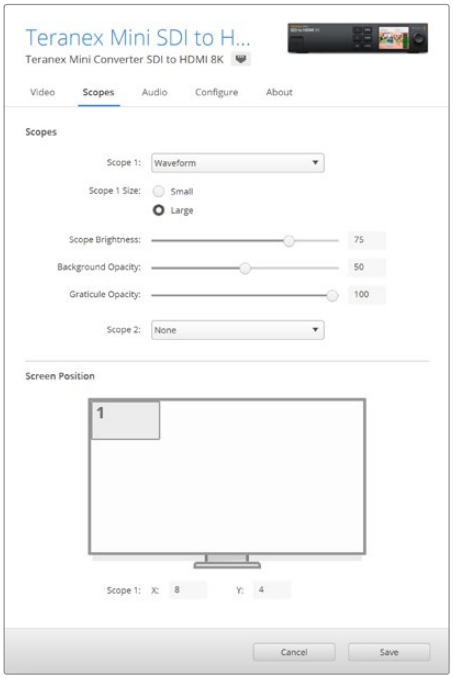
Audio Output Menu

The 'audio output' menu lets you select a stereo pair of channels to de-embed and adjust the gain.

Scopes Menu

The 'scopes' menu lets you enable one or two scope overlays. You can set the type of scopes, as well as their size, position, brightness and the opacity of the scope background and graticule. When you select the types of scopes, you can choose waveform, vectorscope 100%, vectorscope 75%, histogram, RGB parade or YUV parade.

The front panel gives you access to the same settings provided in the Blackmagic Teranex Setup utility.



Network Menu

The ‘network’ menu configures Teranex Mini SDI to HDMI 8K to connect and communicate on your LAN. For more information, see the ‘Changing Network Settings using Teranex Mini Smart Panel’ section.

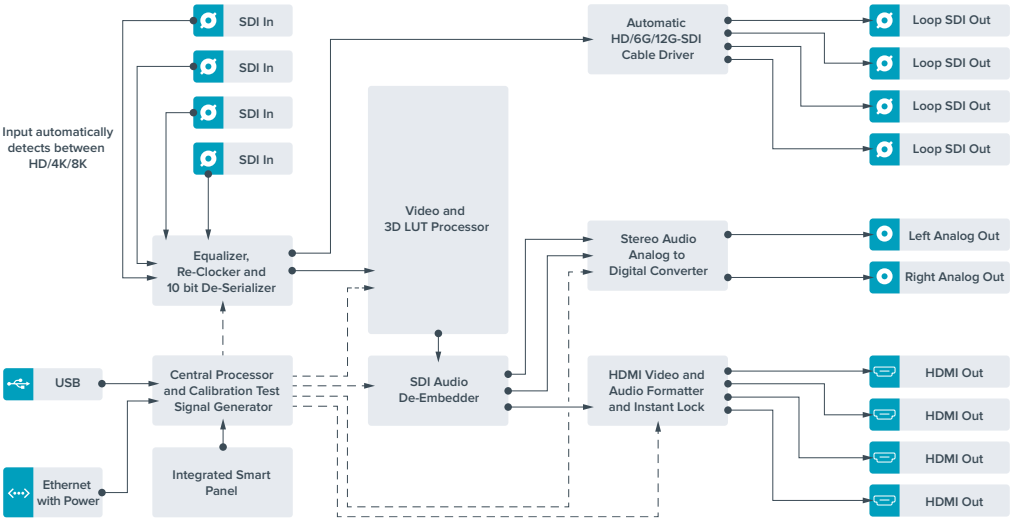
Color Calibration Menu

The ‘color calibration’ menu is for initiating and controlling the monitor calibration process. For more information see the ‘monitor calibration procedure’ section.

Setup Menu

The ‘setup’ menu lets you configure audio. The ‘audio meters’ menu lets you select the type of audio meter to display. Choose from VU -18dBFS, VU -20dBFS, PPM -18dBFS or PPM -20dBFS reference levels.

Teranex Mini – SDI to HDMI 8K Block Diagram



Teranex Mini – IP Video 12G

If you are looking for information on the installation and operation of Blackmagic Teranex Mini IP Video 12G, refer to the Blackmagic Teranex Mini IP Video 12G manual which can be downloaded from www.blackmagicdesign.com/support.

Teranex Mini – SDI to HDMI 12G

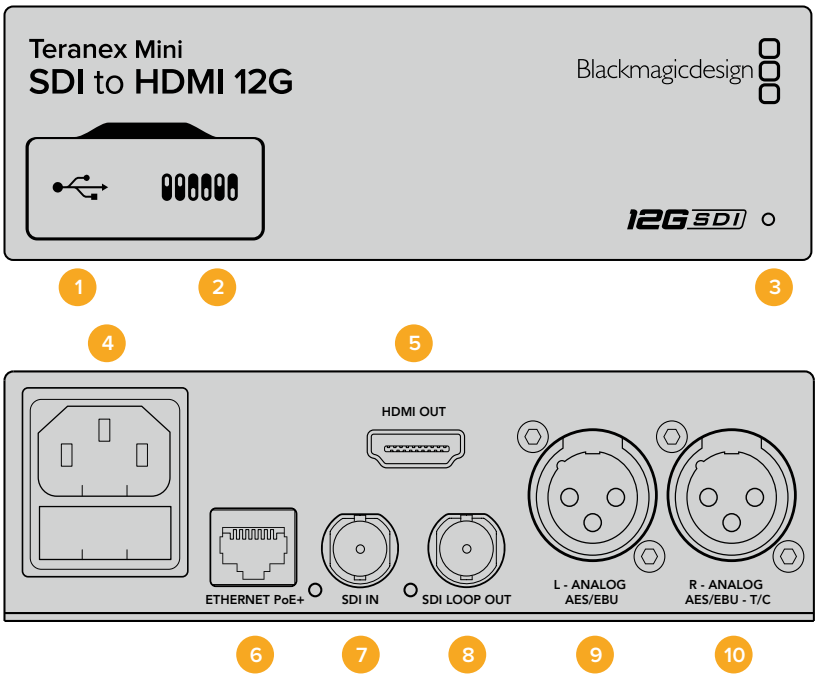
Your Teranex Mini – SDI to HDMI 12G model can be used to connect a huge range of HDMI displays and video projectors to SDI video equipment. Your converter automatically switches between SD SDI, HD-SDI, 3G-SDI, 6G-SDI and 12G-SDI input sources and converts to HDMI with embedded audio, plus balanced AES/EBU or analog audio out. The 'R analog' XLR connector can also be set to output timecode.

The HDMI instant lock feature lets you lock the HDMI output so that changing sources using the same format is clean and glitch free. If your converter detects a HD monitor or TV connected to the HDMI output and has Ultra HD connected to the SDI input, the Ultra HD source will be automatically down converted so you can view the Ultra HD source on an HD monitor.

You can also load 3D LUTs for adding looks, grades, and color profiles to your converted output. The 3D LUT is a full 33 point hardware lookup table for greater accuracy with color manipulation and can even be used to accurately color calibrate consumer televisions so they can be used for critical color correction work.

The 3D LUT also allows color space conversions so different color spaces can be used with various displays.

Your Teranex Mini – SDI to HDMI 12G comes with two default LUTs, including color to monochrome and Blackmagic camera default color space to Rec. 709.



Connectors

1. **Mini-B USB Port**
   Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2. **Switches**
   Adjustable switches for changing settings.

3. **LED Status Indicator**
   Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4. **Power**
   Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5. **HDMI**
   HDMI video output.

6. **Ethernet PoE+**
   Connects to a network switch or computer so you can change settings using the Teranex setup utility. The Ethernet port also supports power over Ethernet plus.

7. **SDI In**
   SDI video input BNC connector.

8. **SDI Loop Out**
   SDI video loop output BNC connector.

9. **L – Analog or AES/EBU**
   Balanced left channel analog audio, or digital AES/EBU audio output XLR connector.

10. **R – Analog, AES/EBU or Timecode**
    Balanced right channel analog audio, or digital AES/EBU audio output XLR connector. Can also be configured for timecode output.

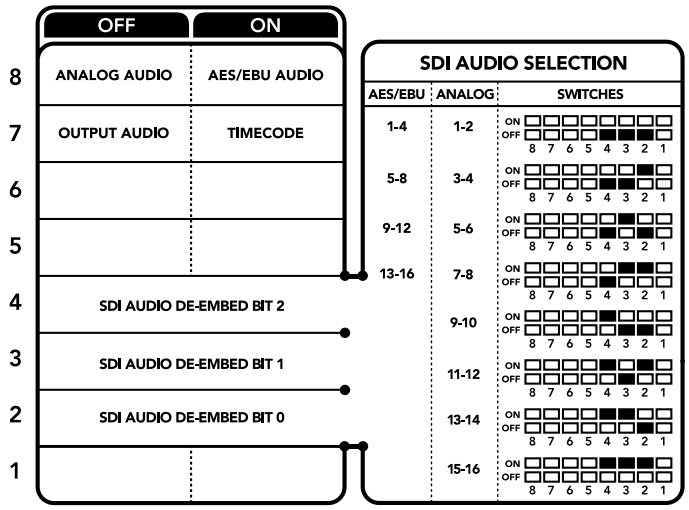
Switches

Teranex Mini – SDI to HDMI 12G's switches provide the following settings:

Switch 8 – Analog Audio, AES/EBU Audio
Set switch 8 to 'off' to output balanced analog audio. Set to 'on' for digital AES/EBU audio.

Switch 7 – Output Audio/Timecode
Set switch 7 to 'on' to output timecode via the R channel audio XLR connector. Set to 'off' to output audio.

Switches 4, 3, 2 – SDI Audio De-Embed Bit 2, 1, 0
Switches 4, 3 and 2 are represented as bits 2, 1, and 0 respectively. This simply means that by setting various on/off combinations for switches 4, 3, and 2, you can choose which pair of audio channels from your SDI input you would like to output to HDMI, analog or AES/EBU audio.

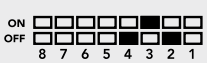


The switch legend on the base of your converter gives you all the information you need to change conversion settings.

SDI Audio Selection Table

By using the following combinations of switch settings, you can select which SDI audio channels to embed into your Teranex Mini – SDI to HDMI 12G's output signal.

Analog Audio Channels	Switch 4	Switch 3	Switch 2	Switch Diagram
1 and 2	OFF	OFF	OFF	
3 and 4	OFF	OFF	ON	
5 and 6	OFF	ON	OFF	
7 and 8	OFF	ON	OFF	
9 and 10	ON	OFF	OFF	
11 and 12	ON	OFF	ON	
13 and 14	ON	ON	OFF	
15 and 16	ON	ON	ON	

AES/EBU Audio Channels	Switch 4	Switch 3	Switch 2	Switch Diagram
1-4	OFF	OFF	OFF	
5-8	OFF	OFF	ON	
9-12	OFF	ON	OFF	
13-16	OFF	ON	ON	

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings. You can access these settings by moving between the 'video,' 'audio,' 'configure,' and 'about' tabs.

The 'about' and 'configure' tabs are detailed in the 'changing settings' section in this manual. The 'video' tab for Teranex Mini – SDI to HDMI 12G contains the following settings.

Video Output Menu

Clip HDMI Output to Legal Levels

This checkbox controls clipping of your SDI input to ensure that it stays within HDMI legal levels and should be kept on by default.

HDMI Instant Lock

Select this checkbox to enable the HDMI instant lock feature. When HDMI instant lock is enabled, the HDMI output signal is kept active even when changing sources. This means your converter does not have to wait for the HDMI television or monitor to lock before displaying the video output as the HDMI signal is already locked. It's important to note that this feature only works when changing sources using the same video standard.

The HDMI instant lock feature can introduce a small delay in video and audio, so if you need zero delay in your converted output you can bypass the HDMI instant lock feature by deselecting the checkbox.

33 Point 3D LUT

Your Blackmagic Teranex Mini – SDI to HDMI 12G supports .cube LUT files that can be created using DaVinci Resolve software, or other color correction software that can export .cube files.

You can load 2 separate LUTs by clicking on the 'load' button for each LUT slot, selecting the desired .cube file from your computer, and clicking 'OK'. Click 'save' to confirm your settings. The LUT filename will appear next to each 'load' button so you know which LUT is being used for LUT 1 or LUT 2.

To turn a LUT on, simply click the 'use LUT 1' or 'use LUT 2' checkboxes. To turn the LUT off, click the 'bypass LUT' checkbox.

The 3D LUT can also be applied to your converter's loop output by checking the 'enable 3D LUT on loop SDI output' checkbox. If you don't want the LUT applied to the loop output simply deselect the checkbox.

If you have a Smart Panel installed, you can easily enable a LUT by pressing the 1 or 2 control panel buttons. Press the buttons again to turn a LUT off.

What is a 3D LUT?

A 3D LUT, or '3D Lookup Table', is a file containing table of values that are used to modify the video colorspace to a new set of color values in a 3D cube space.

The color cube contains all the variations between the mix of each primary color, defined within three x, y, z spatial dimensions. This means the RGB channels in the SDI input video can be remapped to any other RGB output color in the HDMI video output. This is very powerful as it means any color can be mapped to any other color so you can perform very precise color adjustments for calibrating displays, or loading log gamma curves for display when working with different types of raw camera files on set where you want to see linear gamma.

To show how powerful 3D LUTs can be, one of the default LUTs loaded can convert your input video to black and white. This shows that all the input RGB colors are remapped via the 3D LUT to black and white RGB output values via the HDMI output. You can create your own 3D LUTs and upload them via the admin software and DaVinci Resolve even allows you to convert a color grade setting to a 3D LUT that you can then upload to your Teranex Mini – SDI to HDMI 12G. You can output the 3D LUT on the SDI video loop output so you could even use your Teranex Mini as a dedicated 3D LUT color processor even if you don't use the HDMI output!

For more information on how to create a 3D LUT .cube file, refer to the DaVinci Resolve manual which you can download from the Blackmagic Design website at www.blackmagicdesign.com/support.

The 'audio' tab for Teranex Mini – SDI to HDMI 12G contains the following settings.

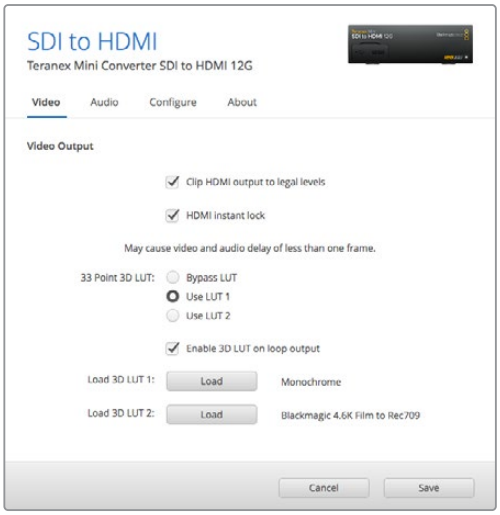
Audio Output Menu

Set XLR Output

You can choose between analog and AES/EBU output by highlighting the 'analog,' 'AES/EBU,' or 'timecode' buttons in the 'audio output' menu. When you select 'timecode' the left XLR connector will output analog audio, while the right XLR output will provide a timecode signal.

Depending on which audio output option you select, you can then pick which audio channels of your SDI input to send to your HDMI, AES/EBU, or Analog audio output, as well as adjusting their gain per channel or channel pair. If you are outputting AES/EBU audio via both XLR connectors, you can select up to four channels. If you are outputting analog audio, you can select up to two channels. If you are using the right XLR connector to output a timecode signal, the left XLR connector will output one channel of analog audio.

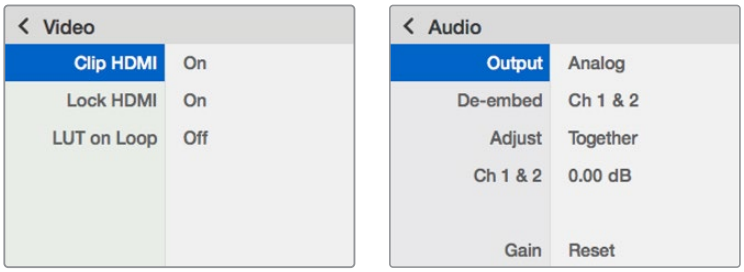
Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter's settings via software, you may need to toggle individual switches for new settings to take effect.



Blackmagic Teranex Setup lets you adjust settings such as HDMI instant lock to instantly resync the video signal when changing or routing sources, load 3D LUT files, change the XLR analog audio output levels, and more.

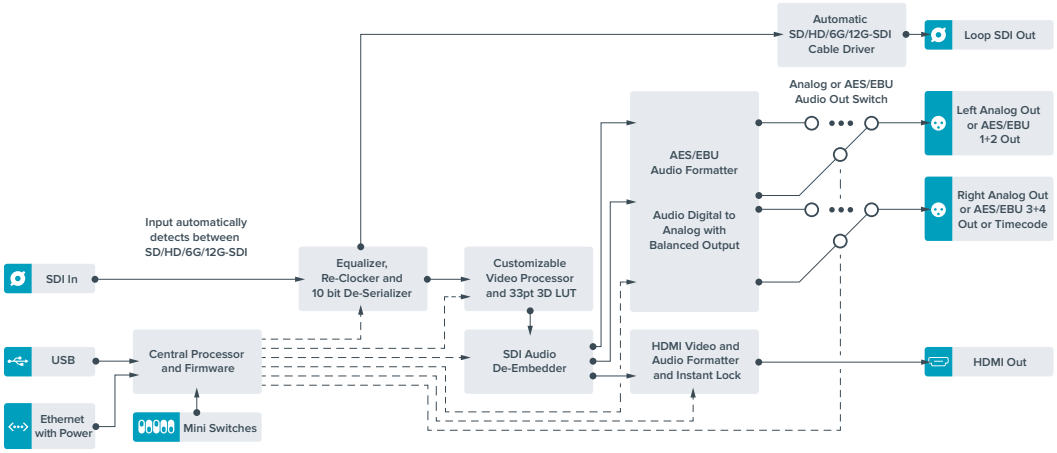
Teranex Mini Smart Panel Settings

If you have installed the optional Teranex Mini Smart Panel on your SDI to HDMI 12G converter, the following menus will be available – 'video,' 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section above. For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section.



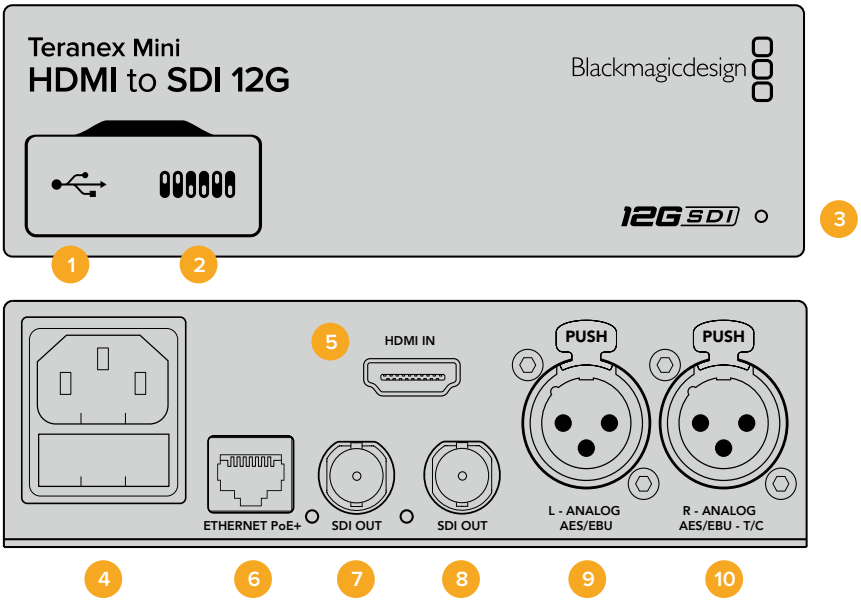
Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – SDI to HDMI 12G Block Diagram



Teranex Mini – HDMI to SDI 12G

Your Teranex Mini – HDMI to SDI 12G converts HDMI devices such as HDV cameras, Ultra HD cameras and game consoles to 12G-SDI BNC up to 2160p60, with the choice to embed audio from HDMI, AES/EBU or balanced analog audio inputs. This means you can send HDMI signals over longer distances. It is ideal for converting HDMI consumer cameras or computers with HDMI outputs to SDI.



Connectors

1 **Mini-B USB Port**

Connects to Blackmagic Teranex Setup via a Mac or Windows computer for changing settings and updating your Teranex Mini's internal software.

2 **Switches**

Adjustable switches for changing settings.

3 **LED Status Indicator**

Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **HDMI**

HDMI video input.

6 **Ethernet PoE+**

Connects to a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet plus.

7 **SDI Out**

SDI video output BNC connector.

8 **SDI Out**

Secondary SDI output BNC connector.

9 **L – Analog or AES/EBU**

Balanced left channel analog audio, or digital AES/EBU audio input XLR connector.

10 **R – Analog, AES/EBU or Timecode**

Balanced right channel analog audio, or digital AES/EBU audio input XLR connector. Can also be configured for timecode input.

Switches

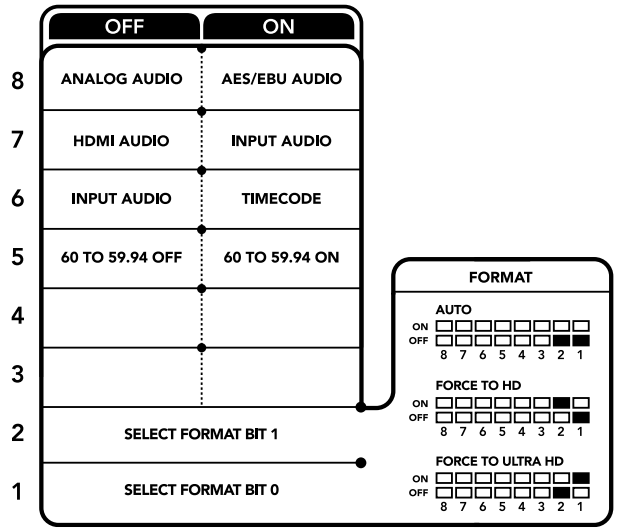
Teranex Mini – HDMI to SDI 12G's switches provide the following settings:

Switch 8 – Analog Audio, AES/EBU Audio

Set switch 8 to 'off' to embed balanced analog audio. Set to 'on' for digital AES/EBU audio. To use these inputs switch 7 must also be set to 'on'.

Switch 7 – HDMI Audio, Input Audio

Set switch 7 to 'off' to select embedded HDMI audio, or to 'on' for analog or AES/EBU audio.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

Switch 6 – Input Audio/Timecode

Set switch 6 to 'on' to input timecode via the R channel audio XLR connector. Set to 'off' to input audio.

Switch 5 – 60 to 59.94 Off/On

When set to 'on', this setting will allow your converter to detect any HDMI source video running 1080p at 60 frames per second and automatically convert it to interlaced video at 59.94 fields per second.

For example, you may need to connect a computer's HDMI output to a switcher using the standard 1080i 59.94 frame rate. Some computers output 60 frames per second, so by setting switch 5 to 'on' your converter will always detect 1080p at 60 frames per second and convert it to 1080i at 59.94 fields per second.

Switches 2, 1 – Select Format Bit 1, 0

When connecting an HDMI source that can output Ultra HD and HD, you can set your converter to force the source output to one or the other. This can be helpful when you want to record or display your computer's desktop on SDI equipment in HD so it is larger and easy to view.

While it may appear like it's an up or down conversion setting, what your converter is actually doing is telling your source equipment to output Ultra HD or HD video so that your converter can then output the source video's native HD or Ultra HD resolution without up or down conversion.

To force your source video to HD, Ultra HD, or to let your converter automatically negotiate the optimum resolution with your source equipment, simply use combinations of switches 1 and 2. The combination settings are shown below.

- **Auto – Switch 1 to OFF, Switch 2 to OFF.**
  Your converter will negotiate an optimum HD or Ultra HD resolution with your source equipment based on its output capabilities.
- **Force to HD – Switch 1 to OFF, Switch 2 to ON.**
  If your HDMI source equipment is capable of outputting HD and Ultra HD, your converter will instruct the source equipment to output HD video.
- **Force to Ultra HD – Switch 1 to ON, Switch 2 to OFF.**
  If your HDMI source equipment is capable of outputting HD and Ultra HD, your converter will instruct the source to output Ultra HD video.

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings. You can access these settings by moving between the 'video,' 'audio,' 'configure,' and 'about' tabs.

The 'about' and 'configure' tabs are detailed in the 'changing settings' section in this manual.

The 'video' tab for Teranex Mini – HDMI to SDI 12G contains the following settings.

Video Processing Menu

Conversion

Click on the 'conversion' drop down menu to select conversion settings for your SDI output. Setting this to 'auto' will negotiate an optimum HD or Ultra HD resolution with your source equipment based on its output capabilities, while 'Force HD' and 'Force Ultra HD' will output HD and Ultra HD video respectively, regardless of the HDMI input. However, SD will remain SD.

Frame Rate

This is for 1080p60 to 1080i59.94 conversion only. When enabled, the frame rate feature tells your converter to detect a 1080p video source using 60 frames per second and automatically convert it to 1080i at 59.94 frames per second. Select or deselect the checkbox to enable or disable the feature.

This feature is helpful when you want to connect an HDMI source outputting 1080p at 60 frames per second to SDI equipment using a standard 1080i 59.94 frames per second format.

3G Output

This 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. Level B is the default setting. These settings only apply when outputting 3G-SDI video.

The 'audio' tab for Teranex Mini – HDMI to SDI 12G contains the following settings.

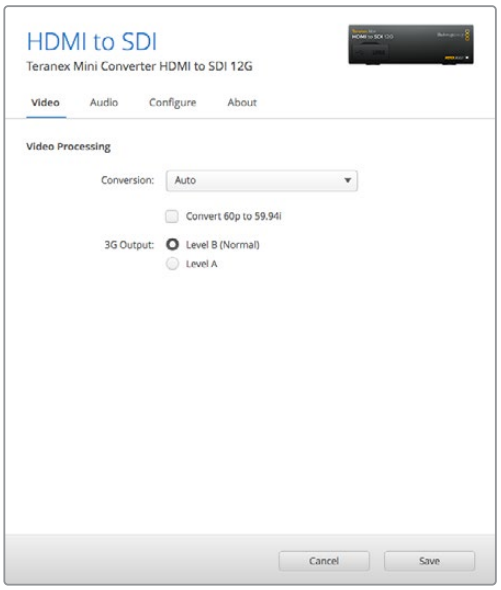
Audio Input Menu

Set XLR Input / Set Audio input

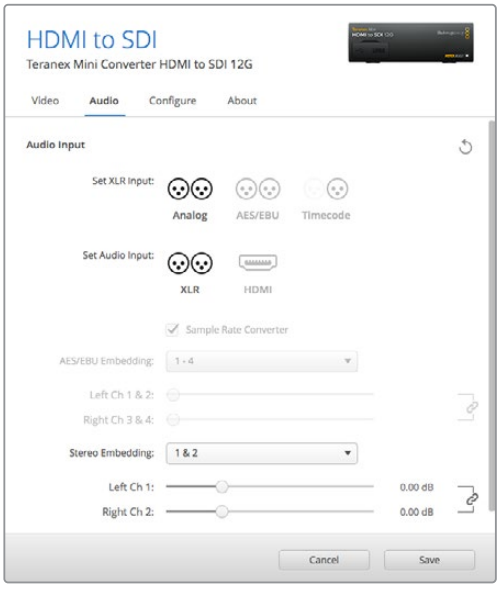
This menu allows you to select between XLR and HDMI audio input. Selecting HDMI will embed the HDMI audio into the SDI video output. Selecting ‘XLR’ lets you choose between analog, AES/EBU, and timecode inputs, as well as which channels of your SDI audio output you wish to embed these into. You can also adjust the gain on the audio signal.

Selecting AES/EBU allows the additional option of checking ‘sample rate converter.’ When this is selected, the sample rate of your SDI audio output will be forced to 48kHz, the correct sample rate for television.

If you need to convert Dolby audio via an AES/EBU source that is sample locked to a reference, make sure you disable the sample rate converter by deselecting the checkbox, otherwise it may interfere with your Dolby audio conversion.



Select between ‘auto’, ‘force to HD’, or ‘force to Ultra HD’ conversion settings using the ‘video’ settings page in Blackmagic Teranex Setup. You can also set your converter to detect 60 frames per second video and automatically convert it to 59.94 frames per second for when connecting to video equipment using the standard 59.94 frame rate.



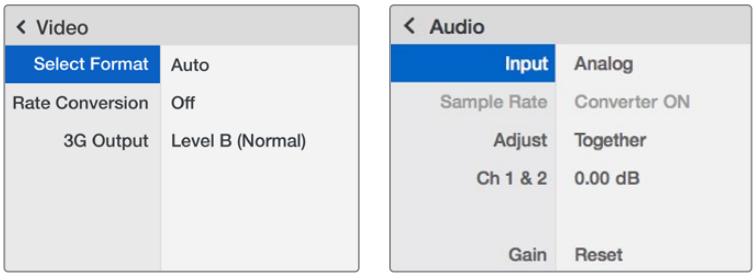
Adjust your analog audio levels and AES/EBU levels using the ‘audio’ settings.

Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter's settings via software, you may need to toggle individual switches for new settings to take effect.

Teranex Mini Smart Panel Settings

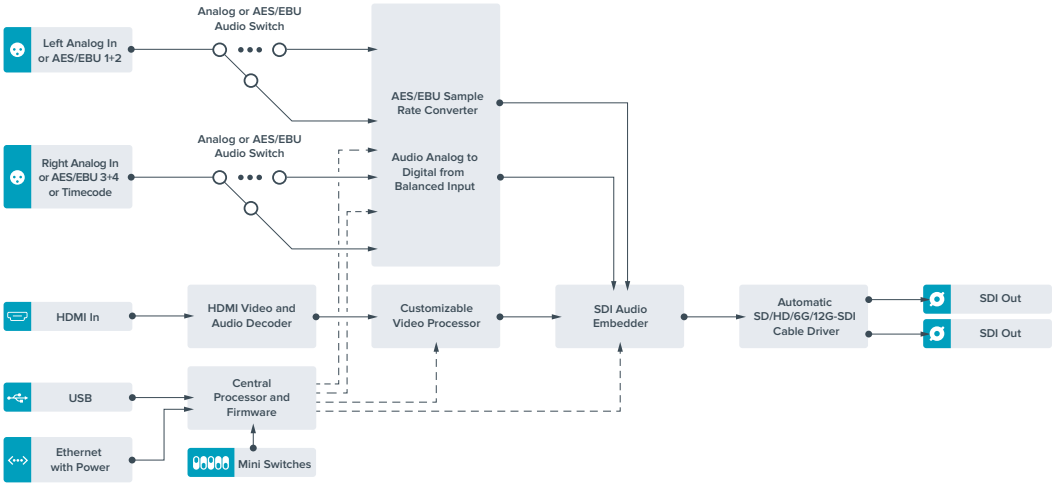
If you have installed the optional Teranex Mini Smart Panel on your HDMI to SDI 12G converter, the following menus will be available – 'video,' 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the section above.

For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.



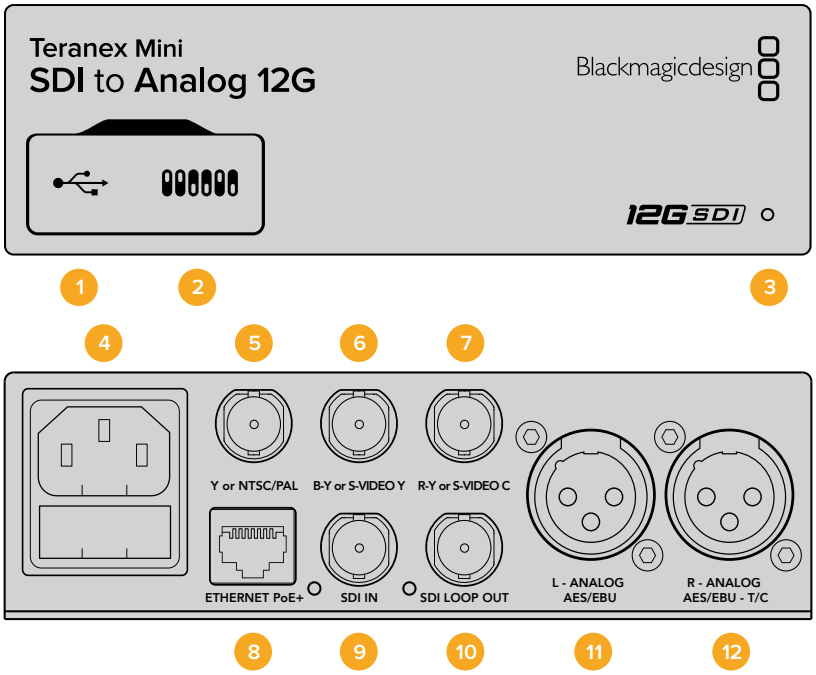
Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – HDMI to SDI 12G Block Diagram



Teranex Mini – SDI to Analog 12G

Your Teranex Mini – SDI to Analog 12G lets you convert from SD SDI, HD-SDI, 3G-SDI, 6G-SDI and 12G-SDI input sources to analog component, NTSC and PAL video out, plus balanced AES/EBU and analog audio out. The built in down converter lets you connect 12G-SDI video to SD and HD analog equipment and easily connects to video monitors and decks such as Betacam SP and VHS. You can even output pairs of analog audio from 16 de-embedded SDI audio channels.



Connectors

1 **Mini-B USB Port**

Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2 **Switches**

Adjustable switches for changing settings.

3 **LED Status Indicator**

Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **Y or NTSC/PAL**

Analog component Y, NTSC or PAL composite output
BNC connector.

6 **B-Y or S-VIDEO Y**

Analog component B-Y, or S-Video Y output BNC connector.

7 **R-Y or S-VIDEO C**

Analog component R-Y, or S-Video C output BNC connector.

8 **Ethernet PoE+**

Connects to a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet plus.

9 **SDI In**

SDI video input BNC connector.

10 **SDI Loop Out**

SDI video loop output BNC connector.

11 **L – Analog or AES/EBU**

Balanced left channel analog audio, or digital AES/EBU audio output XLR connector.

12 **R – Analog, AES/EBU or Timecode**

Balanced right channel analog audio, or digital AES/EBU audio output XLR connector. Can also be configured for timecode output.

Switches

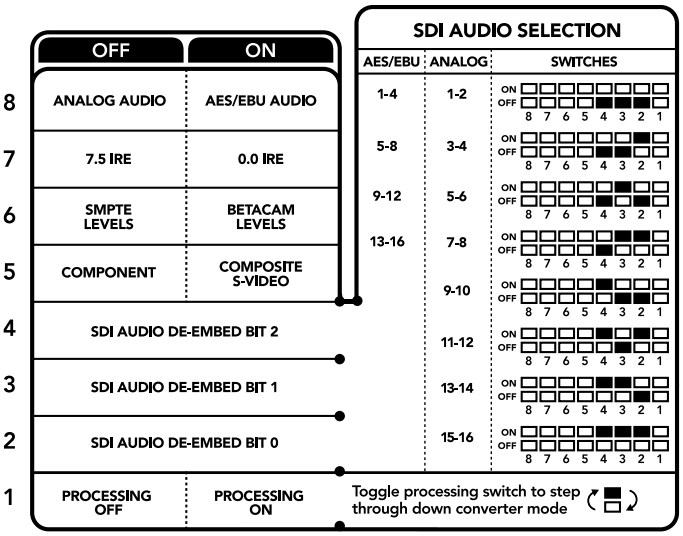
Teranex Mini – SDI to Analog 12G's switches provide the following settings:

Switch 8 – Analog Audio, AES/EBU Audio

Set switch 8 to 'off' to select balanced analog audio, or to 'on' for digital AES/EBU audio output.

Switch 7 – 7.5 IRE, 0.0 IRE

The USA and countries using NTSC with 7.5 setup should set switch 7 to 'off'. If you're working in countries not using 7.5 setup, for example Japan, set switch 7 to 'on'. This setting only affects composite or S-Video outputs.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

Switch 6 – SMPTE Levels, Betacam Levels

Set switch 6 to 'off' for SMPTE levels, or 'on' for Betacam levels. SMPTE levels are more common and even Betacam SP decks can use SMPTE levels, so only switch this to Betacam if you are sure that Betacam levels are being used.

Switch 5 – Component, Composite or S-Video

Set switch 5 to 'off' to select analog component video output, or 'on' for composite and S-Video outputs.

To display the HD video input as SD on the S-Video and composite outputs, down conversion must be set to 'on' by toggling switch 1. Component analog video supports both HD and SD video.

Switch 4, 3 and 2 – SDI Audio De-Embed

Switches 4, 3 and 2 are represented as bits 2, 1, and 0 respectively. This simply means that by setting various on/off combinations for switches 4, 3, and 2, you can choose which pair of audio channels from your SDI input you would like to output to analog or AES/EBU audio.

Switch 1 – Processing Off – Processing On

Switch 1 lets you change the aspect ratio conversion that occurs when down converting Ultra HD or HD inputs to SD analog outputs. This occurs because Ultra HD and HD formats are presented in a 16:9 widescreen ratio of width to height, whereas SD is a taller 4:3 ratio.

The three options for aspect ratio conversion you can toggle through here are anamorphic, center cut and letterbox. These stretch, crop, and add black bars to the top and bottom of your image, respectively. To switch between these, simply toggle switch 1 on and off to move through the available options. Each time switch 1 is set to 'on,' the aspect ratio type will move ahead one option.

The behavior of switch 1 also changes depending on the analog output format you are using. Composite video is always standard definition, so setting switch 1 to 'off' simply leaves the last aspect ratio conversion option in place. However, component video can support a HD signal, so when you are converting video from an SD source to a component output, setting switch 1 to 'off' will output a widescreen HD analog signal, with no aspect ratio conversion.

SDI Audio Selection Table

By using the following combinations of switch settings, you can select which SDI audio channels to output as analog or digital AES/EBU audio with your Teranex Mini – SDI to Analog 12G.

Analog Audio Channels	Switch 4	Switch 3	Switch 2	Switch Diagram
1 and 2	OFF	OFF	OFF	
3 and 4	OFF	OFF	ON	
5 and 6	OFF	ON	OFF	
7 and 8	OFF	ON	ON	
9 and 10	ON	OFF	OFF	
11 and 12	ON	OFF	ON	
13 and 14	ON	ON	OFF	
15 and 16	ON	ON	ON	

AES/EBU Audio Channels	Switch 4	Switch 3	Switch 2	Switch Diagram
1-4	OFF	OFF	OFF	
5-8	OFF	OFF	ON	
9-12	OFF	ON	OFF	
13-16	OFF	ON	ON	

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings.

You can access these settings by moving between the ‘video,’ ‘audio,’ ‘configure,’ and ‘about’ tabs.

The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.

The ‘video’ tab for Teranex Mini – SDI to Analog 12G contains the following settings.

Video Output Menu

This lets you pick between component, or s-video and composite video output as well as setting the luminance and chroma levels, and the B-Y and R-Y component levels independently.

If you have selected s-video and composite output, you can additionally choose between 7.5 IRE and 0.0 IRE black levels, depending on the region you are working in. If you have selected component video, you can switch between SMPTE and Betacam levels. SMPTE levels are more common and even Betacam SP decks can use SMPTE levels, so only switch this to Betacam if you are sure that Betacam levels are being used.

Video Processing Menu

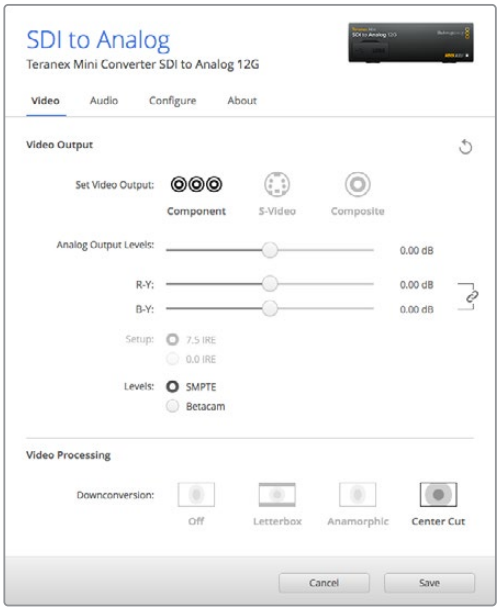
This menu allows you to set the aspect ratio of down converted video. The options are letterbox, anamorphic, center cut or no processing.

The ‘audio’ tab for Teranex Mini – SDI to Analog 12G contains the following settings.

Audio Output Menu

This menu allows you to select between analog, AES/EBU, and timecode audio outputs, as well as which channels of your SDI audio input you wish to de-embed. You can also adjust the gain on the audio output.

Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter’s settings via software, you may need to toggle individual switches for new settings to take effect.

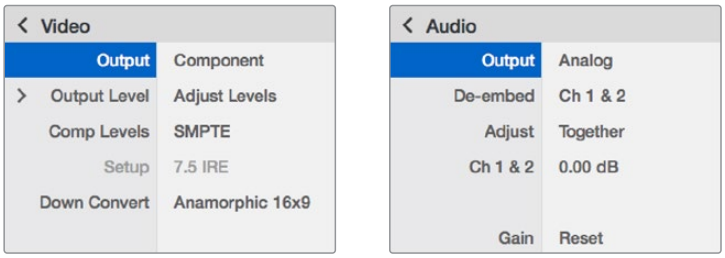


Adjust your video luminance and chroma levels and component chroma levels using the ‘video’ settings page in Blackmagic Teranex Setup.

Adjust your analog audio levels and AES/EBU levels using the 'audio' settings page.

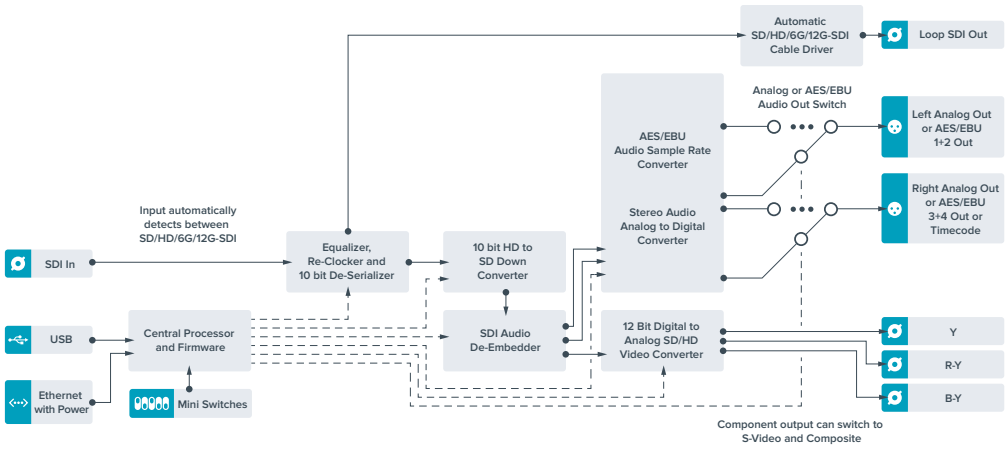
Teranex Mini Smart Panel Settings

If you have installed the optional Teranex Mini Smart Panel on your SDI to Analog 12G converter, the following menus will be available – 'video,' 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section above. For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.



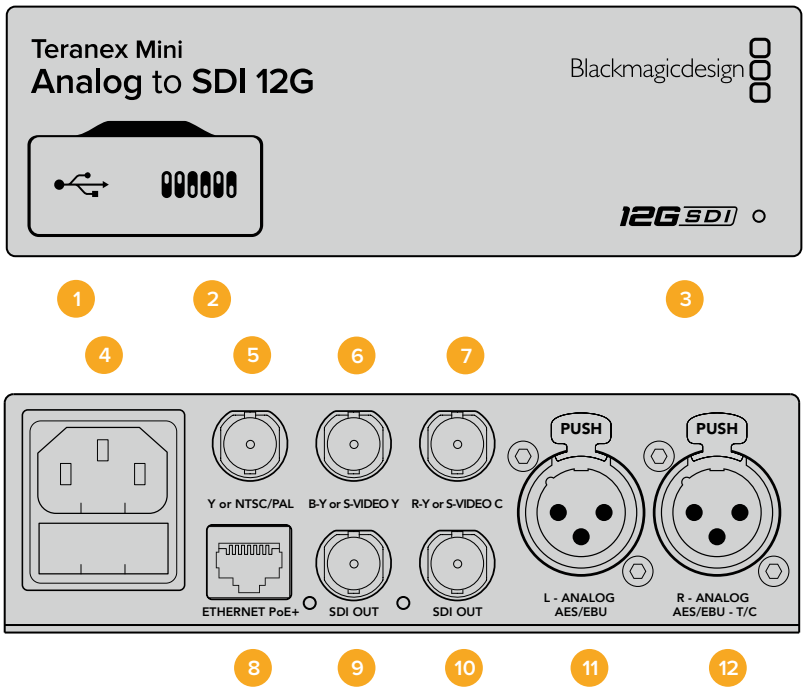
Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – SDI to Analog 12G Block Diagram



Teranex Mini – Analog to SDI 12G

Your Teranex Mini Analog to SDI 12G lets you convert video and audio from analog equipment such as Betacam SP decks, HDV cameras and game consoles to SD-HDI, HD-SDI and 12G-SDI video. A choice of analog input formats is supported, including component SD/HD, S-Video, or composite NTSC and PAL. The converter's 12G-SDI outputs include the option to embed digital AES/EBU or analog audio.



Connectors

1 **Mini-B USB Port**

Connects to the Teranex setup utility via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2 **Switches**
Adjustable switches for changing settings.

3 **LED Status Indicator**
Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**
Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **Y or NTSC/PAL**
Analog component Y, NTSC or PAL composite input BNC connector.

6 **B-Y or S-VIDEO Y**
Analog component B-Y, or S-Video Y input BNC connector.

7 **R-Y or S-VIDEO C**
Analog component R-Y, or S-Video C input BNC connector.

8 **Ethernet PoE+**
Connects to a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet plus.

9 **SDI Out**
SDI video output BNC connector.

10 **SDI Out**
SDI video output BNC connector.

11 **L – Analog or AES/EBU**
Balanced left channel analog audio, or digital AES/EBU audio input XLR connector.

12 **R – Analog, AES/EBU or Timecode**
Balanced right channel analog audio, or digital AES/EBU audio input XLR connector. Can also be configured for timecode input.

Switches

Teranex Mini Analog to SDI 12G's switches provide the following settings:

Switch 8 – Analog Audio, AES/EBU Audio
Set switch 8 to OFF to select balanced analog audio, or to ON for digital AES/EBU audio input.

Switch 7 – 7.5 IRE – 0.0 IRE
The USA and countries using NTSC with 7.5 setup should set switch 7 to OFF. If you're working in countries not using 7.5 setup, set switch 7 to ON. This setting only affects composite or NTSC S-Video outputs.

Switch 6 – SMPTE Levels – Betacam Levels
This setting selects between SMPTE or Betacam video levels. Set switch 6 to OFF for SMPTE levels, or to ON for Betacam levels. SMPTE levels are more common and even Betacam SP decks can use SMPTE levels so only switch this to Betacam if you are sure that Betacam levels are being used.

Switch 5 – Component, Composite or S-Video
Set switch 5 to OFF to select analog component video input, or to ON for composite video and S-Video analog inputs.

Switch 4 – Composite – S-Video

Set switch 4 to OFF to select composite video input, or to ON for S-Video input.

Switch 3 – SD to HD

Set switch 3 to ‘on’ to up convert the SDI output resolution from SD to HD if the Composite, S-Video or Component inputs are SD. Set to ‘off’ to match the input resolution.

Switch 2 – HD to UHD

Set switch 2 to ‘on’ to up convert SDI output resolution to Ultra HD if the Component video input is HD. Set to ‘off’ to match the input resolution.

Switch 1 – Input Audio / Timecode

Set switch 1 to ‘on’ to input timecode via the R channel audio XLR connector. Set to ‘off’ to input audio.

	OFF	ON
8	ANALOG AUDIO	AES/EBU AUDIO
7	7.5 IRE	0.0 IRE
6	SMPTE LEVELS	BETACAM LEVELS
5	COMPONENT	COMPOSITE or S-VIDEO
4	COMPOSITE	S-VIDEO
3	SD TO HD OFF	SD TO HD ON
2	HD TO UHD OFF	HD TO UHD ON
1	INPUT AUDIO	TIMECODE

The switch legend on the base of your Teranex Mini gives you all the information you need to change conversion settings.

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings.

You can access these settings by moving between the ‘video,’ ‘audio,’ ‘configure,’ and ‘about’ tabs.

The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.

The ‘video’ tab for Teranex Mini Analog to SDI 12G contains the following settings.

Video Input Menu

This lets you pick between component, s-video, and composite video input as well as setting the luminance and chroma levels, and the B-Y and R-Y component levels independently.

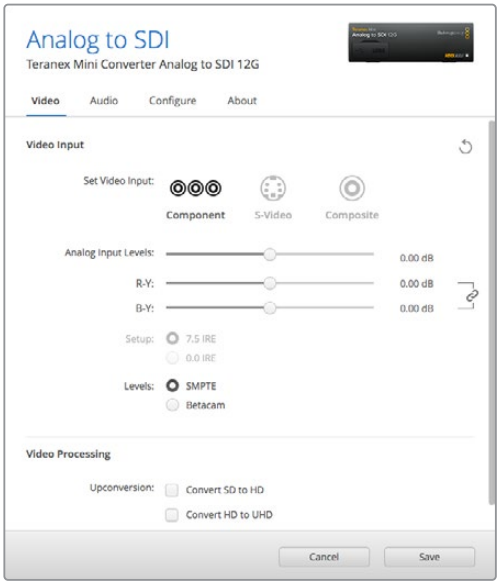
If you have selected S-Video or composite input, you can additionally choose between 7.5 IRE and 0.0 IRE black levels, depending on the region you are working in.

If you have selected component video, you can switch between SMPTE and Betacam levels. SMPTE levels are more common and even Betacam SP decks can use SMPTE levels, so only switch this to Betacam if you are sure that Betacam levels are being used.

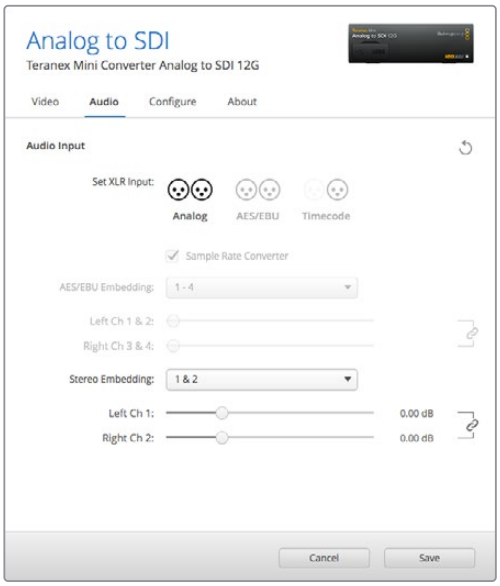
Video Processing Menu

This menu allows you to set up conversion options, dependent on your analog video input. Component video inputs can be converted from SD to HD, and HD to Ultra HD. S-Video and composite inputs can only be converted from SD to HD.

The ‘audio’ tab for Teranex Mini Analog to SDI 12G contains the following settings.



Adjust your video luminance and chroma levels and component chroma levels using the ‘video’ settings page in Blackmagic Teranex Setup.



Adjust your analog audio levels and AES/EBU levels using the ‘audio’ settings page.

Audio Input Menu

This menu allows you to select between analog, AES/EBU, and timecode audio inputs, as well as which channels of your SDI audio output you wish to embed these into. You can also adjust the gain on the audio signal.

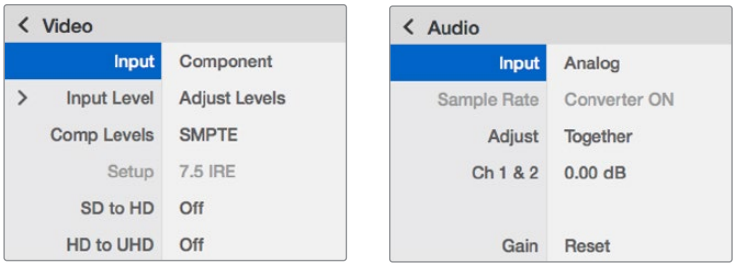
Selecting AES/EBU allows the additional option of checking ‘sample rate conversion.’ When this is selected, the sample rate of your SDI audio output will be up- or down- converted to 24-bit, 48kHz.

Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter’s settings via software, you may need to toggle individual switches for new settings to take effect.

Teranex Mini Smart Panel Settings

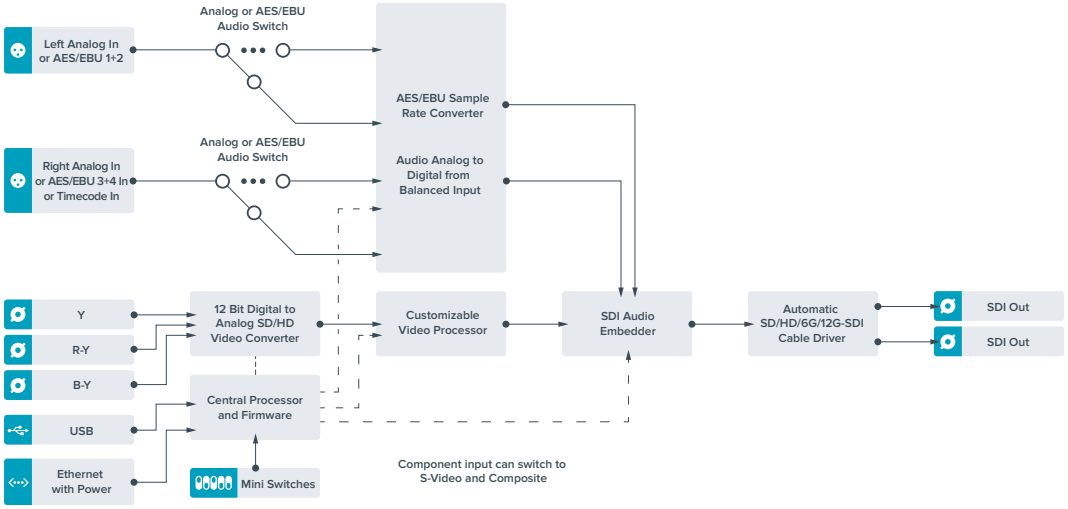
If you have installed the optional Teranex Mini Smart Panel on your Analog to SDI 12G to converter, the following menus will be available – ‘video,’ ‘audio,’ and ‘network.’ The settings available in these menus are identical to those detailed in the ‘Blackmagic Teranex Setup settings’ section above.

For more information on changing settings using the Teranex Mini Smart Panel, refer to the ‘changing settings’ section in this manual.



Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

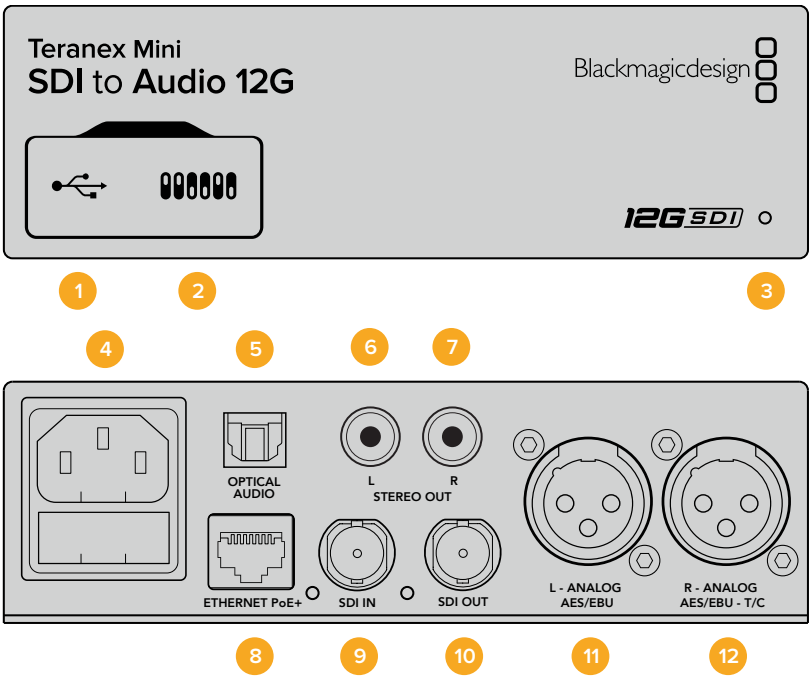
Teranex Mini – Analog to SDI 12G Block Diagram



Teranex Mini – SDI to Audio 12G

With Teranex Mini SDI to Audio 12G you can de-embed audio from any SDI video connection and output to two channels of analog audio or four channels of AES/EBU digital. Output to audio equipment such as audio mixers, analog decks and reference monitors.

Additional SDI audio channels can be de-embedded by daisy chaining another Teranex Mini SDI to Audio 12G to your converter's SDI output.



Connectors

1 **Mini-B USB Port**
Connects to the Teranex setup utility via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2 **Switches**
Adjustable switches for changing settings.

3 **LED Status Indicator**
Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**
Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **Optical S/PDIF Audio Output**
S/PDIF Signal with TOSLINK Connector.

6 **L – Unbalanced HiFi Analog Line Level Output**
Unbalanced left channel analog audio output RCA connector.

7 **R – Unbalanced HiFi Analog Line Level Output**
Unbalanced right channel analog audio output RCA connector.

8 **Ethernet PoE+**

Connects to a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet.

9 **SDI In**

SDI video input BNC connector.

10 **SDI Loop Out**

SDI video loop output BNC connector.

11 **L – Analog or AES/EBU**

Balanced left channel analog audio, or digital AES/EBU audio output XLR connector.

12 **R – Analog, AES/EBU or Timecode**

Balanced right channel analog audio, or digital AES/EBU audio output XLR connector. Can also be configured for timecode output.

Switches

Teranex Mini SDI to Audio 12G's switches provide the following settings:

Switch 8 – Analog Audio, AES/EBU Audio

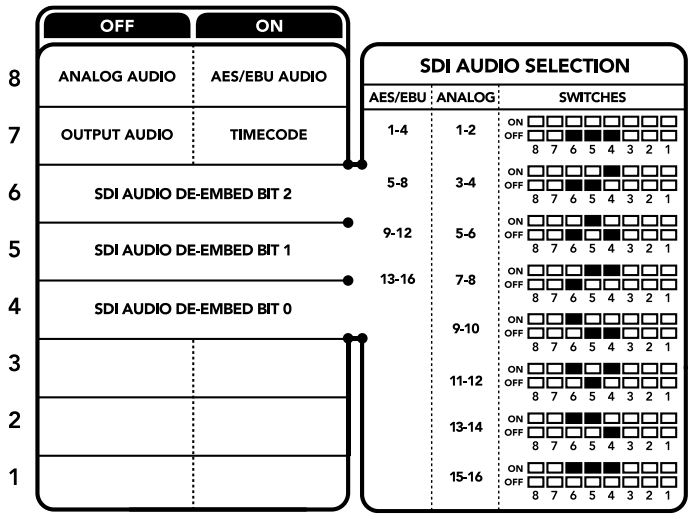
Set switch 8 to OFF to select balanced analog audio, or to ON for digital AES/EBU audio output.

Switch 7 – Output Audio/Timecode

Set switch 7 to 'on' to output timecode via the R channel audio XLR connector. Set to 'off' to output audio.

Switches 6, 5, 4 – SDI Audio De-Embed Bit 2, 1, 0

Switches 6, 5 and 4 are represented as bits 2, 1 and 0 respectively. This simply means that by setting various on/off combinations for switches 6, 5 and 4, you can choose which audio channels to de-embed from the SDI input signal into your audio output.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

SDI Audio De–Embed Table

Analog Audio Channels	Switch 6	Switch 5	Switch 4	Switch Diagram
1-2	OFF	OFF	OFF	
3-4	OFF	OFF	ON	
5-6	OFF	ON	OFF	
7-8	OFF	ON	ON	
9-10	ON	OFF	OFF	
11-12	ON	OFF	ON	
13-14	ON	ON	OFF	
15-16	ON	ON	ON	

AES/EBU Audio Channels	Switch 6	Switch 5	Switch 4	Switch Diagram
1-4	OFF	OFF	OFF	
5-8	OFF	OFF	ON	
9-12	OFF	ON	OFF	
13-16	OFF	ON	ON	

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings.

You can access these settings by moving between the ‘audio,’ ‘configure,’ and ‘about’ tabs.

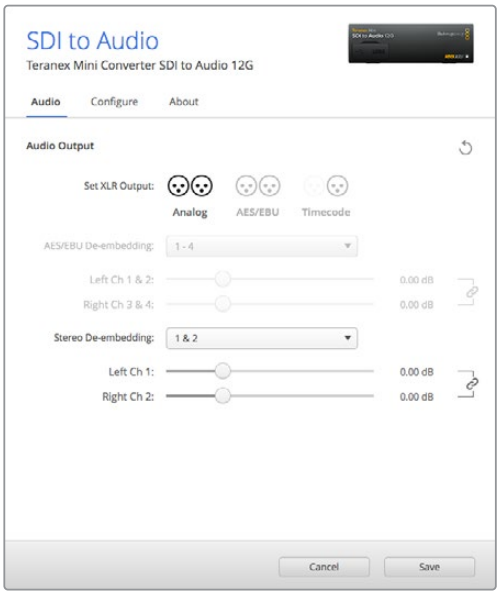
The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.

The ‘audio’ tab for Teranex Mini SDI to Audio 12G contains the following settings.

Audio Output Menu

This menu allows you to select between analog, AES/EBU, and timecode audio outputs, as well as which channels of your SDI audio input you wish to de-embed. You can also adjust the gain on the audio output.

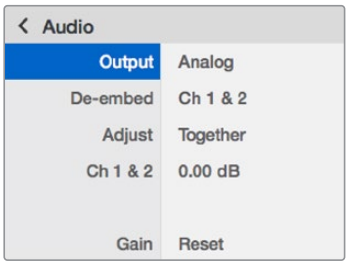
Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter's settings via software, you may need to toggle individual switches for new settings to take effect.



Adjust your analog audio levels and AES/EBU levels using the 'audio' settings page in Blackmagic Teranex Setup.

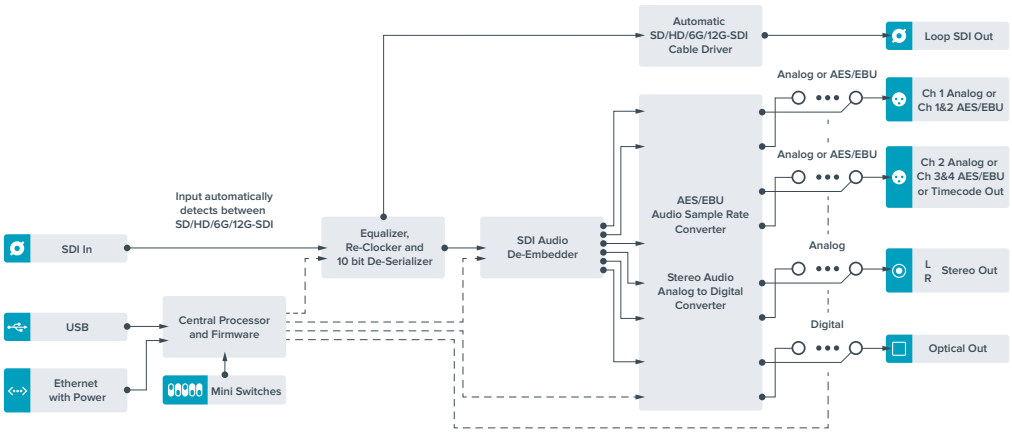
Teranex Mini Smart Panel Settings

If you have installed the optional Teranex Mini Smart Panel on your SDI to Audio 12G converter, the following menus will be available – 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section above. For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.



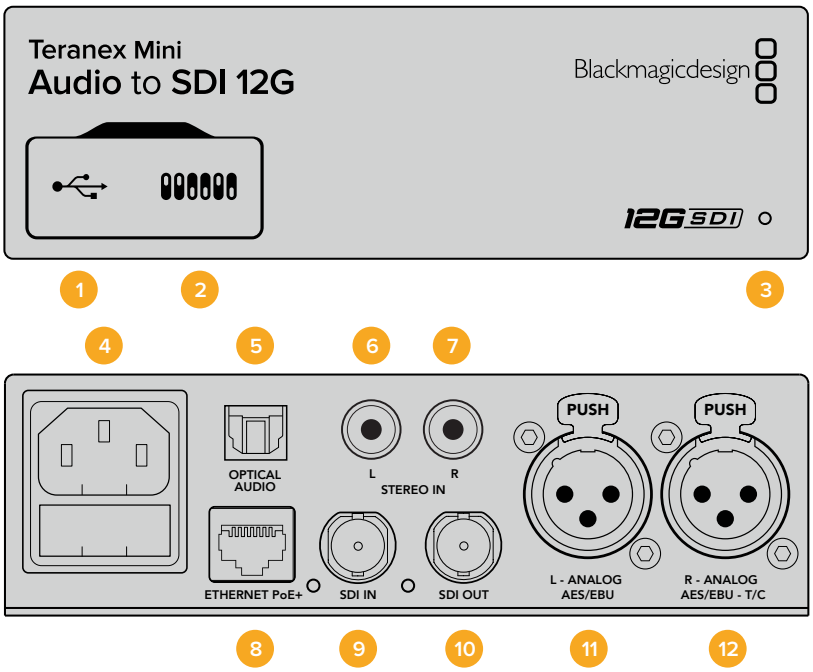
Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – SDI to Audio 12G Block Diagram



Teranex Mini – Audio to SDI 12G

With Teranex Mini Audio to SDI 12G, you can embed two channels of analog audio, or four channels of AES/EBU digital audio into any SDI video connection. You can use this Teranex Mini to embed audio from equipment, such as audio mixers and analog decks, into SDI video connections for use with SDI routers and decks. Additional SDI audio channels can be embedded by daisy chaining another Teranex Mini Audio to SDI 12G to your converter's SDI output.



Connectors

1 **Mini-B USB Port**
Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2 **Switches**
Adjustable switches for changing settings.

3 **LED Status Indicator**
Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**
Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **Optical S/PDIF Audio Input**
S/PDIF Signal with TOSLINK Connector.

6 **L – Unbalanced HiFi Analog Line Level Input**
Unbalanced left channel analog audio input RCA connector.

7 **R – Unbalanced HiFi Analog Line Level Input**
Unbalanced right channel analog audio input RCA connector.

8 **Ethernet PoE+**
Connects to a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet.

9 **SDI In**
SDI video input BNC connector.

10 **SDI Out**
SDI video output BNC connector.

11 **L – Analog or AES/EBU**
Balanced left channel analog audio, or digital AES/EBU audio input XLR connector.

12 **R – Analog, AES/EBU or Timecode**
Balanced right channel analog audio, or digital AES/EBU audio input XLR connector. Can also be configured for timecode input.

Switches

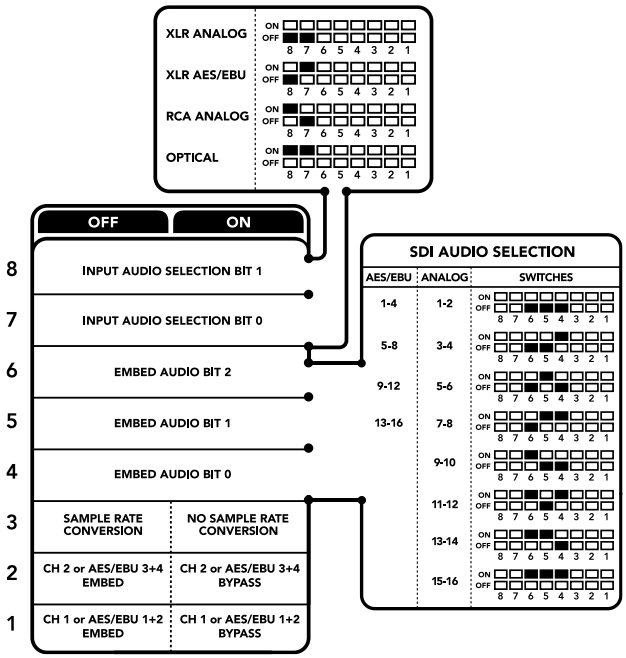
Teranex Mini Audio to SDI 12G's switches provide the following settings:

Switch 8, 7 – Input Audio Selection Bit 1, 0
Switches 8 and 7 are represented as bits 1 and 0, respectively. This simply means that by setting various on/off combinations for switches 8 and 7 you can select from four input audio options.

Switch 6, 5, 4 – Embed Audio Bit 2, 1, 0
Switches 6, 5, and 4 are represented as bits 2, 1, and 0, respectively. This simply means that by setting various on/off combinations for switches 6, 5, and 4 you can select which channels of your SDI signal you wish to embed audio into.

If you are embedding analog audio, there are eight combinations, allowing you to embed audio into the channel pairs from 1-2 through to 15-16.

If you are embedding AES/EBU audio, there are four combinations. You can select between embedding audio into channels 1 to 4, 5 – 8, 9 – 12, or 13 – 16



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

Switch 3 – Sample Rate Conversion, No Sample Rate Conversion

Set switch 3 to OFF to enable sample rate conversion, or ON to disable sample rate conversion. This switch should almost always be set to OFF to ensure audio is embedded at the correct sample rate for television.

When switch 3 is set to OFF this setting converts the sample rate of your analog or AES/EBU audio and embeds audio into the SDI output at a sample rate of 48 kHz.

Switch 2 – Ch 2 or AES/EBU 3+4 Embed / Bypass

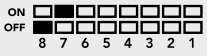
Once you have selected your audio channels, use switches 2 and 1 to select which channels to embed or disable. The disable setting lets you avoid overwriting audio channels you wish to keep in the audio signal.

Set switch 2 to ON to bypass channel 2, or AES/EBU channels 3 and 4. Set switch 1 to ON to bypass channel 1, or AES/EBU channels 1 and 2.

Switch 1 – Ch 1 or AES/EBU 1+2 Embed/Bypass

See switch 2 description.

Audio Selection Tables

Input Audio Source	Switch 8	Switch 7	Switch Diagram
XLR Analog	OFF	OFF	
XLR AES/EBU	OFF	ON	
Rca Analog	ON	OFF	
Optical	ON	ON	

SDI Channel Tables

Analog Audio Channels	Switch 6	Switch 5	Switch 4	Switch Diagram
1-2	OFF	OFF	OFF	
3-4	OFF	OFF	ON	
5-6	OFF	ON	OFF	
7-8	OFF	ON	ON	
9-10	ON	OFF	OFF	
11-12	ON	OFF	ON	
13-14	ON	ON	OFF	
15-16	ON	ON	ON	

AES/EBU Audio Channels	Switch 6	Switch 5	Switch 4	Switch Diagram
1-4	OFF	OFF	OFF	
5-8	OFF	OFF	ON	
9-12	OFF	ON	OFF	
13-16	OFF	ON	ON	

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings.You can access these settings by moving between the ‘audio,’ ‘configure,’ and ‘about’ tabs in Blackmagic Teranex Setup. The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.

The ‘audio’ tab for Teranex Mini Audio to SDI 12G contains the following settings.

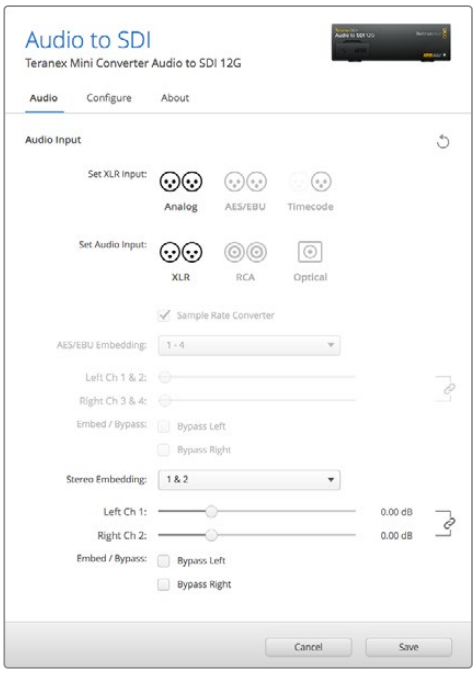
Audio Input Menu

This menu allows you to select between RCA, XLR, and optical inputs.

If you have selected XLR, you can further select between analog, AES/EBU, and timecode inputs.

Selecting AES/EBU allows the additional option of checking ‘sample rate conversion.’ When this is selected, the sample rate of your SDI audio output will be forced to 48kHz, the correct sample rate for television.

The audio input menu also allows you to chose which channel pair, or channel quad in the case of AES/EBU audio, of your SDI signal you wish to embed audio into, as well as adjusting the audio gain.



Adjust your analog audio levels and AES/EBU levels using the 'audio' settings page in Blackmagic Teranex Setup.

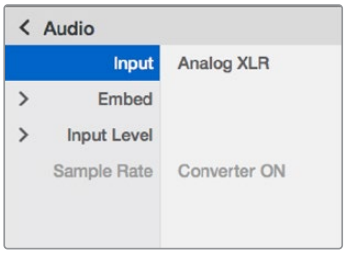
You can bypass channels or channel pairs if you want to avoid overwriting audio in your SDI signal.

Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Blackmagic Teranex Setup. If reverting to switch control after removing the Smart Panel or updating your converter's settings via software, you may need to toggle individual switches for new settings to take effect.

Teranex Mini Smart Panel Settings

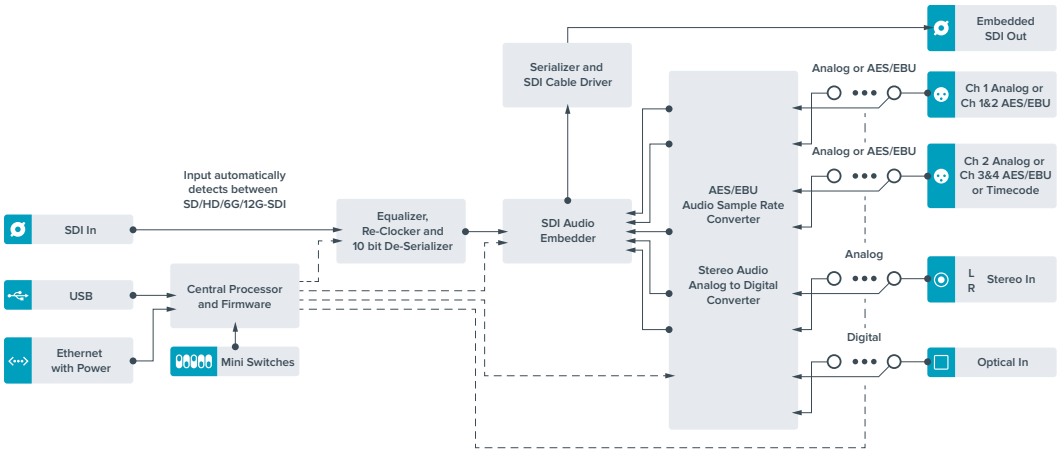
If you have installed the optional Teranex Mini Smart Panel on your Audio to SDI 12G converter, the following menus will be available – 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section above.

For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.



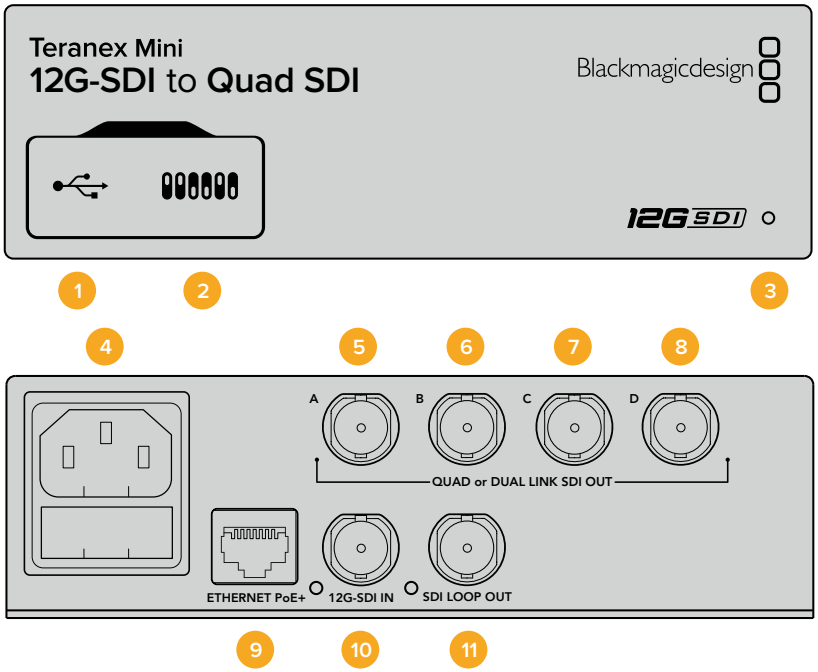
Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – Audio to SDI 12G Block Diagram



Teranex Mini – 12G–SDI to Quad SDI

Teranex Mini 12G-SDI to Quad SDI lets you convert a 12G-SDI signal to quad link SDI so you can connect to Ultra HD equipment that use four separate BNC connectors. This conversion is perfect if you need to connect 12G-SDI Ultra HD signals to four separate HD monitors, for example large video wall displays. Your Teranex Mini includes a 12G-SDI loop through connector and support for both level A and level B 3G-SDI equipment.



Connectors

1 **Mini-B USB Port**

The USB port lets you connect your converter to a Mac or Windows computer so you can adjust settings and update your converter's internal software.

2 Switches

Switches on the front of your Teranex Mini let you change settings using the tip of a pen.

3 LED Status Indicator

The LED glows white when the converter is receiving power and green when a valid video input signal is detected. When more than one Teranex Mini is connected to your computer, you can identify your converter using the ‘identify’ checkbox in Blackmagic Teranex Setup. When the checkbox is enabled, your converter’s LED will flash on and off.

4 Power

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 SDI Out A

This BNC connector outputs the following signals:

– SD/HD-SDI
– Single link 3G-SDI
– Single link 6G-SDI
– Dual link HD-SDI channel A
– Dual link 3G-SDI Ultra HD channel A
– Quad link HD-SDI Ultra HD channel A

6 SDI Out B

This SDI video output BNC connector outputs the following signals:

– Dual link HD-SDI channel B
– Dual link 3G-SDI Ultra HD channel B
– Quad link HD-SDI Ultra HD channel B

7 SDI Out C

The ‘SDI Out C’ BNC connector outputs quad link HD-SDI Ultra HD channel C.

8 SDI Out D

This BNC connector is used to output quad link HD-SDI Ultra HD channel D.

9 Ethernet PoE+

The Ethernet connector lets you plug your Teranex Mini into a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet plus.

10 12G-SDI In

This input supports a 12G-SDI signal on a BNC connector.

11 SDI Loop Out

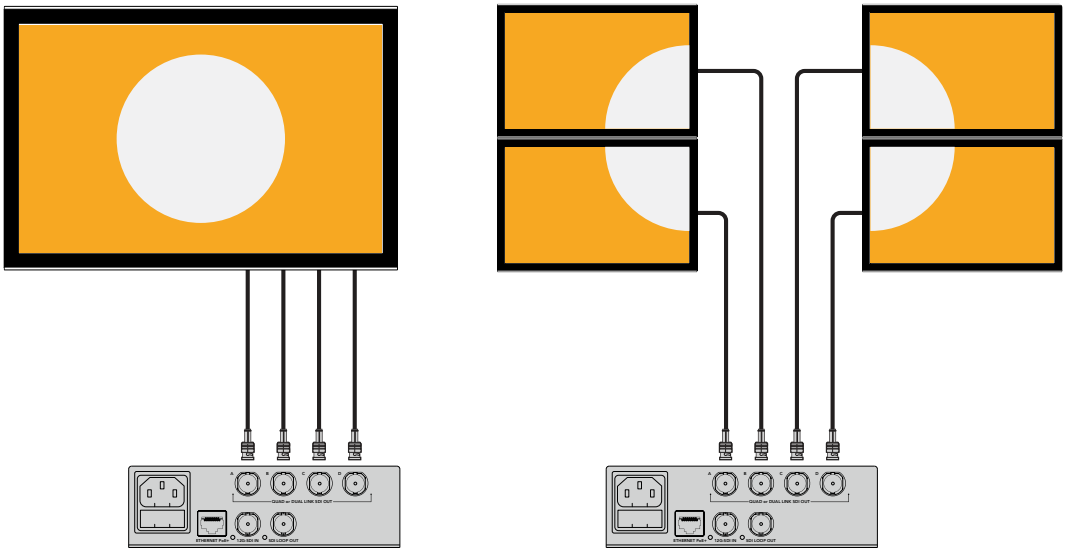
This BNC connector outputs the incoming 12G-SDI signal so you can feed it through to other 12G-SDI equipment.

Quad HD split

Your Teranex Mini 12G SDI to Quad SDI converter has multiple ways of sending high bandwidth image data over relatively low bandwidth connections.

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

Dual link 6G SDI operates in the same way as quad link, in that one complete signal is split across multiple cables, except that only two 3G-SDI outputs are used.



Quad Link

Quadrant HD

Switches

Teranex Mini – 12G-SDI to Quad SDI's switches provide the following settings:

Switches 8 & 7 – Quad SDI Output

Switches 8 and 7 are represented as bits 1 and 0, respectively. This simply means that by setting various on off combinations of switches 8 and 7, you can choose how an 12G-SDI Ultra HD signal is split among your Teranex Mini converter's four outputs.

Below are some example configurations for converting an Ultra HD signal to quad link, dual link or quad HD split mode.

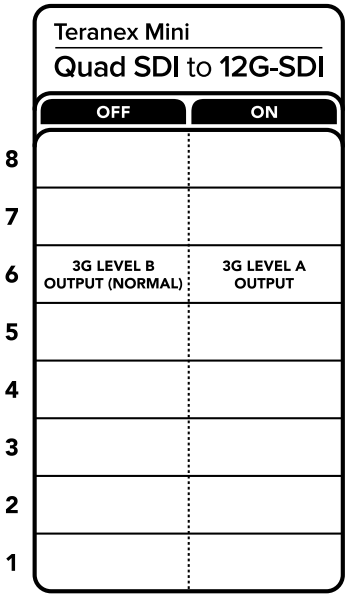
If the input is 12G-SDI and switches 8 and 7 are set to 'off', the output will be interleaved quad link.

If the input is 12G-SDI, switch 8 is set to 'off', and 7 is set to 'on', the output will be 4 HD quadrants.

If the input is 6G-SDI, switch 8 is set to 'on' and switches 7 and 6 are set to 'off' the output will be dual link 3G-SDI level B.

If the input is 6G-SDI, switch 8 is set to 'on', switch 7 is set to 'off' and switch 6 to 'on', the output will be dual link 3G-SDI level A.

When the converter is in Quad HD split mode, the 4 outputs will carry 4 independent HD quadrants to form the complete Ultra HD image.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

Switch 6 – 3G Level B/A

This setting 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. Level B is the default setting, and is accessed by setting switch 6 to 'off.' To output Level A video, set switch 6 to 'on.' These settings only apply when outputting 3G-SDI video.

Quad Link Selection Table

Quad SDI Output	Switch 8	Switch 7	Switch Diagram
Quad HD Split	OFF	ON	
Quad Link	OFF	OFF	
Dual Link	ON	OFF	
Single Link	ON	ON	

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings. You can access these settings by moving between the 'video,' 'configure,' and 'about' tabs.

The 'about' and 'configure' tabs are detailed in the 'changing settings' section in this manual.

The 'video' tab for Teranex Mini 12G-SDI to Quad SDI contains the following settings.

Video Processing Menu

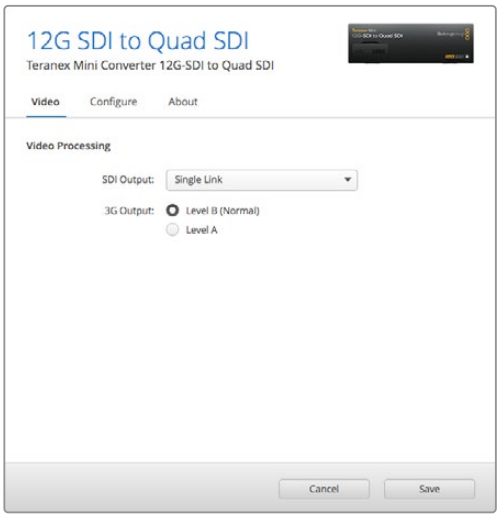
SDI Output

Use this menu to select between SDI output options. The available options are single link, dual link, quad HD split and quad link. These dictate how an 12G-SDI Ultra HD signal is split between your converter's four SDI outputs.

While a 12G-SDI input signal can be output as quad link or quad HD split, 6G inputs can be split into four 1.5G outputs, or two pairs 3G outputs. Lower bitrate inputs, such as 3G-SDI or 1.5G-SDI, can be duplicated across all four outputs by choosing 'single link.'

3G Output

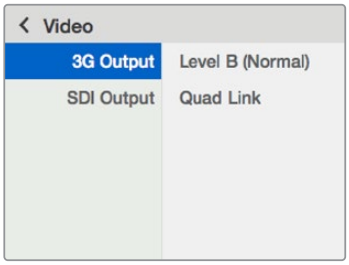
This lets you change the 3G-SDI output standard to maintain compatibility with equipment that can only receive level A or level B 3G-SDI video. Level B is the default setting. These settings only apply when outputting 3G-SDI video.



Adjust your SDI output settings using the 'video' settings page in Blackmagic Teranex Setup.

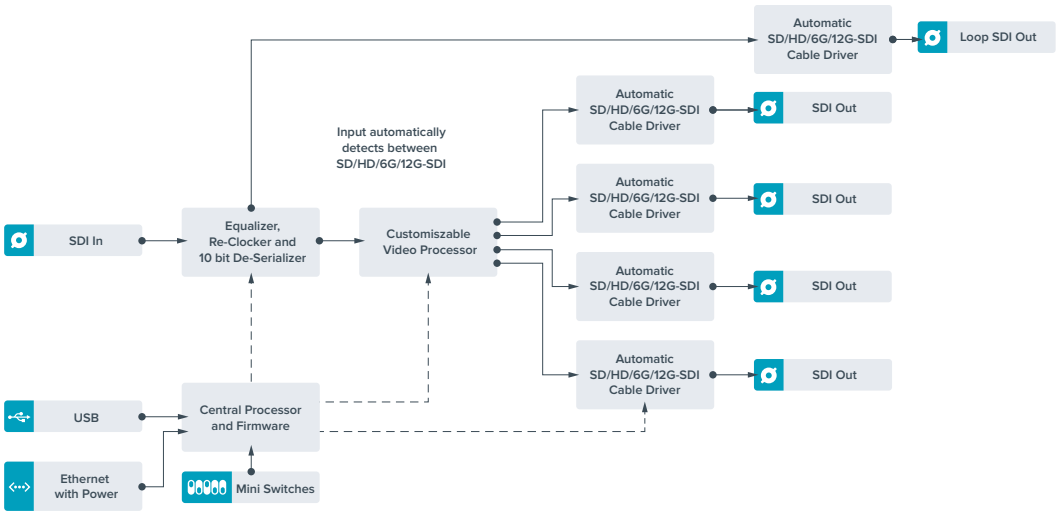
Teranex Mini Smart Panel Settings

The 'video' and 'network' settings can be changed from the front panel if you have the optional Teranex Mini Smart Panel installed. The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section. For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.



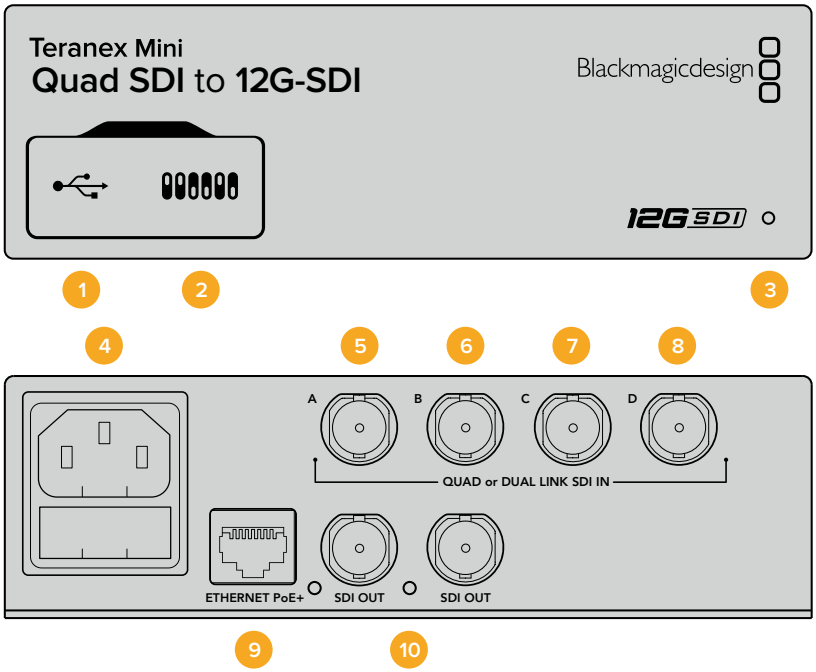
Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – 12G–SDI to Quad SDI Block Diagram



Teranex Mini – Quad SDI to 12G-SDI

Teranex Mini Quad SDI to 12G-SDI lets you connect quad link Ultra HD equipment to the latest 12G-SDI equipment. This means you can convert Ultra HD outputs that use four separate BNC cables into a single 12G-SDI BNC cable so you can plug into the latest 12G-SDI routers, switchers, projectors and more! Supports both Level A and Level B 3G-SDI.



Connectors

1 **Mini-B USB Port**

The USB port lets you connect your converter to a Mac or Windows computer so you can adjust settings and update your converter's internal software.

2 **Switches**

Switches on the front of your Teranex Mini let you change settings using the tip of a pen.

3 **LED Status Indicator**

The LED glows white when the converter is receiving power and green when a valid video input signal is detected. When more than one Teranex Mini is connected to your computer, you can identify your converter using the 'identify' checkbox in Blackmagic Teranex Setup. When the checkbox is enabled, your converter's LED will flash on and off.

4 **Power**

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **SDI In A**

This BNC connector accepts the following input signals:

– SD/HD-SDI
– Single link 3G-SDI
– Single link 6G-SDI
– Dual link HD-SDI channel A
– Dual link 3G-SDI Ultra HD channel A
– Quad link HD-SDI Ultra HD channel A

6 **SDI In B**

This BNC connector accepts the following input signals:

– Dual link HD-SDI channel B
– Dual link 3G-SDI Ultra HD channel B
– Quad link HD-SDI Ultra HD channel B

7 **SDI In C**

The 'SDI In C' BNC connector is used to plug in quad link HD-SDI Ultra HD channel C.

8 **SDI In D**

Use this BNC connector to plug in quad link HD-SDI Ultra HD channel D.

9 **Ethernet PoE+**

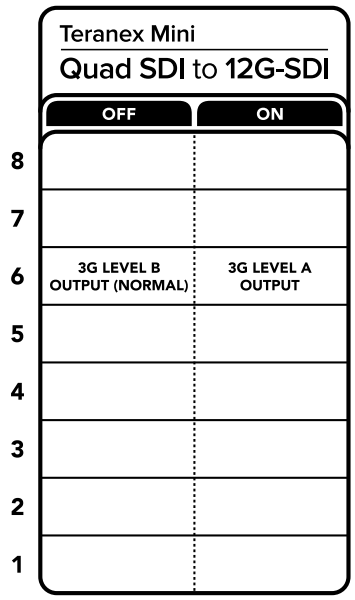
The Ethernet connector lets you plug your Teranex Mini into a network switch or computer so you can change settings using Blackmagic Teranex Setup.The Ethernet port also supports power over Ethernet plus.

10 **SDI Outputs**

These two BNC connectors let you output two separate 12G-SDI signals.

Switches

The switch 6 ‘on/off’ setting 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. Level B is the default setting, and is accessed by setting switch 6 to ‘off’. To output Level A video, set switch 6 to ‘on.’ These settings only apply when outputting 3G-SDI video.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings. You can access these settings by moving between the ‘video,’ ‘configure,’ and ‘about’ tabs.

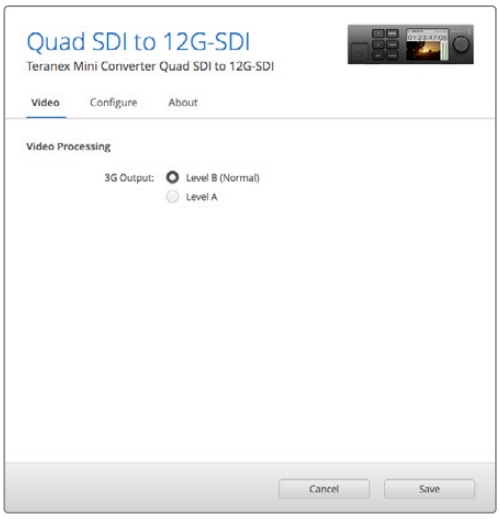
The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.

The ‘video’ tab for Teranex Mini – SDI to Analog 12G contains the following settings.

Video Processing Menu

3G Output

This 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. Level B is the default setting. These settings only apply when outputting 3G-SDI video.



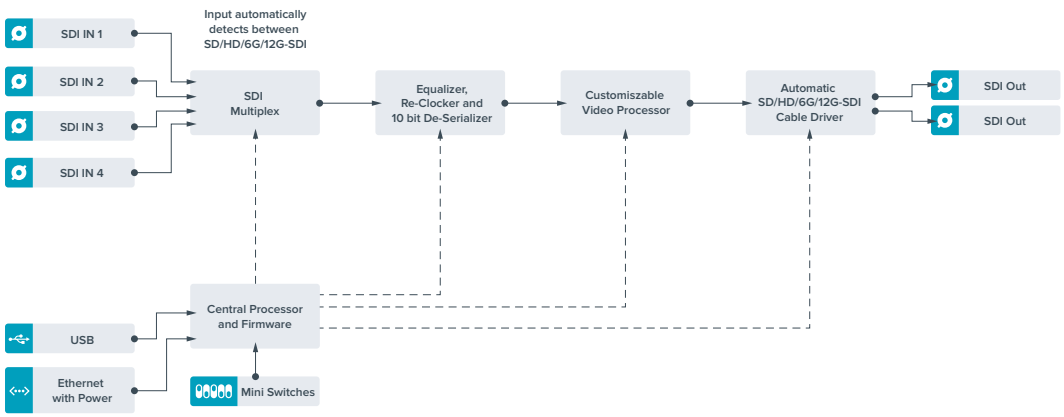
Adjust your SDI output settings using the 'video' settings page in Blackmagic Teranex Setup

Teranex Mini Smart Panel Settings

The 'video' and 'network' settings can be changed from the front panel if you have the optional Teranex Mini Smart Panel installed. The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section above. For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.

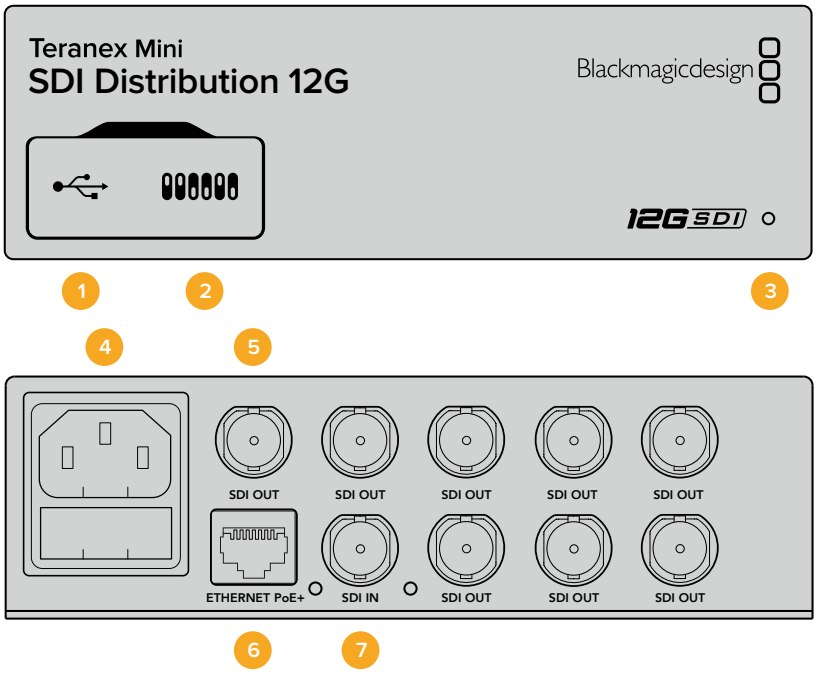
Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – Quad SDI to 12G–SDI Block Diagram



Teranex Mini – SDI Distribution 12G

With Teranex Mini – SDI Distribution 12G you can distribute a single SDI video input to up to eight SDI outputs. Your Teranex Mini features the latest multi rate 12G-SDI connections with full SDI re-clocking allowing the converter to automatically switch between all SD, HD and Ultra HD formats up to 2160p60. Your Teranex Mini – SDI Distribution 12G is perfect for distributing a single SDI signal to multiple devices such as monitors, switchers and encoders.



Connectors

1 **Mini-B USB Port**

The USB port lets you connect your converter to a Mac or Windows computer so you can adjust settings and update your converter's internal software.

2 **Switches**

Switches on the front of your Teranex Mini let you change settings using the tip of a pen.

3 **LED Status Indicator**

The LED glows white when the converter is receiving power and green when a valid video input signal is detected. When more than one Teranex Mini is connected to your computer, you can identify your converter using the 'identify' checkbox in Blackmagic Teranex Setup. When the checkbox is enabled, your converter's LED will flash on and off.

4 **Power**

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **SDI Out**

The 8 BNC connectors labeled 'SDI Out' let you connect 8 independent outputs to SDI video equipment.

6 **Ethernet PoE+**

The Ethernet connector lets you plug your Teranex Mini into a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet plus.

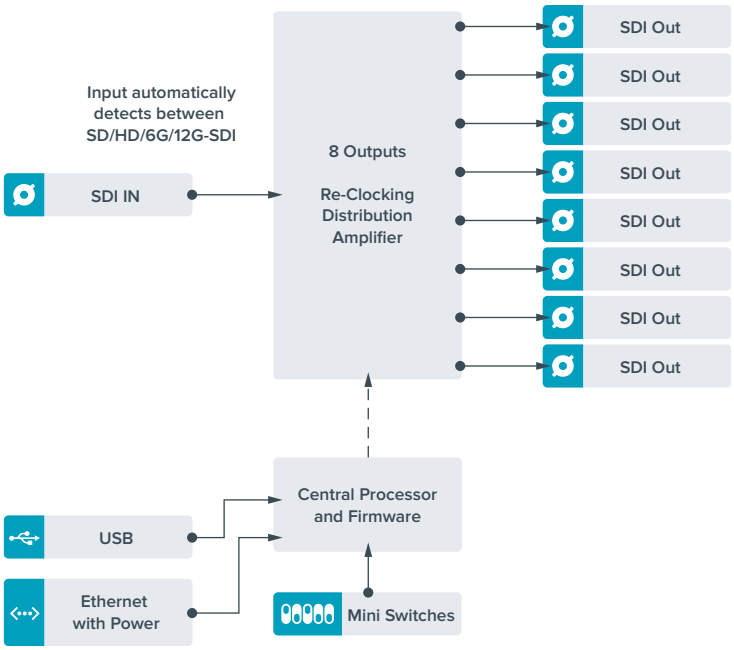
7 **SDI In**

Use this BNC connector to plug in your SDI source video.

Switches

There are no user settings required for Teranex Mini – SDI Distribution 12G.

Teranex Mini – SDI Distribution 12G Block Diagram



Teranex Mini – Optical to HDMI 12G

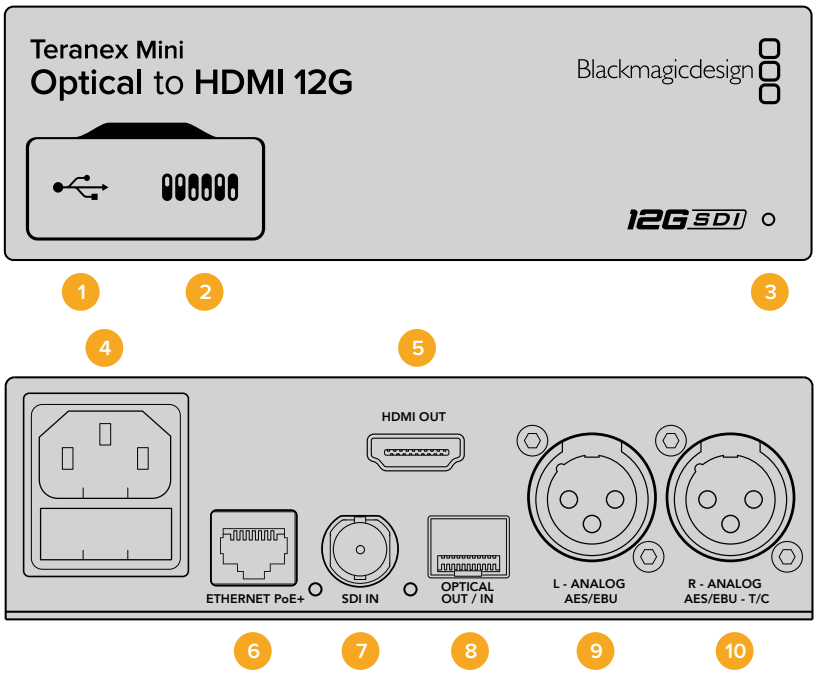
Your Teranex Mini – Optical to HDMI 12G model can be used to connect a huge range of HDMI displays and video projectors to equipment that supports SDI video via optical fiber. Your converter automatically switches between SD SDI, HD-SDI, 3G-SDI, 6G-SDI and 12G-SDI input sources and converts to HDMI with embedded audio, plus balanced AES/EBU or analog audio out. The 'R analog' XLR connector can also be set to output timecode.

The HDMI instant lock feature lets you lock the HDMI output so that changing sources using the same format is clean and glitch free. If your converter detects a HD monitor or TV connected to the HDMI output and has Ultra HD connected to the SDI or Optical input, the Ultra HD source will be automatically down converted so you can view the Ultra HD source on an HD monitor.

You can also load 3D LUTs for adding looks, grades, and color profiles to your converted output. The 3D LUT is a full 33 point hardware lookup table for greater accuracy with color manipulation and can even be used to accurately color calibrate consumer televisions so they can be used for critical color correction work.

The 3D LUT also allows color space conversions so different color spaces can be used with various displays.

Your Teranex Mini – Optical to HDMI 12G comes with two default LUTs, including color to monochrome and Blackmagic camera default color space to Rec. 709.



Connectors

1 **Mini-B USB Port**

Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2 **Switches**

Adjustable switches for changing settings.

3 **LED Status Indicator**

Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **HDMI Out**

HDMI video output.

6 **Ethernet PoE+**

Connects to a network switch or computer so you can change settings using the Teranex setup utility. The Ethernet port also supports power over Ethernet plus.

7 **SDI In**

SDI video input BNC connector.

8 **Optical Input and Output**

Optical video input and output LC connectors via optional SMPTE compatible SDI optical fiber module. The optical input automatically detects between SD/HD/6G/12G-SDI. The optical output can be used as a loop through output.

9 **L – Analog or AES/EBU**

Balanced left channel analog audio, or digital AES/EBU audio output XLR connector.

10 **R- Analog, AES/EBU or Timecode**

Balanced right channel analog audio, or digital AES/EBU audio output XLR connector. Can also be configured for timecode output.

Switches

Teranex Mini – Optical to HDMI 12G's switches provide the following settings:

Switches 8 – Analog Audio, AES/EBU Audio

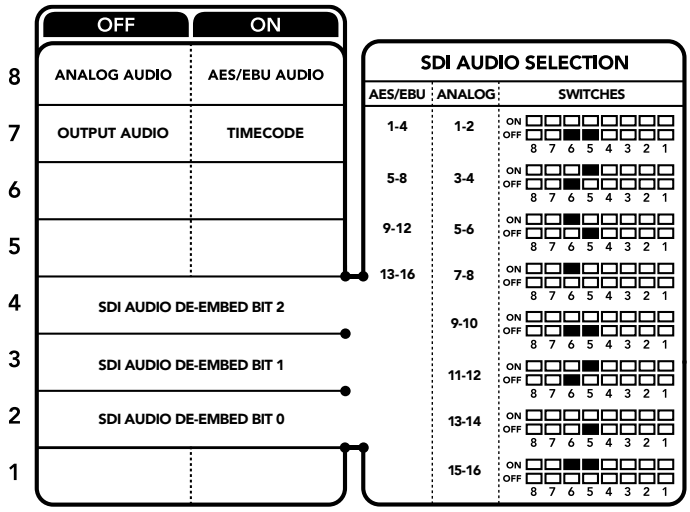
Set switch 8 to 'off' to output balanced analog audio. Set to 'on' for digital AES/EBU audio.

Switches 7 – Output Audio/Timecode

Set switch 7 to 'on' to output timecode via the R channel audio XLR connector. Set to 'off to' output audio.

Switches 4, 3, 2 – SDI Audio De-Embed Bit 2, 1, 0

Switches 4, 3 and 2 are represented as bits 2, 1, and 0 respectively. This simply means that by setting various on/off combinations for switches 4, 3, and 2, you can choose which pair of audio channels from your SDI or Optical input you would like to output to HDMI, analog or AES/EBU audio.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

SDI Audio Selection Table

By using the following combinations of switch settings, you can select which SDI or Optical audio channels to embed into your Teranex Mini – Optical to HDMI 12G's output signal.

Analog Audio Channels	Switch 4	Switch 3	Switch 2	Switch Diagram
1 and 2	OFF	OFF	OFF	
3 and 4	OFF	OFF	ON	

AES/EBU Audio Channels	Switch 4	Switch 3	Switch 2	Switch Diagram
1-4	OFF	OFF	OFF	
5-8	OFF	OFF	ON	
9-12	OFF	ON	OFF	
13-16	OFF	ON	ON	

Analog Audio Channels	Switch 4	Switch 3	Switch 2	Switch Diagram
5 and 6	OFF	ON	OFF	
7 and 8	OFF	ON	OFF	
9 and 10	ON	OFF	OFF	
11 and 12	ON	OFF	ON	
13 and 14	ON	ON	OFF	
15 and 16	ON	ON	ON	

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings. You can access these settings by moving between the ‘video,’ ‘audio,’ ‘configure,’ and ‘about’ tabs.

The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual. The ‘video’ tab for Teranex Mini – Optical to HDMI 12G contains the following settings.

Video Output Menu

Clip HDMI Output to Legal Levels

This checkbox controls clipping of your SDI and Optical input to ensure that it stays within HDMI legal levels and should be kept on by default.

HDMI Instant Lock

Select this checkbox to enable the HDMI instant lock feature. When HDMI instant lock is enabled, the HDMI output signal is kept active even when changing sources. This means your converter does not have to wait for the HDMI television or monitor to lock before displaying the video output as the HDMI signal is already locked. It’s important to note that this feature only works when changing sources using the same video standard.

The HDMI instant lock feature can introduce a small delay in video and audio, so if you need zero delay in your converted output you can bypass the HDMI instant lock feature by deselecting the checkbox.

33 Point 3D LUT

Your Blackmagic Teranex Mini – Optical to HDMI 12G supports .cube LUT files that can be created using DaVinci Resolve software, or other color correction software that can export . cube files.

You can load 2 separate LUTs by clicking on the ‘load’ button for each LUT slot, selecting the desired .cube file from your computer, and clicking ‘OK’. Click ‘save’ to confirm your settings. The LUT filename will appear next to each ‘load’ button so you know which LUT is being used for LUT 1 or LUT 2.

To turn a LUT on, simply click the ‘use LUT 1’ or ‘use LUT 2’ checkboxes. To turn the LUT off, click the ‘bypass LUT’ checkbox.

The 3D LUT can also be applied to your converter’s loop output by checking the ‘enable 3D LUT on loop SDI output’ checkbox. If you don’t want the LUT applied to the loop output simply deselect the checkbox.

If you have a Smart Panel installed, you can easily enable a LUT by pressing the 1 or 2 control panel buttons. Press the buttons again to turn a LUT off.

What is a 3D LUT?

A 3D LUT, or ‘3D Lookup Table’, is a file containing table of values that are used to modify the video colorspace to a new set of color values in a 3D cube space.

The color cube contains all the variations between the mix of each primary color, defined within three x, y, z spatial dimensions. This means the RGB channels in the SDI or Optical input video can be remapped to any other RGB output color in the HDMI video output. This is very powerful as it means any color can be mapped to any other color so you can perform very precise color adjustments for calibrating displays, or loading log gamma curves for display when working with different types of raw camera files on set where you want to see linear gamma.

To show how powerful 3D LUTs can be, one of the default LUTs loaded can convert your input video to black and white. This shows that all the input RGB colors are remapped via the 3D LUT to black and white RGB output values via the HDMI output. You can create your own 3D LUTs and upload them via the admin software and DaVinci Resolve even allows you to convert a color grade setting to a 3D LUT that you can then upload to your Teranex Mini – Optical to HDMI 12G. You can output the 3D LUT on the optical video loop output so you could even use your Teranex Mini as a dedicated 3D LUT color processor even if you don’t use the HDMI output!

For more information on how to create a 3D LUT .cube file, refer to the DaVinci Resolve manual which you can download from the Blackmagic Design website at www.blackmagicdesign.com/support.

The ‘audio’ tab for Teranex Mini – Optical to HDMI 12G contains the following settings.

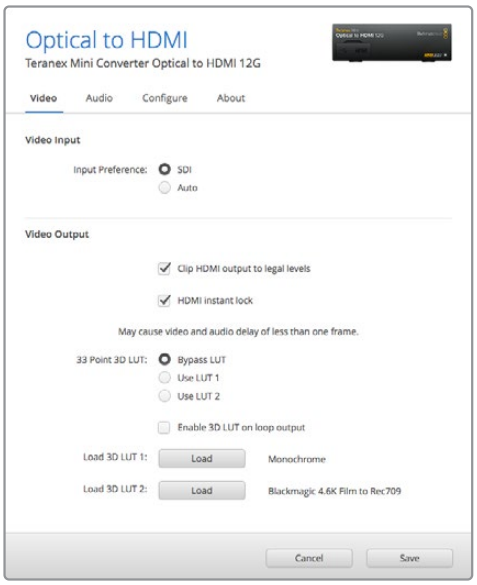
Audio Output Menu

Set XLR Output

You can choose between analog and AES/EBU output by highlighting the ‘analog,’ ‘AES/EBU,’ or ‘timecode’ buttons in the ‘audio output’ menu. When you select ‘timecode’ the left XLR connector will output analog audio, while the right XLR output will provide a timecode signal.

Depending on which audio output option you select, you can then pick which audio channels of your SDI or optical input to send to your HDMI, AES/EBU, or Analog audio output, as well as adjusting their gain per channel or channel pair. If you are outputting AES/EBU audio via both XLR connectors, you can select up to four channels. If you are outputting analog audio, you can select up to two channels. If you are using the right XLR connector to output a timecode signal, the left XLR connector will output one channel of analog audio.

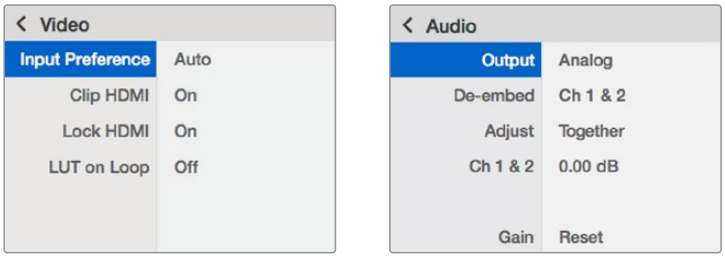
Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter's settings via software, you may need to toggle individual switches for new settings to take effect.



Blackmagic Teranex Setup lets you adjust settings such as HDMI instant lock to instantly resync the video signal when changing or routing sources, load 3D LUT files, change the XLR analog audio output levels, and more.

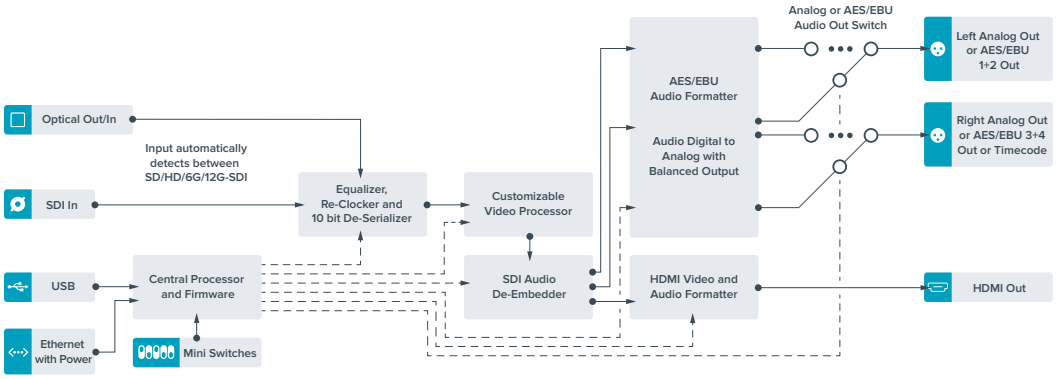
Teranex Mini Smart Panel Settings

If you have installed the optional Teranex Mini Smart Panel on your Optical to HDMI 12G converter, the following menus will be available – 'video,' 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section above. For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section.



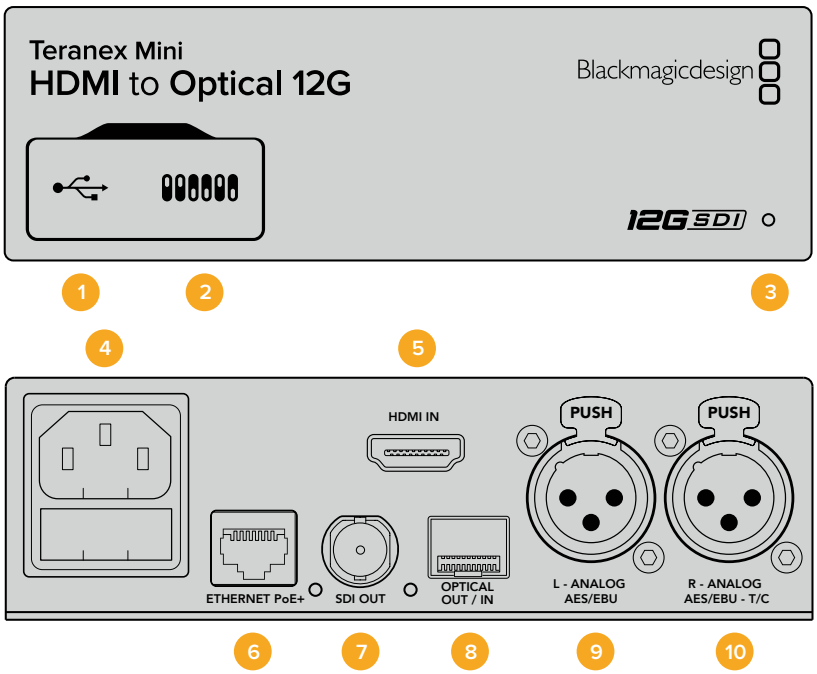
Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – Optical to HDMI 12G Block Diagram



Teranex Mini – HDMI to Optical 12G

Your Teranex Mini – HDMI to Optical 12G converts HDMI devices such as HDV cameras, Ultra HD cameras and game consoles to 12G-SDI BNC or optical fiber up to 2160p60, with the choice to embed audio from HDMI, AES/EBU or balanced analog audio inputs. This means you can send HDMI signals over long optical cable runs. It is ideal for converting HDMI consumer cameras or computers with HDMI outputs to SDI or optical fiber.



Connectors

1 **Mini-B USB Port**

Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2 **Switches**

Adjustable switches for changing settings.

3 **LED Status Indicator**

Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **HDMI In**

HDMI video input.

6 **Ethernet PoE+**

Connects to a network switch or computer so you can change settings using the Teranex setup utility. The Ethernet port also supports power over Ethernet plus.

7 **SDI Out**

SDI video output BNC connector.

8 **Optical Output**

Optical video output LC connector via optional SMPTE compatible SDI optical fiber module. The optical output automatically matches the input video.

9 **L – Analog or AES/EBU**

Balanced left channel analog audio, or digital AES/EBU audio output XLR connector.

10 **R- Analog, AES/EBU or Timecode**

Balanced right channel analog audio, or digital AES/EBU audio output XLR connector. Can also be configured for timecode output.

Switches

Teranex Mini – HDMI to Optical 12G's switches provide the following settings:

Switches 8 – Analog Audio, AES/EBU Audio

Set switch 8 to 'off' to embed balanced analog audio. Set to 'on' for digital AES/EBU audio. To use these inputs switch 7 must also be set to 'on'.

Switches 7 – HDMI Audio, Input Audio

Set switch 7 to 'off' to select embedded HDMI audio, or to 'on' for analog or AES/EBU audio.

Switch 6 – Input Audio/Timecode

Set switch 6 to 'on' to input timecode via the R channel audio XLR connector. Set to 'off' to input audio.

Switch 5 – 60 to 59.94 Off/On

When set to 'on', this setting will allow your converter to detect any HDMI source video running 1080p at 60 frames per second and automatically convert it to interlaced video at 59.94 fields per second.

For example, you may need to connect a computer's HDMI output to a switcher using the standard 1080i 59.94 frame rate. Some computers output 60 frames per second, so by setting switch 5 to 'on' your converter will always detect 1080p at 60 frames per second and convert it to 1080i at 59.94 fields per second.

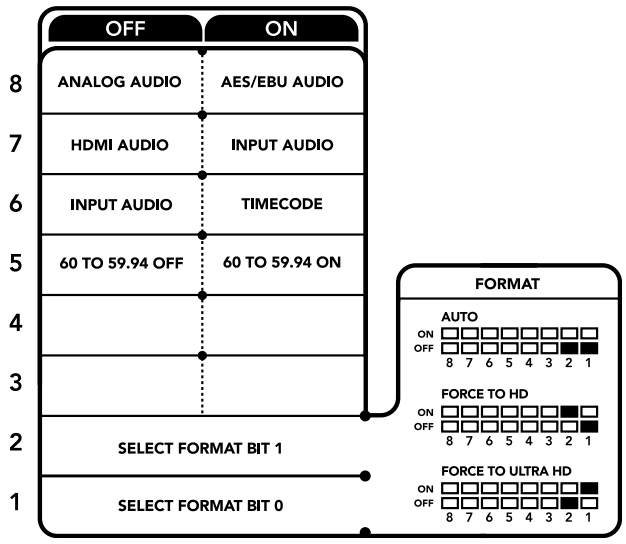
Switches 2, 1 – Select Format Bit 1, 0

When connecting an HDMI source that can output Ultra HD and HD, you can set your converter to force the source output to one or the other. This can be helpful when you want to record or display your computer's desktop on SDI or Optical equipment in HD so it is larger and easy to view.

While it may appear like it's an up or down conversion setting, what your converter is actually doing is telling your source equipment to output Ultra HD or HD video so that your converter can then output the source video's native HD or Ultra HD resolution without up or down conversion.

To force your source video to HD, Ultra HD, or to let your converter automatically negotiate the optimum resolution with your source equipment, simply use combinations of switches 1 and 2. The combination settings are shown below.

- **Auto – Switch 1 to OFF, Switch 2 to OFF.**
  Your converter will negotiate an optimum HD or Ultra HD resolution with your source equipment based on its output capabilities.
- **Force to HD – Switch 1 to OFF, Switch 2 to ON.**
  If your HDMI source equipment is capable of outputting HD and Ultra HD, your converter will instruct the source equipment to output HD video.
- **Force to Ultra HD – Switch 1 to ON, Switch 2 to OFF.**
  If your HDMI source equipment is capable of outputting HD and Ultra HD, your converter will instruct the source to output Ultra HD video.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings. You can access these settings by moving between the 'video,' 'audio,' 'configure,' and 'about' tabs.

The 'about' and 'configure' tabs are detailed in the 'changing settings' section in this manual.

The 'video' tab for Teranex Mini – HDMI to Optical 12G contains the following settings.

Video Processing Menu

Conversion

Click on the 'conversion' drop down menu to select conversion settings for your SDI or Optical output. Setting this to 'auto' will negotiate an optimum HD or Ultra HD resolution with your source equipment based on its output capabilities, while 'Force HD' and 'Force Ultra HD' will output HD and Ultra HD video respectively, regardless of the HDMI input. However, SD will remain SD.

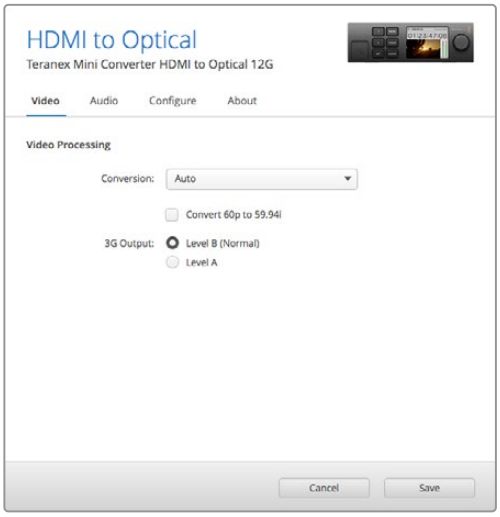
Frame Rate

When enabled, the frame rate feature tells your converter to detect a video source using 60 frames per second and automatically convert it to 59.94 frames per second. Select or deselect the checkbox to enable or disable the feature.

This feature is helpful when you want to connect an HDMI source outputting 60 frames per second to SDI or Optical equipment using a standard HD 59.94 frames per second format.

3G Output

The '3G Output' setting lets you select between Level A or Level B 3G-SDI via optical. This changes the 3G-SDI output standard to maintain compatibility with equipment that can receive only level A or level B 3G-SDI video. The default setting is Level B.



Select between 'auto', 'force to HD', or 'force to Ultra HD' conversion settings using the 'video' settings page in Blackmagic Teranex Setup. You can also set your converter to detect 60 frames per second video and automatically convert it to 59.94 frames per second for when connecting to video equipment using the standard 59.94 frame rate.

The 'audio' tab for Teranex Mini – HDMI to Optical 12G contains the following settings.

Audio Input Menu

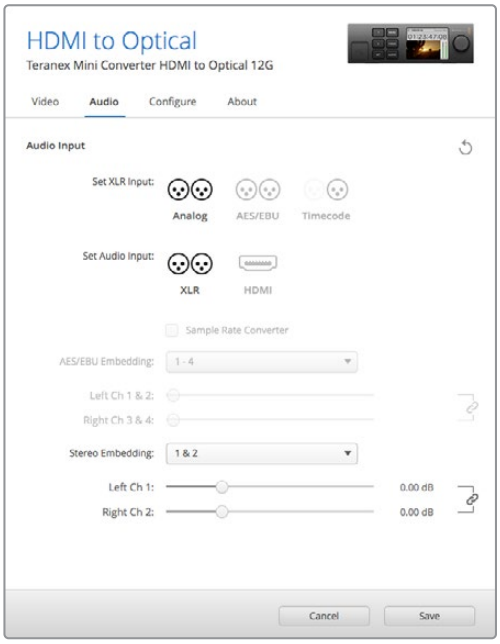
Set XLR Input / Set Audio input

This menu allows you to select between XLR and HDMI audio input. Selecting HDMI will embed the HDMI audio into the SDI or optical video output. Selecting 'XLR' lets you choose between analog, AES/EBU, and timecode inputs, as well as which channels of your SDI or optical audio output you wish to embed these into. You can also adjust the gain on the audio signal.

Selecting AES/EBU allows the additional option of checking 'sample rate converter.' When this is selected, the sample rate of your SDI or Optical audio output will be forced to 48kHz, the correct sample rate for television.

If you need to convert Dolby audio via an AES/EBU source that is sample locked to a reference, make sure you disable the sample rate converter by deselecting the checkbox, otherwise it may interfere with your Dolby audio conversion.

Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter's settings via software, you may need to toggle individual switches for new settings to take effect.

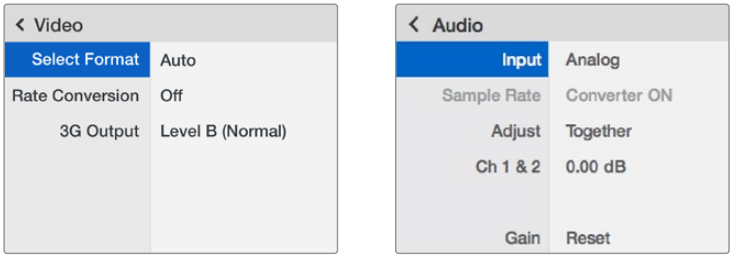


Adjust your analog audio levels and AES/EBU levels using the 'audio' settings page in Blackmagic Teran5ex Setup.

Teranex Mini Smart Panel Settings

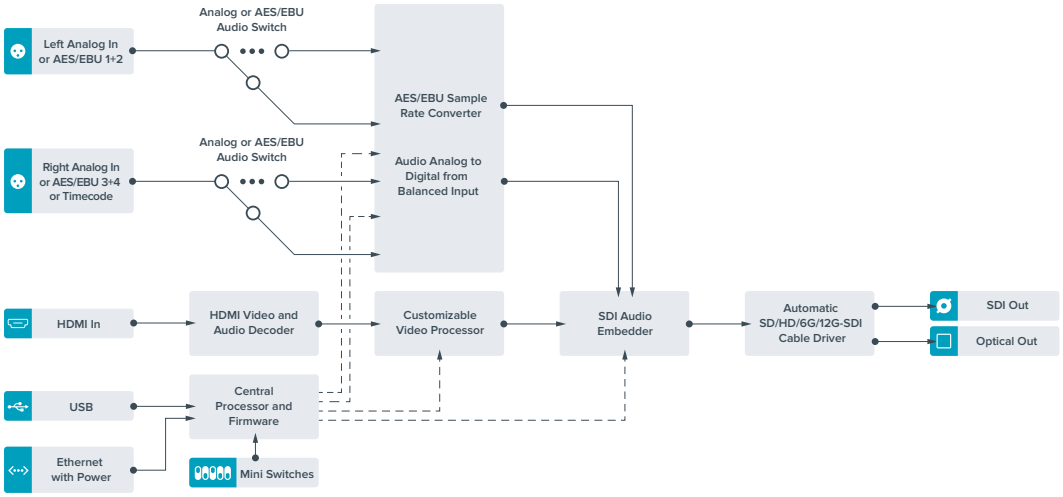
If you have installed the optional Teranex Mini Smart Panel on your HDMI to Optical 12G converter, the following menus will be available – 'video,' 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the section above.

For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.



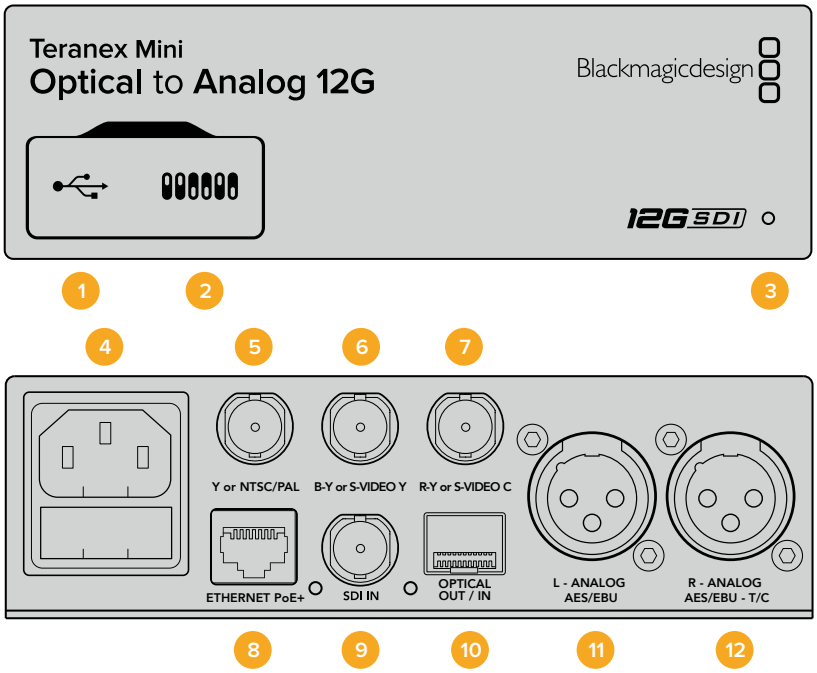
Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – HDMI to Optical 12G Block Diagram



Teranex Mini – Optical to Analog 12G

Your Teranex Mini – Optical to Analog 12G lets you convert from SD SDI, HD-SDI, 3G-SDI, 6G-SDI and 12G-SDI and Optical fiber input sources to analog component, NTSC and PAL video out, plus balanced AES/EBU and analog audio out. The built in down converter lets you connect 12G-SDI video via BNC or optical fiber inputs to SD and HD analog equipment and easily connects to video monitors and decks such as Betacam SP and VHS. You can even output pairs of analog audio from 16 de-embedded SDI and optical audio channels.



Connectors

1. **Mini-B USB Port**
   Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2. **Switches**
   Adjustable switches for changing settings.

3. **LED Status Indicator**
   Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4. **Power**
   Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5. **Y or NTSC/PAL**
   Analog component Y, NTSC or PAL composite output BNC connector.

6. **B-Y or S-VIDEO Y**
   Analog component B-Y, or S-Video Y output BNC connector.

7. **R-Y or S-VIDEO C**
   Analog component R-Y, or S-Video C output BNC connector.

8. **Ethernet PoE+**
   Connects to a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet plus.

9. **SDI In**
   SDI video input BNC connector.

10. **Optical Input and Output**
    Optical video input and output LC connectors via optional SMPTE compatible SDI optical fiber module. The optical input automatically detects between SD/HD/6G/12G-SDI. The optical output can be used as a loop through output.

11. **L – Analog or AES/EBU**
    Balanced left channel analog audio, or digital AES/EBU audio output XLR connector.

12. **R – Analog, AES/EBU or Timecode**
    Balanced right channel analog audio, or digital AES/EBU audio output XLR connector. Can also be configured for timecode output.

Switches

Teranex Mini – Optical to Analog 12G's switches provide the following settings:

Switch 8 – Analog Audio, AES/EBU Audio

Set switch 8 to 'off' to select balanced analog audio, or to 'on' for digital AES/EBU audio output.

Switch 7 – 7.5 IRE, 0.0 IRE

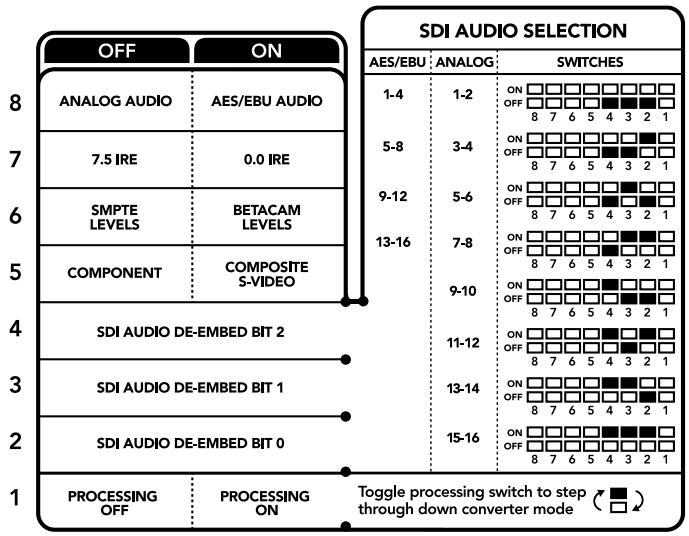
The USA and countries using NTSC with 7.5 setup should set switch 7 to 'off'. If you're working in countries not using 7.5 setup, for example Japan, set switch 7 to 'on'. This setting only affects composite or S-Video outputs.

Switch 6 – SMPTE Levels, Betacam Levels

Set switch 6 to ‘off’ for SMPTE levels, or ‘on’ for Betacam levels. SMPTE levels are more common and even Betacam SP decks can use SMPTE levels, so only switch this to Betacam if you are sure that Betacam levels are being used.

Switch 5 – Component, Composite or S-Video

Set switch 5 to ‘off’ to select analog component video output, or ‘on’ for composite and S-Video outputs. To display the HD video input as SD on the S-Video and composite outputs, down conversion must be set to ‘on’ by toggling switch 1. Component analog video supports both HD and SD video.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

Switch 4, 3 and 2 – SDI Audio De-Embed

Switches 4, 3 and 2 are represented as bits 2, 1, and 0 respectively. This simply means that by setting various on/off combinations for switches 4, 3, and 2, you can choose which pair of audio channels from your SDI or optical input you would like to output to analog or AES/EBU audio.

Switch 1 – Processing Off – Processing On

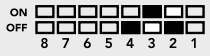
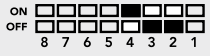
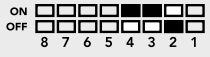
Switch 1 lets you change the aspect ratio conversion that occurs when down converting Ultra HD or HD inputs to SD analog outputs. This occurs because Ultra HD and HD formats are presented in a 16:9 widescreen ratio of width to height, whereas SD is a taller 4:3 ratio.

The three options for aspect ratio conversion you can toggle through here are anamorphic, center cut and letterbox. These stretch, crop, and add black bars to the top and bottom of your image, respectively. To switch between these, simply toggle switch 1 on and off to move through the available options. Each time switch 1 is set to ‘on,’ the aspect ratio type will move ahead one option.

The behavior of switch 1 also changes depending on the analog output format you are using. Composite video is always standard definition, so setting switch 1 to ‘off’ simply leaves the last aspect ratio conversion option in place. However, component video can support a HD signal, so when you are converting video from an SD source to a component output, setting switch 1 to ‘off’ will output a widescreen HD analog signal, with no aspect ratio conversion.

SDI Audio Selection Table

By using the following combinations of switch settings, you can select which SDI audio channels to output as analog or digital AES/EBU audio with your Teranex Mini – Optical to Analog 12G.

Analog Audio Channels	Switch 4	Switch 3	Switch 2	Switch Diagram
1 and 2	OFF	OFF	OFF	
3 and 4	OFF	OFF	ON	
5 and 6	OFF	ON	OFF	
7 and 8	OFF	ON	ON	
9 and 10	ON	OFF	OFF	
11 and 12	ON	OFF	ON	
13 and 14	ON	ON	OFF	
15 and 16	ON	ON	ON	

AES/EBU Audio Channels	Switch 4	Switch 3	Switch 2	Switch Diagram
1-4	OFF	OFF	OFF	
5-8	OFF	OFF	ON	
9-12	OFF	ON	OFF	
13-16	OFF	ON	ON	

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings.

You can access these settings by moving between the ‘video,’ ‘audio,’ ‘configure,’ and ‘about’ tabs.

The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.

The ‘video’ tab for Teranex Mini – Optical to Analog 12G contains the following settings.

Video Output Menu

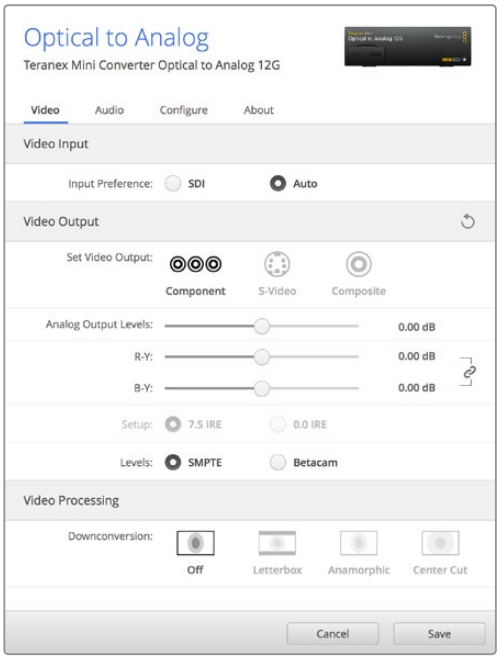
This lets you pick between component, or s-video and composite video output as well as setting the luminance and chroma levels, and the B-Y and R-Y component levels independently.

If you have selected s-video and composite output, you can additionally choose between 7.5 IRE and 0.0 IRE black levels, depending on the region you are working in. If you have selected component video, you can switch between SMPTE and Betacam levels. SMPTE levels are more common and even Betacam SP decks can use SMPTE levels, so only switch this to Betacam if you are sure that Betacam levels are being used.

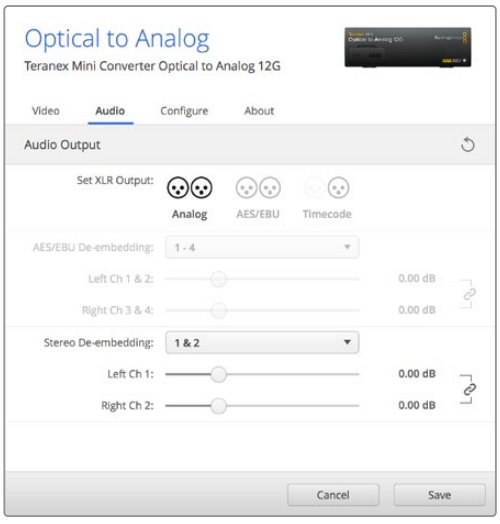
Video Processing Menu

This menu allows you to set the aspect ratio of down converted video. The options are letterbox, anamorphic, center cut or no processing.

The ‘audio’ tab for Teranex Mini – Optical to Analog 12G contains the following settings.



Adjust your video luminance and chroma levels and component chroma levels using the ‘video’ settings page in Blackmagic Teranex Setup.



Adjust your analog audio levels and AES/EBU levels using the ‘audio’ settings page.

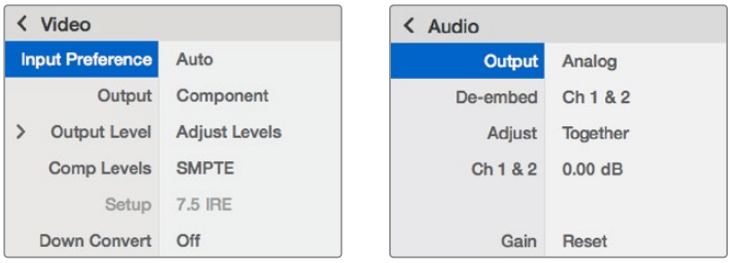
Audio Output Menu

This menu allows you to select between analog, AES/EBU, and timecode audio outputs, as well as which channels of your SDI audio input you wish to de-embed. You can also adjust the gain on the audio output.

Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter's settings via software, you may need to toggle individual switches for new settings to take effect.

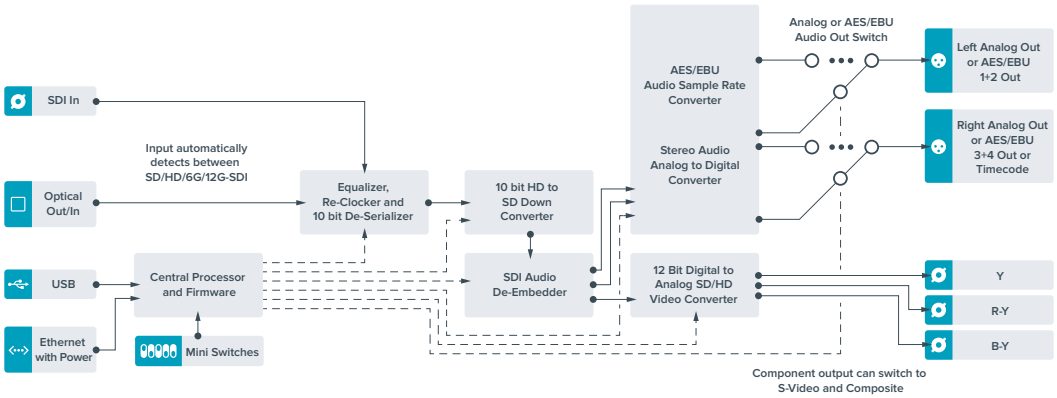
Teranex Mini Smart Panel Settings

If you have installed the optional Teranex Mini Smart Panel on your Optical to Analog 12G converter, the following menus will be available – 'video,' 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section above. For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.



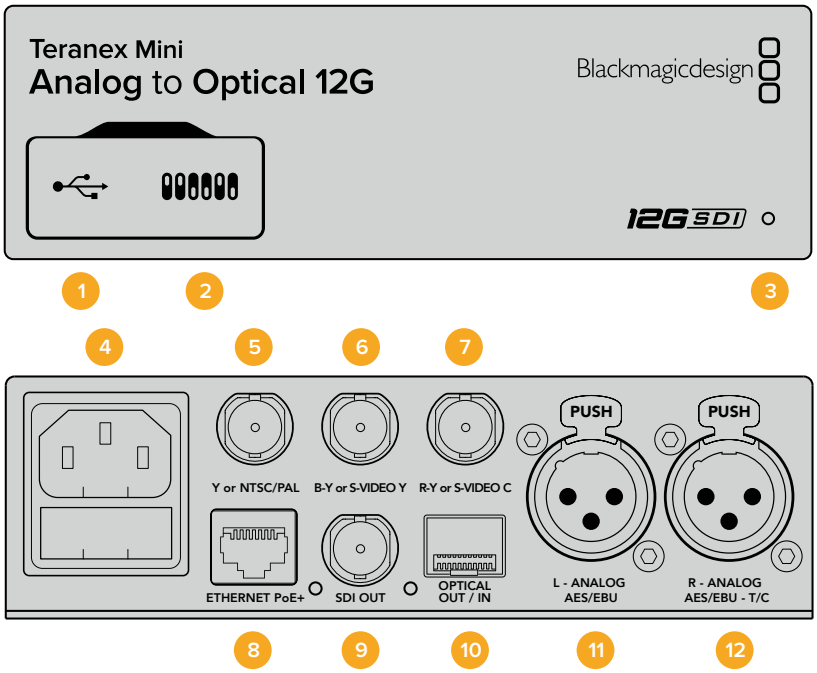
Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – Optical to Analog 12G Block Diagram



Teranex Mini – Analog to Optical 12G

Your Teranex Mini Analog to Optical 12G lets you convert video and audio from analog equipment such as Betacam SP decks, HDV cameras and game consoles to 12G-SDI via BNC or optical fiber outputs. A choice of analog input formats is supported, including component SD/HD, S-Video, or composite NTSC and PAL. The converter's 12G-SDI and optical outputs include the option to embed digital AES/EBU or analog audio.



Connectors

1 **Mini-B USB Port**
Connects to the Teranex setup utility via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2 **Switches**
Adjustable switches for changing settings.

3 **LED Status Indicator**
Glows white when the converter is receiving power and green when a valid video inputsignal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**
Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **Y or NTSC/PAL**
Analog component Y, NTSC or PAL composite input BNC connector.

6 **B-Y or S-VIDEO Y**
Analog component B-Y, or S-Video Y input BNC connector.

7 **R-Y or S-VIDEO C**
Analog component R-Y, or S-Video C input BNC connector.

8 **Ethernet PoE+**

Connects to a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet plus.

9 **SDI Out**

SDI video output BNC connector.

10 **Optical Output**

Optical video output LC connector via optional SMPTE compatible SDI optical fiber module. The optical output automatically matches the input video.

11 **L – Analog or AES/EBU**

Balanced left channel analog audio, or digital AES/EBU audio input XLR connector.

12 **R – Analog, AES/EBU or Timecode**

Balanced right channel analog audio, or digital AES/EBU audio input XLR connector. Can also be configured for timecode input.

Switches

Teranex Mini – Analog to Optical 12G's switches provide the following settings:

Switch 8 – Analog Audio, AES/EBU Audio

Set switch 8 to OFF to select balanced analog audio, or to ON for digital AES/EBU audio input.

Switch 7 – 7.5 IRE – 0.0 IRE

The USA and countries using NTSC with 7.5 setup should set switch 7 to OFF. If you're working in countries not using 7.5 setup, set switch 7 to ON. This setting only affects composite or NTSC S-Video outputs.

Switch 6 – SMPTE Levels – Betacam Levels

This setting selects between SMPTE or Betacam video levels. Set switch 6 to OFF for SMPTE levels, or to ON for Betacam levels. SMPTE levels are more common and even Betacam SP decks can use SMPTE levels so only switch this to Betacam if you are sure that Betacam levels are being used.

	OFF	ON
8	ANALOG AUDIO	AES/EBU AUDIO
7	7.5 IRE	0.0 IRE
6	SMPTE LEVELS	BETACAM LEVELS
5	COMPONENT	COMPOSITE or S-VIDEO
4	COMPOSITE	S-VIDEO
3	SD TO HD OFF	SD TO HD ON
2	HD TO UHD OFF	HD TO UHD ON
1	INPUT AUDIO	TIMECODE

The switch legend on the base of your Teranex Mini gives you all the information you need to change conversion settings.

Switch 5 – Component, Composite or S-Video

Set switch 5 to OFF to select analog component video input, or to ON for composite video and S-Video analog inputs.

Switch 4 – Composite – S-Video

Set switch 4 to OFF to select composite video input, or to ON for S-Video input.

Switch 3 – SD to HD

Set switch 3 to 'on' to up convert the SDI or Optical output resolution from SD to HD if the Composite, S-Video or Component inputs are SD. Set to 'off' to match the input resolution.

Switch 2 – HD to UHD

Set switch 2 to 'on' to up convert SDI or Optical output resolution to Ultra HD if the Component video input is HD. Set to 'off' to match the input resolution.

Switch 1 – Input Audio / Timecode

Set switch 1 to 'on' to input timecode via the R channel audio XLR connector. Set to 'off' to input audio.

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings.

You can access these settings by moving between the 'video,' 'audio,' 'configure,' and 'about' tabs.

The 'about' and 'configure' tabs are detailed in the 'changing settings' section in this manual. The 'video' tab for Teranex Mini Analog to Optical 12G contains the following settings.

Video Input Menu

This lets you pick between component, s-video, and composite video input as well as setting the luminance and chroma levels, and the B-Y and R-Y component levels independently.

If you have selected S-Video or composite input, you can additionally choose between 7.5 IRE and 0.0 IRE black levels, depending on the region you are working in.

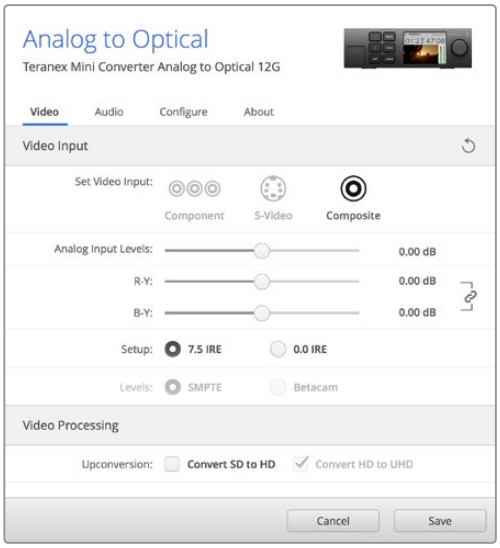
If you have selected component video, you can switch between SMPTE and Betacam levels. SMPTE levels are more common and even Betacam SP decks can use SMPTE levels, so only switch this to Betacam if you are sure that Betacam levels are being used.

Video Processing Menu

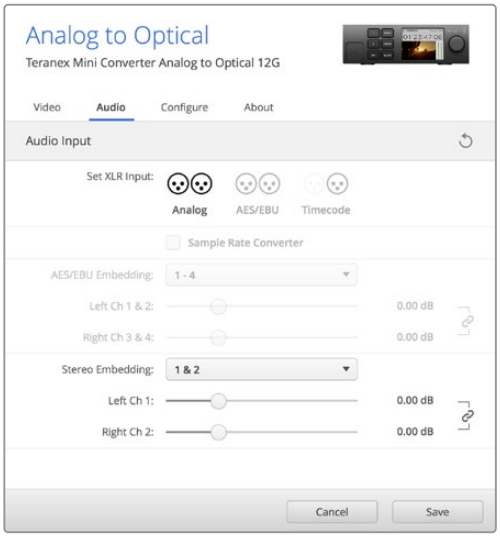
This menu allows you to set up conversion options, dependent on your analog video input.

Component video inputs can be converted from SD to HD, and HD to Ultra HD. S-Video and composite inputs can only be converted from SD to HD.

The 'audio' tab for Teranex Mini Analog to Optical 12G contains the following settings.



Adjust your video luminance and chroma levels and component chroma levels using the ‘video’ settings page in Blackmagic Teranex Setup.



Adjust your analog audio levels and AES/EBU levels using the ‘audio’ settings page.

Audio Input Menu

This menu allows you to select between analog, AES/EBU, and timecode audio inputs, as well as which channels of your SDI or optical audio output you wish to embed these into. You can also adjust the gain on the audio signal.

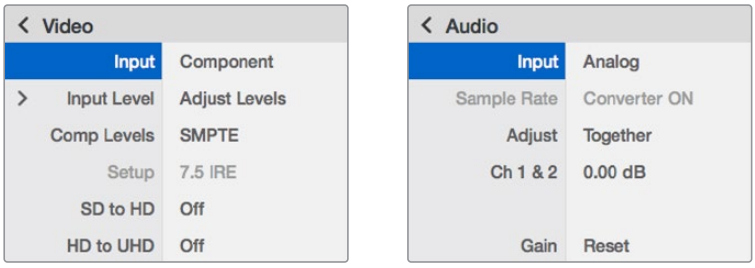
Selecting AES/EBU allows the additional option of checking ‘sample rate conversion.’ When this is selected, the sample rate of your SDI or optical audio output will be up or down converted to 24-bit, 48kHz.

Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter’s settings via software, you may need to toggle individual switches for new settings to take effect.

Teranex Mini Smart Panel Settings

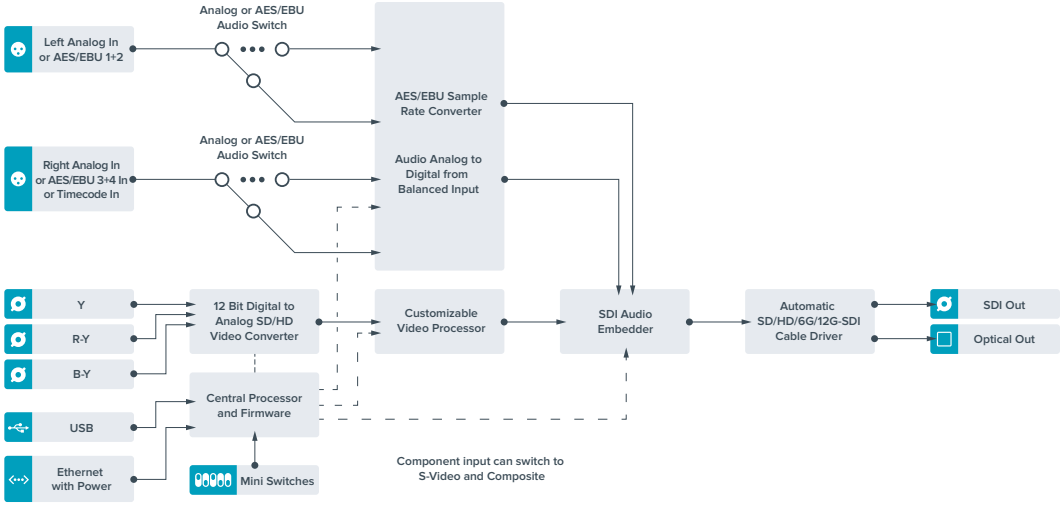
If you have installed the optional Teranex Mini Smart Panel on your Analog to Optical 12G to converter, the following menus will be available – ‘video,’ ‘audio,’ and ‘network.’ The settings available in these menus are identical to those detailed in the ‘Blackmagic Teranex Setup settings’ section above.

For more information on changing settings using the Teranex Mini Smart Panel, refer to the ‘changing settings’ section in this manual.



Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

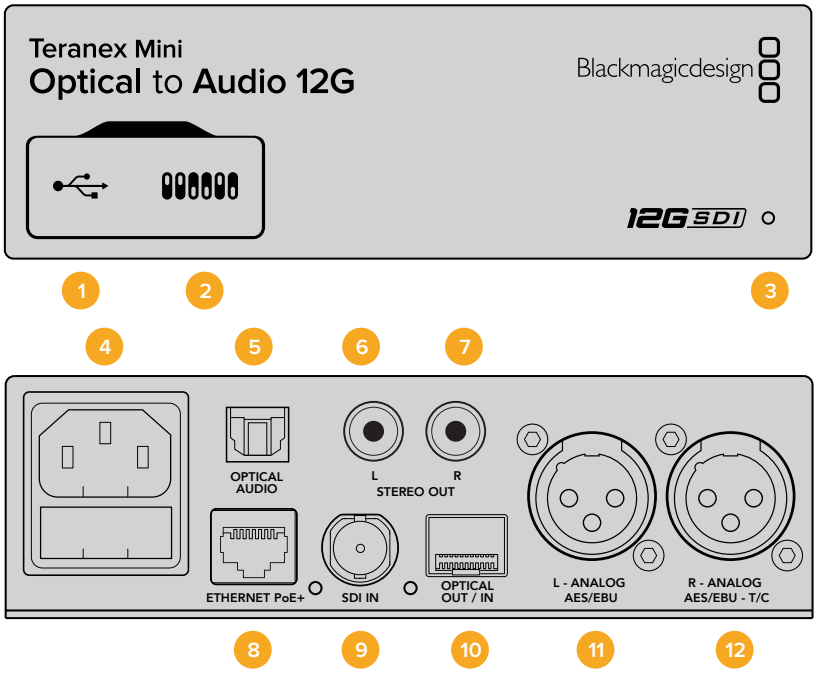
Teranex Mini – Analog to Optical 12G Block Diagram



Teranex Mini – Optical to Audio 12G

With Teranex Mini Optical to Audio 12G you can de-embed audio from any SD, HD or Ultra HD Optical fiber or 12G-SDI video connection and output to two channels of analog audio or four channels of AES/EBU digital. Output to audio equipment such as audio mixers, analog decks and reference monitors.

Additional SDI audio channels can be de-embedded by daisy chaining another Teranex Mini SDI to Audio 12G to your converter’s SDI output.



Connectors

1 **Mini-B USB Port**

Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2 **Switches**

Adjustable switches for changing settings.

3 **LED Status Indicator**

Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**

Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **Optical S/PDIF Audio Output**

S/PDIF Signal with TOSLINK Connector.

6 **L – Unbalanced HiFi Analog Line Level Output**

Unbalanced left channel analog audio output RCA connector.

7 **R – Unbalanced HiFi Analog Line Level Output**

Unbalanced right channel analog audio output RCA connector.

8 **Ethernet PoE+**

Connects to a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet.

9 **SDI In**

SDI video input BNC connector.

10 Optical Input and Output

Optical video input and output LC connectors via optional SMPTE compatible SDI optical fiber module. The optical input automatically detects between SD/HD/6G/12G-SDI. The optical output can be used as a loop through output.

11 L – Analog or AES/EBU

Balanced left channel analog audio, or digital AES/EBU audio output XLR connector.

12 R – Analog, AES/EBU or Timecode

Balanced right channel analog audio, or digital AES/EBU audio output XLR connector. Can also be configured for timecode output.

Switches

Teranex Mini Optical to Audio 12G's switches provide the following settings:

Switch 8 – Analog Audio, AES/EBU Audio

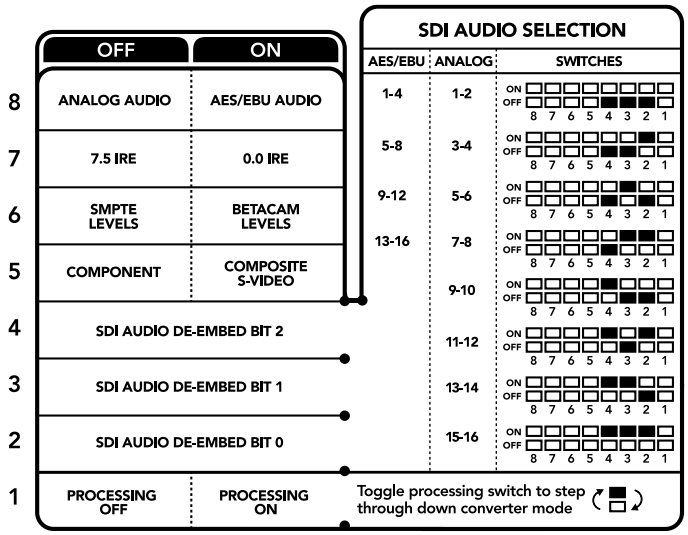
Set switch 8 to OFF to select balanced analog audio, or to ON for digital AES/EBU audio output.

Switch 7 – Output Audio/Timecode

Set switch 7 to 'on' to output timecode via the R channel audio XLR connector. Set to 'off' to output audio.

Switches 6, 5, 4 – SDI Audio De-Embed Bit 2, 1, 0

Switches 6, 5 and 4 are represented as bits 2, 1 and 0 respectively. This simply means that by setting various on/off combinations for switches 6, 5 and 4, you can choose which audio channels to de-embed from the SDI or optical input signal into your audio output.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

SDI Audio De–Embed Table

Analog Audio Channels	Switch 6	Switch 5	Switch 4	Switch Diagram
1-2	OFF	OFF	OFF	
3-4	OFF	OFF	ON	
5-6	OFF	ON	OFF	
7-8	OFF	ON	ON	
9-10	ON	OFF	OFF	
11-12	ON	OFF	ON	
13-14	ON	ON	OFF	
15-16	ON	ON	ON	

AES/EBU Audio Channels	Switch 6	Switch 5	Switch 4	Switch Diagram
1-4	OFF	OFF	OFF	
5-8	OFF	OFF	ON	
9-12	OFF	ON	OFF	
13-16	OFF	ON	ON	

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings.

You can access these settings by moving between the ‘audio,’ ‘configure,’ and ‘about’ tabs.

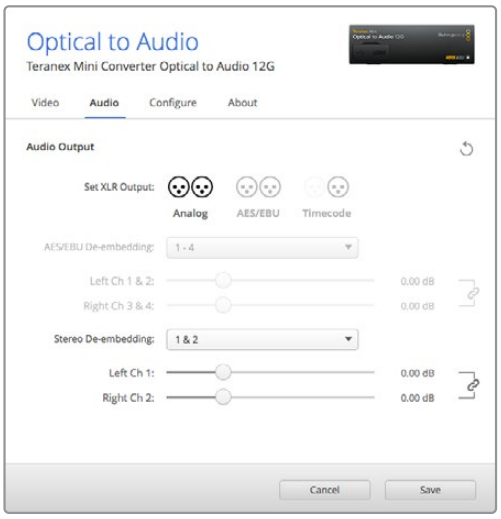
The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.

The ‘audio’ tab for Teranex Mini Optical to Audio 12G contains the following settings.

Audio Output Menu

This menu allows you to select between analog, AES/EBU, and timecode audio outputs, as well as which channels of your SDI or optical audio input you wish to de-embed. You can also adjust the gain on the audio output.

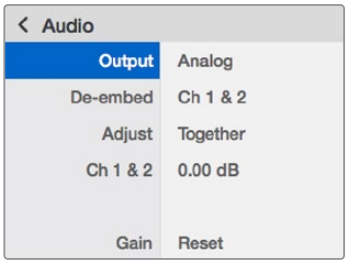
Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Teranex setup utility. If reverting to switch control after removing the Smart Panel or updating your converter’s settings via software, you may need to toggle individual switches for new settings to take effect.



Adjust your analog audio levels and AES/EBU levels using the 'audio' settings page in Blackmagic Teranex Setup.

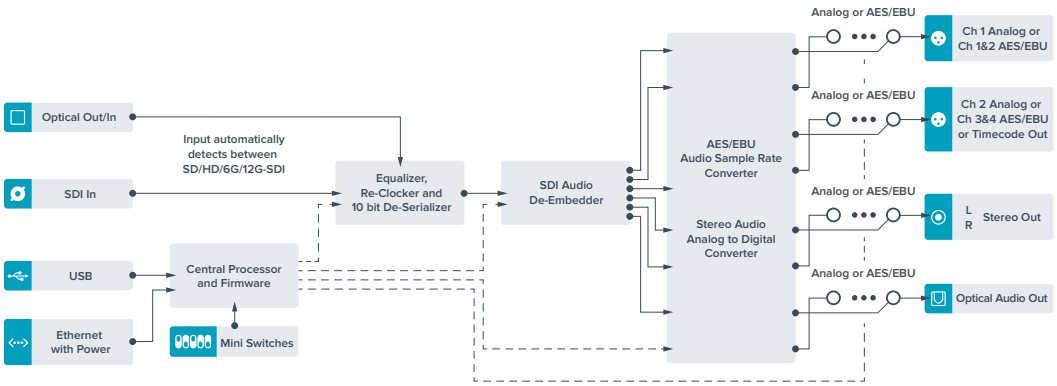
Teranex Mini Smart Panel Settings

If you have installed the optional Teranex Mini Smart Panel on your Optical to Audio 12G converter, the following menus will be available – 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section above. For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.



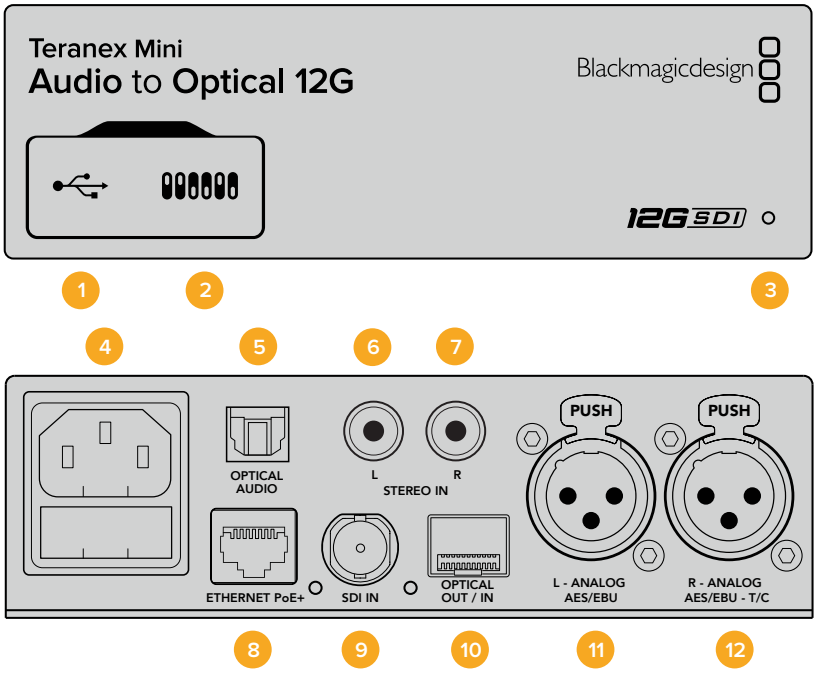
Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – Optical to Audio 12G Block Diagram



Teranex Mini – Audio to Optical 12G

With Teranex Mini Audio to Optical 12G, you can embed two channels of analog audio, or four channels of AES/EBU digital audio into any SD, HD, Ultra HD or DCI 4K SDI video connection. You can use this Teranex Mini to embed audio from equipment, such as audio mixers and analog decks to optical fiber so you can connect across longer distances. Additional SDI audio channels can be embedded by daisy chaining another Teranex Mini Audio to Optical 12G to your converter's optical or SDI output.



Connectors

1 **Mini-B USB Port**
Connects to the Blackmagic Teranex Setup software via a Mac or Windows computer for adjusting settings and updating your Teranex Mini's internal software.

2 **Switches**
Adjustable switches for changing settings.

3 **LED Status Indicator**
Glows white when the converter is receiving power and green when a valid video input signal is detected. Will flash on/off to identify individual converters via Blackmagic Teranex Setup.

4 **Power**
Standard built in IEC C14 connector for 90 – 240 volt AC power supply.

5 **Optical S/PDIF Audio Input**
S/PDIF Signal with TOSLINK Connector.

6 **L – Unbalanced HiFi Analog Line Level Input**
Unbalanced left channel analog audio input RCA connector.

7 **R – Unbalanced HiFi Analog Line Level Input**
Unbalanced right channel analog audio input RCA connector.

8 **Ethernet PoE+**
Connects to a network switch or computer so you can change settings using Blackmagic Teranex Setup. The Ethernet port also supports power over Ethernet.

9 **SDI In**
SDI video input BNC connector.

10 **Optical Input and Output**
Optical video input and output LC connectors via optional SMPTE compatible SDI optical fiber module. The optical input automatically detects between SD/HD/6G/12G-SDI. The optical output provides the converted video with embedded audio.

11 **L – Analog or AES/EBU**
Balanced left channel analog audio, or digital AES/EBU audio input XLR connector.

12 **R – Analog, AES/EBU or Timecode**
Balanced right channel analog audio, or digital AES/EBU audio input XLR connector. Can also be configured for timecode input.

Switches

Teranex Mini Audio to Optical 12G's switches provide the following settings:

Switch 8, 7 – Input Audio Selection Bit 1, 0
Switches 8 and 7 are represented as bits 1 and 0, respectively. This simply means that by setting various on/off combinations for switches 8 and 7 you can select from four input audio options.

Switch 6, 5, 4 – Embed Audio Bit 2, 1, 0
Switches 6, 5, and 4 are represented as bits 2, 1, and 0, respectively. This simply means that by setting various on/off combinations for switches 6, 5, and 4 you can select which channels of your SDI or optical signal you wish to embed audio into.

If you are embedding analog audio, there are eight combinations, allowing you to embed audio into the channel pairs from 1-2 through to 15-16.

If you are embedding AES/EBU audio, there are four combinations. You can select between embedding audio into channels 1 to 4, 5 – 8, 9 – 12, or 13 – 16.

Switch 3 – Sample Rate Conversion, No Sample Rate Conversion
Set switch 3 to OFF to enable sample rate conversion, or ON to disable sample rate conversion. This switch should almost always be set to OFF to ensure audio is embedded at the correct sample rate for television.

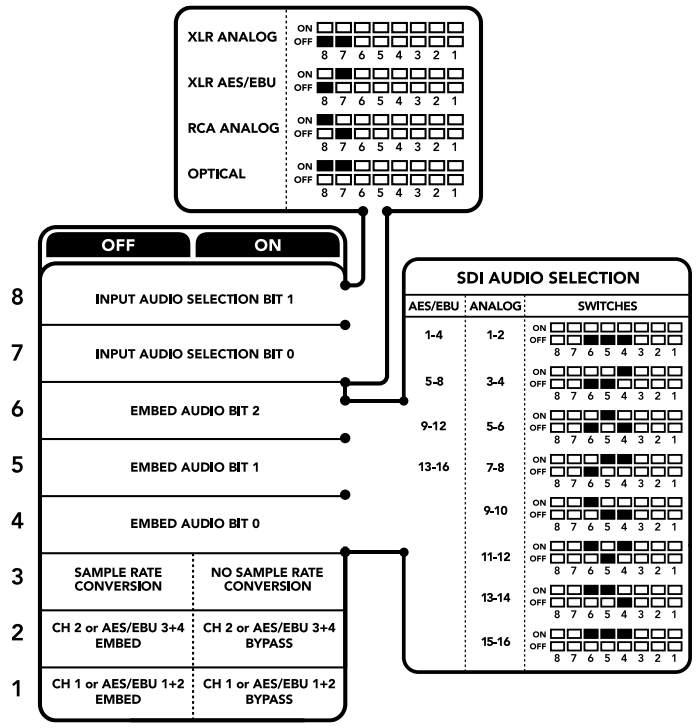
When switch 3 is set to OFF this setting converts the sample rate of your analog or AES/EBU audio and embeds audio into the optical output at a sample rate of 48 kHz.

Switch 2 – Ch 2 or AES/EBU 3+4 Embed / Bypass
Once you have selected your audio channels, use switches 2 and 1 to select which channels to embed or disable. The disable setting lets you avoid overwriting audio channels you wish to keep in the audio signal.

Set switch 2 to ON to bypass channel 2, or AES/EBU channels 3 and 4. Set switch 1 to ON to bypass channel 1, or AES/EBU channels 1 and 2.

Switch 1 – Ch 1 or AES/EBU 1+2 Embed/Bypass

See switch 2 description.



The switch legend on the base of your converter gives you all the information you need to change conversion settings.

Audio Selection Tables

Input Audio Channels	Switch 8	Switch 7	Switch Diagram
XLR Analog	OFF	OFF	
XLR AES/EBU	OFF	ON	
RCA Analog	ON	OFF	
Optical	ON	ON	

SDI Channel Tables

Analog Audio Channels	Switch 6	Switch 5	Switch 4	Switch Diagram
1-2	OFF	OFF	OFF	
3-4	OFF	OFF	ON	
5-6	OFF	ON	OFF	

Analog Audio Channels	Switch 6	Switch 5	Switch 4	Switch Diagram
7-8	OFF	ON	ON	
9-10	ON	OFF	OFF	
11-12	ON	OFF	ON	
13-14	ON	ON	OFF	
15-16	ON	ON	ON	

AES/EBU Audio Channels	Switch 6	Switch 5	Switch 4	Switch Diagram
1-4	OFF	OFF	OFF	
5-8	OFF	OFF	ON	
9-12	OFF	ON	OFF	
13-16	OFF	ON	ON	

Blackmagic Teranex Setup Settings

The Teranex setup utility can change all the same settings that are available using the switches, plus additional settings.You can access these settings by moving between the ‘audio,’ ‘configure,’ and ‘about’ tabs in Blackmagic Teranex Setup. The ‘about’ and ‘configure’ tabs are detailed in the ‘changing settings’ section in this manual.

The ‘audio’ tab for Teranex Mini Audio to Optical 12G contains the following settings.

Audio Input Menu

This menu allows you to select between RCA, XLR, and optical inputs.

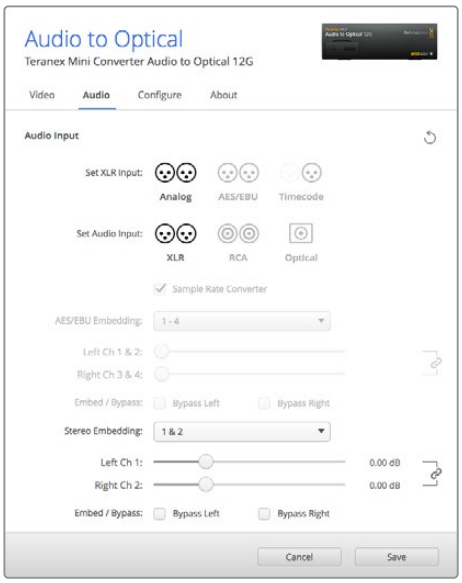
If you have selected XLR, you can further select between analog, AES/EBU, and timecode inputs.

Selecting AES/EBU allows the additional option of checking ‘sample rate conversion.’ When this is selected, the sample rate of your optical audio output will be forced to 48kHz, the correct sample rate for television.

The audio input menu also allows you to chose which channel pair, or channel quad in the case of AES/EBU audio, of your SDI or optical signal you wish to embed audio into, as well as adjusting the audio gain.

You can bypass channels or channel pairs if you want to avoid overwriting audio in your SDI or optical signal.

Your Teranex Mini will retain its last settings whether applied via switch, Smart Panel or Blackmagic Teranex Setup. If reverting to switch control after removing the Smart Panel or updating your converter's settings via software, you may need to toggle individual switches for new settings to take effect.

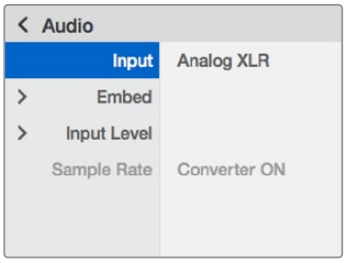


Adjust your analog audio levels and AES/EBU levels using the 'audio' settings page in Blackmagic Teranex Setup.

Teranex Mini Smart Panel Settings

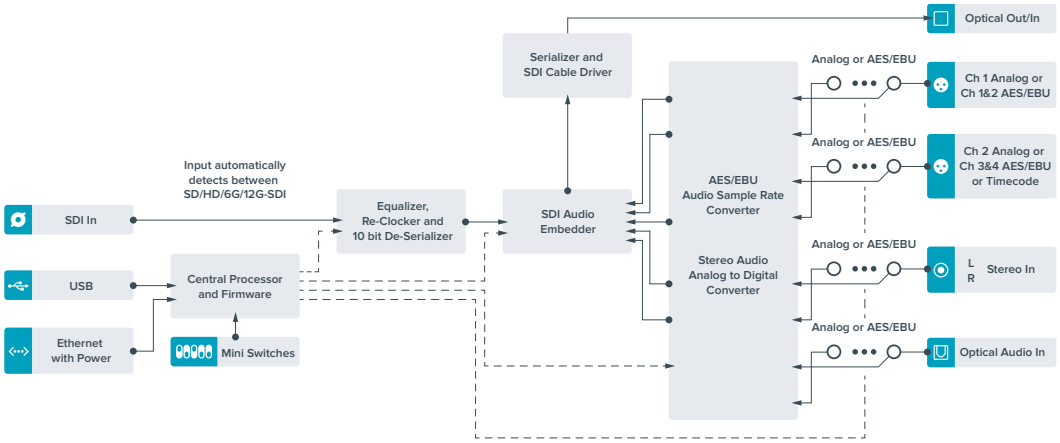
If you have installed the optional Teranex Mini Smart Panel on your Audio to Optical 12G converter, the following menus will be available – 'audio,' and 'network.' The settings available in these menus are identical to those detailed in the 'Blackmagic Teranex Setup settings' section above.

For more information on changing settings using the Teranex Mini Smart Panel, refer to the 'changing settings' section in this manual.



Using Teranex Mini Smart Panel gives you access to the same settings as Blackmagic Teranex Setup.

Teranex Mini – Audio to Optical 12G Block Diagram



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 Mini.

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.

Contacting Blackmagic Design Support

If you can't find the help you need in our support material, 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 Software Version Currently Installed

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

On macOS, open Blackmagic Teranex Setup from the Applications folder. Select About Blackmagic Teranex Setup from the application menu to reveal the version number.

On Windows 10, open Blackmagic Teranex Setup from your Start menu. Click on the Help menu and select About Blackmagic Teranex Setup to reveal the version number.

How to Get the Latest Software Updates

After checking the version of Blackmagic Teranex Setup 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.

Regulatory Notices

Disposal of waste of electrical and electronic equipment within the European union.

The symbol on the product indicates that this equipment must not be disposed of with other waste materials. In order to dispose of your waste equipment, it must be handed over to a designated collection point for recycling. The separate collection and recycling of your waste equipment at the time of disposal will help conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city recycling office or the dealer from whom you purchased the product.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this product in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at personal expense.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

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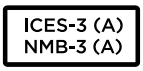
MSIP-REM-BMD-201509012, MSIP-REM-BMD-201509010, MSIP-REM-BMD-201511005, MSIP-REM-BMD-201511003, MSIP-REM-BMD-201509011, MSIP-REM-BMD-201509009, MSIP-REM-BMD-201602003, MSIP-REM-BMD-201602004, MSIP-REM-BMD-201602005, R-REM-BMD-201804006, MSIP-REM-BMD-201611008, MSIP-REM-BMD-201611005, MSIP-REM-BMD-201611006, MSIP-REM-BMD-201611003, MSIP-REM-BMD-201611007, MSIP-REM-BMD-201611004, R-R-BMD-201909005, MSIP-REM-BMD-201509013

ISED Canada Statement



This device complies with Canadian standards for Class A digital apparatus.

Any modifications or use of this product outside its intended use could void compliance to these standards.

Connection to HDMI interfaces must be made with high quality shielded HDMI cables.

State of California Statement

This product can expose you to chemicals such as trace amounts of polybrominated biphenyls within plastic parts, which is known to the state of California to cause cancer and birth defects or other reproductive harm.

For more information go to www.P65Warnings.ca.gov.

Safety Information

This equipment must be connected to a mains socket outlet with a protective earth connection.

To reduce the risk of electric shock, do not expose this equipment to dripping or splashing.

This equipment is suitable for use in tropical locations with an ambient temperature of up to 40°C.

Ensure that adequate ventilation is provided around the product and is not restricted.

When rack mounting, ensure the ventilation is not restricted by adjacent equipment.

No operator serviceable parts inside. Refer servicing to your local Blackmagic Design service centre.

Use only at altitudes not more than 2000m above sea level.

This product has the facility to connect small form-factor transceiver (SFP) optical fibre modules. Only use Laser class 1 optical SFP modules.

Recommended Blackmagic Design SFP modules:

– 3G-SDI: PL-4F20-311C-BMD

– 6G-SDI: PL-8F10-311C-BMD

– 12G-SDI: PL-TG10-311C-BMD

Warranty

36 Month Limited Warranty

Blackmagic Design warrants that Teranex Minis will be free from defects in materials and workmanship for a period of 36 months from the date of purchase excluding connectors, cables, fiber optic modules, fuses and batteries which 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 charges, 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.

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