Epiphan AV.io SDI

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Product feedback

Your feedback is important! We regularly contact our customers to ensure our products meet your performance and reliability requirements. We strive to continually enhance our products to accommodate your needs. Please let us know how you think we can improve our products by emailing your suggestions to info@epiphan.com.

Specifications

Go to the USB Video Grabbers page of the Epiphan Video website to get the most recent product specifications and additional information about AV.io SDI.

Warranty

All Epiphan Video products are provided with a 100% return to depot warranty for one year from the date of purchase.

Technical support

Epiphan's products are backed by our professional support team. If you are having issues with your product, please gather details about your system and contact our team by:

- E-mailing support@epiphan.com
- Live chat via the link on our support site
- Phone toll free at 1-877-599-6581 or call +1 613-599-6581

Be sure to include as much information about your problem as possible, including:

- Problem description •
- Details of the video or audio source (type, resolution, refresh rate, etc.)
- Product serial number
- Your operating system and version number

Firmware 2.0.4 release notes

Firmware 2.0.4 is the inaugural release for AV.io SDI, bringing the effortless, high-quality video capture experience from AV.io HD to SDI cameras and professional video mixing consoles.

Overview

AV.io SDI is the easiest SDI capture card you'll ever use. It doesn't need any special drivers installed on your computer – plug it in to your USB port and start using it right away. It's as simple as using a webcam! Windows, Mac and Linux operating systems automatically detect AV.io SDI ensuring compatibility with your favorite software, including Skype, Wirecast and QuickTime.

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Quickstart

Setting up your AV.io SDI device to capture live video and audio content couldn't be easier!

Before you begin the connection process, you will require:

1. A 3G-SDI, HD-SDI or SD-SDI video source (with or without audio)

2. Your AV.io SDI device

3. A capture computer, laptop or notebook

4. A USB 3.0 cable (included with purchase) to connect to your AV.io SDI to your capture computer

5. An SDI cable (included with purchase) to connect your video source to your AV.io SDI

Once you have these things ready to go, you can now begin the simple process of hooking up your AV.io SDI so you can start capturing!

To connect your AV.io SDI for capture:
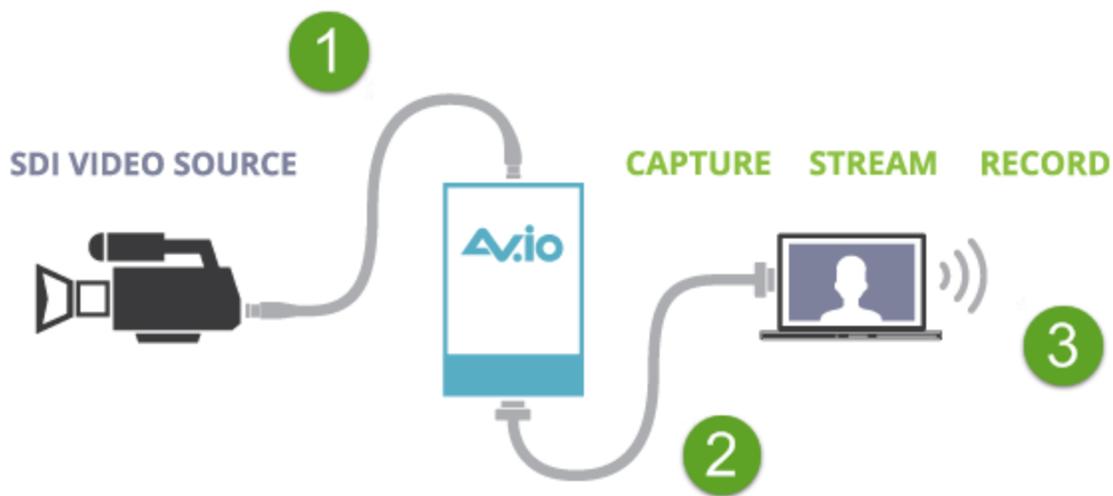
1. Connect your AV.io SDI device to your video source

2. Connect your AV.io SDI device to your computer

3. Open your favorite third-party application, select AV.io SDI from the list of available cameras and start capturing!

And that's it! No drivers to install and no extensive set-up! Just connect the cables and you're ready to go!

Getting started

Welcome and thank you for buying Epiphan Video's AV.io SDI!

This guide contains all the information necessary to successfully use AV.io SDI to quickly and easily capture live video content without any configuration – simply connect the cables and you're ready to go!

This guide starts off by jumping right into it by showing you how to start capturing video, then we'll take you through how AV.io SDI works, followed with some technical reference material, and we'll conclude with a walkthrough of some optional video capture configuration.

Let's get started!

What's In The Box?

Your AV.io HD product contains everything you need to easily capture live video content with minimal setup. Your purchase includes the following:

AV.io SDI video grabber		Your video capture device!
SDI cable (0.5 m)		Connects an SDI source to your AV.io SDI.

USB 3.0 cable (1 m)		The USB 3.0 cable connects your AV.io HD video grabber with your computer's USB 3.0 or 2.0 port.

System requirements

System requirements are the barebones technical essentials your computer needs to work with AV.io SDI. System requirements to use AV.io SDI include:

Video source	A 3G-SDI, HD-SDI or SD-SDI video source.
Video capture workstation	Any computer (laptop/desktop/other format) with: - a compatible USB 3.0 host controller for SuperSpeed operation; or, - a USB 2.0 controller
Video capture workstation operating system	Windows 7, Windows 8.1, Windows 10 Mac OS X 10.10 and up Linux distribution with kernel 3.5.0 or higher
Processor frequency	Minimum recommended value: 2.4 GHz
RAM	Minimum recommended value: 4 GB

Technical specifications

Technical specifications for AV.io SDI are included in the table below.

Connectors	BNC style SDI connector USB standard B type
Input	SDI (3G-SDI, HD-SDI, SD-SDI) with BNC-style connector
Audio (SDI) Input	16-bit and 24-bit PCM encoded audio at 48 kHz
Audio (UAC) output	16-bit 48 kHz stereo audio
Output color space	YUV 4:2:2
Supported output resolutions (at 15, 30 or 60 fps)	640×360 640×480 960×540 1280×720 1920×1080

Capture delay	Near-zero latency, although certain third-party applications may contribute to delay
OS support (32-bit and 64-bit)	Windows 7, Windows 8.1, Windows 10 Mac OS X 10.10 and up Linux distribution with kernel 3.5.0 or higher
USB support	USB 3.0 and 2.0

Hardware

This section describes the physical features of your AV.io SDI, including diagrams and hardware feature descriptions.

Topics covered include:

- Hardware diagrams; and,
- Indicator LED details

Hardware diagrams

Your AV.io SDI device includes an input, an output and an indicator light.

Input/output ports and indicator lights are identified and explained in the top and bottom cap view AV.io SDI images below. Indicator light details are explained in the proceeding section.

Top cap view:

Bottom cap view:
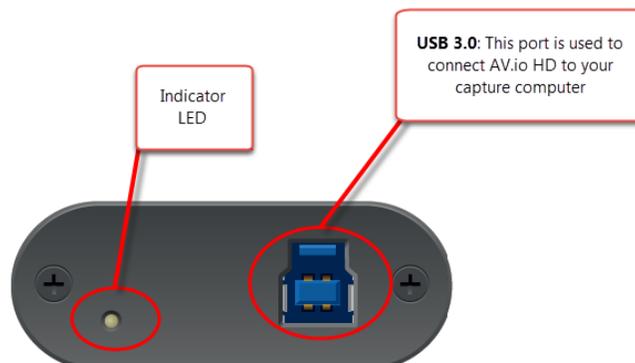
Indicator LED details

The color and action of the indicator LED depends on whether you are connected by USB 3.0 or USB 2.0. For maximum performance, always use a USB 3.0 port and the included USB 3.0 cable. Note that frame capture rate will be reduced when connected via USB 2.0.

If you're not sure if your controller is USB 3.0 or USB 2.0, plug AV.io SDI into the capture computer and look at the indicator LED. After initial boot up (red LED), blue is used for USB 3.0 and green is used for USB 2.0:

Blue LED means USB 3.0   Green LED means USB 2.0

Connection type/LED color	USB 3.0 connection	USB 2.0 connection
Solid red	• Firmware update in progress • AV.io SDI initializing	• Firmware update in progress • AV.io SDI initializing
Solid green	–	USB 2.0 connection active
Blinking green	-	Video and/or audio transferring successfully
Solid blue	USB 3.0 connection active	–
Blinking blue	Video and/or audio transferring successfully	-

Capture

Setting up your AV.io SDI device to capture live video content couldn't be easier!

Before you begin the connection process, you will require:

1. A 3G-SDI, HD-SDI or SD-SDI video source

2. Your AV.io SDI device

3. A capture computer, laptop or notebook

4. A USB 3.0 cable (included with purchase) to connect to your AV.io SDI to your capture computer

5. An SDI cable (included with purchase) to connect your video source to your AV.io SDI

Once you have these things ready to go, you can now begin the simple process of hooking up your AV.io SDI so you can start capturing!

Set up your AV.io SDI for capture

Connecting your AV.io SDI to your capture computer is simple and is accomplished in three easy steps.

To connect your AV.io SDI for capture:
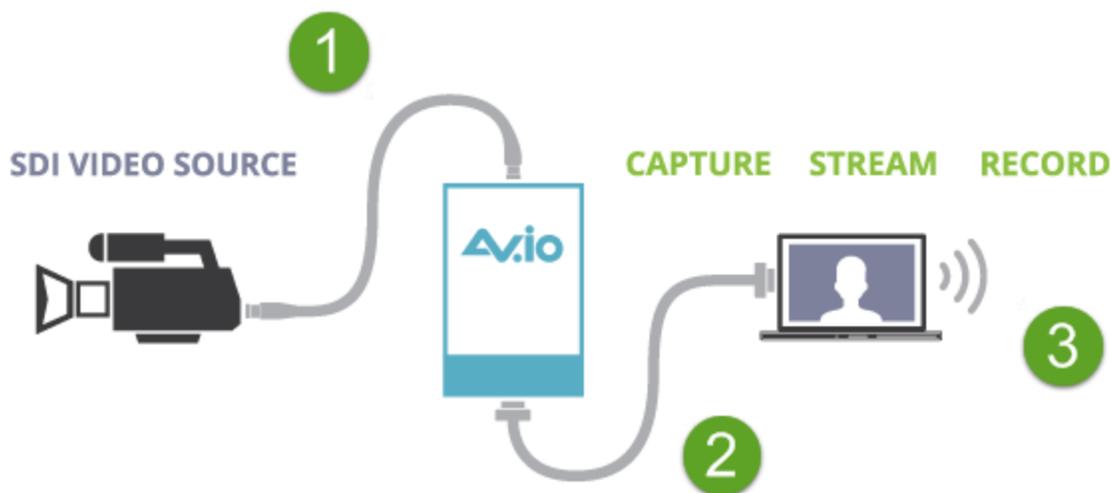
1. Connect your AV.io SDI device to your video source

2. Connect your AV.io SDI device to your desktop computer, laptop or notebook

3. Open your favorite third-party application, select AV.io SDI from the list of available cameras and start capturing!

And that's it! No drivers to install and no extensive set-up! Just connect the cables and you're ready to go!

How AV.io SDI works

Once you're ready to start capturing, you'll need either a built-in or third-party application to capture video and audio content with AV.io SDI.

The application communicates with AV.io SDI and negotiates a **frame rate** (frequency at which frames in a video sequence are displayed) and **frame size** (size of a single video frame in pixels). Higher frame rate means smoother video capture while frame size determines the aspect ratio of the video output as well as its size and degree of crispness.

With the help of AV.io SDI, the content from your video source is automatically configured and captured on your computer through your selected application. If the application requests a frame size that is smaller or larger than your video source, AV.io SDI automatically scales the video for you. For consistent output, audio is automatically resampled to 16-bit 48 kHz stereo audio.

No configuration required!

Resolutions, capture rates and aspect ratios

The **resolution** (also known as frame size or display mode) of a video signal, digital image, TV screen, computer monitor or other display device is a count of the number of pixels displayed horizontally and vertically. For example the resolution 1920×1080 (which is 1080p) creates an image that is 1920 pixels wide and 1080 pixels tall.

AV.io SDI generates a list of the following possible resolutions for your capture application to select for output display:

640×360	960×540	1920×1080
640×480	1280×720	

Captured video content is output to your application at **15, 30 or 60 frames per second** (your application chooses one of these frame rates) when captured over USB 3.0.

The **aspect ratio** of an image describes the proportional relationship between its pixel width and height. The resolution 1920×1080 (1080p) is quite a bit wider than it is tall. The ratio of its width to height is 16 to 9, represented as an aspect ratio 16:9.

AV.io SDI outputs resolutions in commonly supported aspects ratios, color-coded according to table of resolutions above and described in the table below:

Aspect Ratio	Common Use
4:3	Standard letterbox TV display and non-widescreen computer displays, SD-SDI resolution
16:9	Widescreen (HD) TV displays (1080p, 1080i, 720p etc)

Automatic image scaling & audio resampling

If your source content is larger or smaller than the frame size chosen by the application, AV.io SDI automatically **scales your source** to match the desired frame size! No user configuration required!

AV.io SDI also automatically performs **audio resampling**, meaning that no matter the bit depth or frequency of audio through an HDMI audio source, AV.io SDI automatically resamples your audio so that your application gets a consistent audio sample rate and bit depth, even if you change the video source!

Third-party applications

AV.io SDI uses pre-installed drivers on your OS (called **UVC drivers** and **UAC drivers**) to communicate with third-party applications and capture content. Due to AV.io SDI's use of UVC/UAC technology, there is no need for driver installation. Just like a webcam, your AV.io SDI device is immediately recognized as a camera device (like a web cam) and can be used to capture content via any UVC-compatible third-party application.

Third-party applications that work with AV.io SDI include, but are not limited to the following list. Try your favorite capture application!

Zero-install applications (included with your OS)		
Skype (with Windows 8.1 and Windows 10)	**Windows Camera app** (with Windows 8.1 and Windows 10)	**Quicktime** (with Mac OS X)

Popular applications available for download		
Skype	**Wirecast**	**Quicktime**
Adobe FMLE	**VLC media player**	

Configuration options

Your AV.io SDI device is ready to use right out of the box; however, there is support for additional configuration should you need it. Changes can be made to your AV.io SDI's default settings and firmware updates can be applied via Epiphan's AV.io Config tool.

Detailed instructions on how to use AV.io Config can be found using the links below:

- Install the AV.io Config tool
- Configure settings using AV.io Config tool
- Update firmware using the AV.io Config tool

The AV.io Config tool allows you to change several settings to make changes to your video capture experience if necessary. Most users won't need to use this utility for anything other than firmware updates, but advanced users may find these tweaks help them get the most out of their AV.io SDI.

These settings include: **input signal resolution**, **aspect ratio preservation, audio pair selection** and **performance mode** .

Input signal resolution (disabled by default)

When enabled, your AV.io SDI adds the exact resolution of your input signal to the list of supported output resolutions. This is the only way to enable 1:1 capture for special frame sizes. However it is important to note that the capture resolution is still dictated by the third-party application and this application can override any AV.io SDI custom capture settings. Also note that in selecting this mode, any change in input signal (programmatic or by connecting a different input) causes AV.io SDI to renegotiate its resolution with the application. This can cause an interruption in the captured stream.

Preserve aspect ratio (enabled by default)

When enabled, your AV.io SDI preserves the aspect ratio of your input signal by adding black bars to the sides or top and bottom of the frame (only for cases when the application using the signal requests a frame size with a different aspect ratio). For example, with this option enabled, a 4:3 input signal gets black bars added to the sides of the image when viewed in an application that requests a 16:9 aspect ratio. With this option disabled, the 4:3 image is instead stretched to fit the full 16:9 size.

Audio pair selection (disabled by default)

Your AV.io SDI can capture one of the (up to) 8 audio channel pairs provided over SDI. Use this option to allow your third party application to choose which audio pair to capture. By default, this is disabled and the first audio pair is captured.

Performance mode (enabled by default)

When enabled, your AV.io SDI enters and exits system suspend mode (i.e. sleep) faster by disabling support for the Suspend/U3 USB power state. This means AV.io SDI starts working again faster after your computer wakes from a system suspend state, at the cost of increased power consumption. Disabling this setting is ideal in situations where power consumption needs to be monitored, such as battery preservation in laptops.

Now that you've learned what these settings do, you may want to Configure settings using AV.io Config tool or Update firmware using the AV.io Config tool.

Install the AV.io Config tool

Epiphan's AV.io Config tool is used for loading firmware updates on your AV.io SDI and for advanced settings changes.

> You may install AV.io Config on the same computer(s) where you use AV.io SDI, or only on one computer for configuration. All firmware updates and settings changes are saved to the device and work without any software installed on the computer.

To install the AV.io Config tool, follow the directions below for your computer's Operating Sytem.

Windows

1. Download the AV.io Config package under the **Windows** heading on the AV.io SDI Downloads page on Epiphan's web site.

2. Extract all the files from the zip file (remember the location you're unzipping to).

3. Browse to the unzip folder and open the AV.io Config tool by double-clicking on **AVioConfig.exe**. (Depending on your local security settings, you may need to right-click and choose to run the file as an administrator).

4. AV.io Config starts! If you video grabber is connected to the computer by USB, it is detected.

Mac

1. Download the AV.io Config package under the **Mac OS X** heading on the AV.io SDI Downloads page on Epiphan's web site.

2. Double-click the downloaded file to open the disk image package.

3. If desired, drag the AVioConfig application to your desktop or another location where you will find it for future use.

4. Double-click the AVioConfig application icon to launch AV.io Config; a warning box appears.
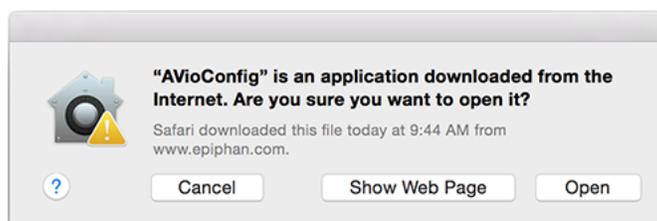
5. Click **Open**.

6. AV.io Config starts! If you video grabber is connected to the computer by USB, it is detected.

Linux

1. Download the AV.io Config package under the **Linux** heading on the AV.io SDI Downloads page on Epiphan's web site.

2. Untar and unzip the contents of the .tar.bz2 file (tar -xjvf can be used to untar and unzip in one command).

3. Browse (or change directories) to the unzip folder.

4. Either: Double-click the AV.io Config application icon or execute the AV.io Config application from the command line to launch AV.io Config (./AVioConfig).

5. AV.io Config starts! If you video grabber is connected to the computer by USB, it is detected.

Configure settings using AV.io Config tool

Epiphan's AV.io Config tool gives advanced users the ability to change several settings to their video capture experience. The settings that can be changed include: Re-numerate input signal resolution, aspect ratio preservation, audio pair selection and performance mode. See Configuration options

To change the configurable settings with the AV.io Config tool:

1. If needed, install the AV.io Config tool. For details specific to your OS, see Install the AV.io Config tool.

2. Connect your AV.io SDI device to your computer, laptop or notebook.

3. Open the AV.io Config tool.

4. Select your AV.io SDI device from the list under the Devices heading.

If your video grabber is not displayed, press the Refresh icon to refresh the list of connected devices.

5. Click the **Settings** tab; the settings page appears.
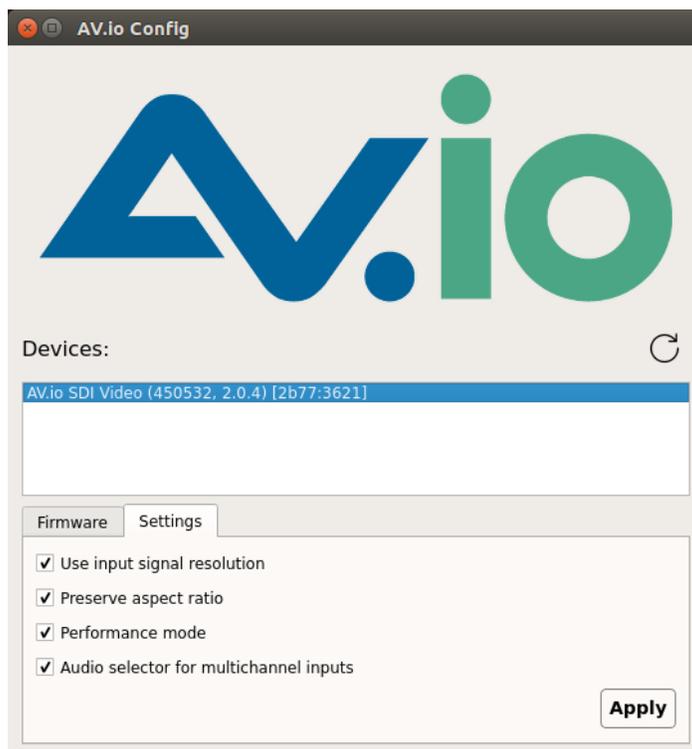
6. Enable or disable the individual settings by clicking each checkbox according to your needs. See
    Configuration options for a description of each setting.

Update firmware using the AV.io Config tool

From time-to-time Epiphan Video releases firmware updates for our video grabbers. If you register your product and agree to be notified of product updates, you'll receive an email when there is an AV.io SDI update available for download.

When new firmware is available, you can load this firmware onto your AV.io SDI using the AV.io Config tool and the steps below.

> 🛑 Attempting to update firmware while running virtual machines will result in firmware upgrade failure.

To update firmware using the AV.io Config tool:

1. If you haven't already done so, download and install the AV.io Config tool. See Install the AV.io Config tool.

2. Download the firmware update file from the Epiphan website, as described in your firmware update notification email.

3. Connect your AV.io SDI device to your computer, laptop or notebook.

4. Open the AV.io Config tool.

5. Select your AV.io SDI device from the list under the Devices heading.

> If your AV.io SDI device is not displayed, press the Refresh icon to refresh the list of connected devices.
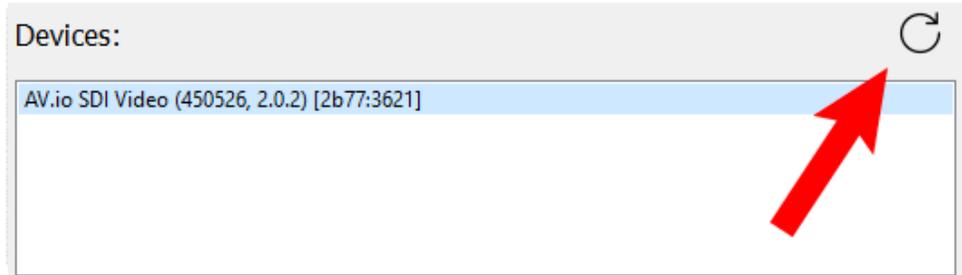
6. Using the diagram below, check the current firmware version of your AV.io SDI. If it is the same version as the new firmware you, there is no need to do the firmware update.

7. Click the **Firmware** tab
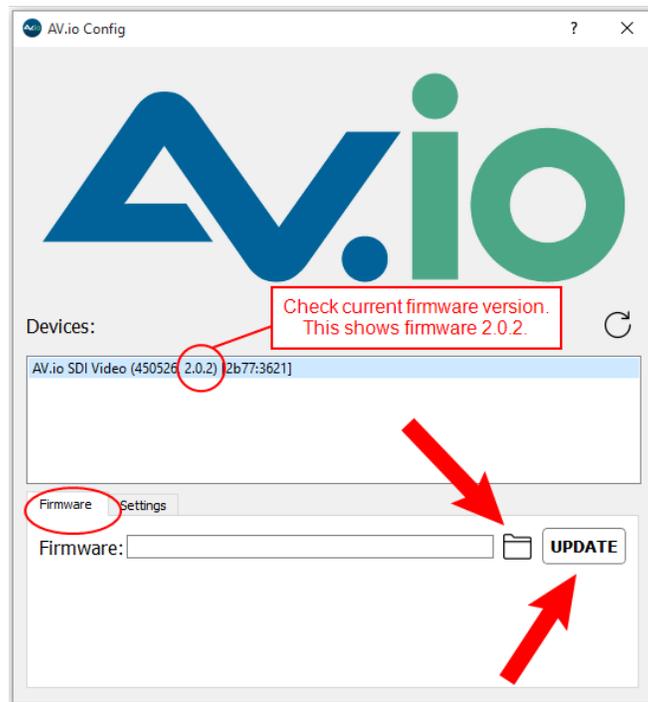
8. Click the **folder icon** to navigate to the saved location of the firmware, and click **Update** to update your video grabber to the selected firmware; an update bar appears and displays the progress of the update.

> **STOP** Do not disconnect your AV.io SDI at any point during the update process! Doing so may cause irrevocable errors and/or permanently damage the device.

9. When the update is finished the progress bar turns green and displays "Update Completed". You may now safely disconnect your AV.io SDI if needed.
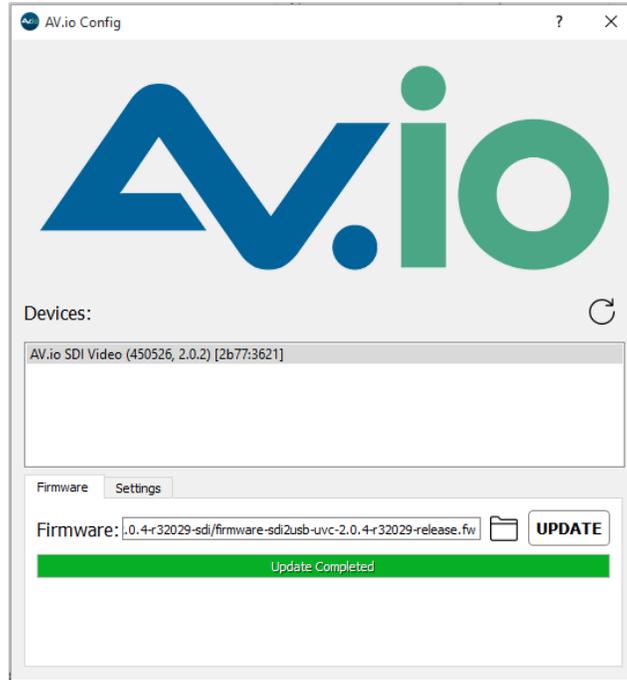
> When updating firmware on a Mac, the "Update Completed" text will not be displayed. The firmware upgrade is complete when the progress bar fills the width of the AV.io Config window and the window contents are no longer greyed out.

Limitations and Known Issues

This section includes known issues or limitations that affect functionality or usability and ways that you can work around these limitations.

Affecting all operating systems

- Disconnecting and reconnecting the USB 3.0 cable on an AV.io SDI device with an SDI splitter halts video capture.
  - Workaround: When possible, avoid this problem by not using a splitter. If a splitter is necessary, disconnect both the USB 3.0 cable and SDI splitter from the AV.io SDI device, then first reconnect the USB 3.0 cable before reconnecting the SDI cable between AV.io SDI and the splitter.
- Embedded audio from BlackMagic HDMI-SDI convertor can be distorted.
  - **Workaround**: If possible, use another convertor or capture without embedded audio.

Affecting Windows

- Windows 7: The AV.io Config tool sometimes fails to display AV.io SDI in the device list despite showing up as an installed device on the computer's Device Manager, therefore occasionally preventing advanced configuration and firmware updates.
  - **Workaround**: Use AV.io Config on a different supported OS to configure AV.io SDI. Firmware updates and configuration changes are saved to the device. (Note that the AV.io SDI device still functions perfectly with the capture application on the original Windows 7 workstation despite possible issues with the AV.io Config tool.)
- Windows 7/8.1: The AV.io Config tool may display the AV.io SDI device more than once in the device list possibly causing user confusion.
  - **Workaround**: Simply press the refresh icon to refresh the device list; only one AV.io SDI device now displays properly.
- Windows 8.1: On rare occasions (< 5% of the time), captured video has a small vertical fluctuation (of a few pixels) or small artifacts in the lower right quadrant of the screen. This is noticeable right from the the beginning of capture.
  - **Workaround**: Simply disconnect and re-connect AV.io SDI's USB 3.0 cable to the capture computer.
- Windows 8.1 (with an Etron EJ188H USB 3.0 controller only): Video and audio capture fails with Windows Movie Maker.

- ○ **Workaround**: If using a computer with this host controller, use a different capture application (like VLC), or upgrade to Windows 10.
- Windows 8.1 (with a Texas Instruments TSub USB 3.0 controller only): Audio capture fails with Windows Camera.
    - ○ **Workaround**: If using a computer with this host controller, use a different capture application (like VLC), or upgrade to Windows 10.
- Windows 8.1/10 (with an ASMedia ADM1042 A USB 3.0 controller only): Video capture fails when the capture computer recovers from sleep mode, even if capture was stopped prior to sleep mode.
    - ○ **Workaround**: Simply disconnect and re-connect AV.io SDI's USB 3.0 cable to the capture computer.
- Windows 8.1/10 (with an Etron USB 3.0 controller only): Firmware update fails with an error message. Retrying does not clear the message.
    - ○ **Workaround**: Perform the firmware update on another computer (without an Etron USB host controller) or using another USB port on the same computer. Note that USB 2.0 can be used for firmware updates.

Affecting Mac

- It is not possible to capture from AV.io SDI if a webcam is connected when using VLC media player 2.2.1 on a Mac (this is a VLC-specific bug).
    - ○ **Workaround**: Disconnect the webcam, downgrade to an older version of VLC media player (ex: 2.1) or use a different capture application.
- Audio capture isn't available using VLC on a Mac.
    - ○ **Workaround**: If audio capture is needed, use another capture applicatin such as QuickTime.
- Sometimes video doesn't update (appears frozen) when using AV.io SDI as the video source for Skype video calls.
    - ○ **Workaround**: Disconnect and reconnect the video grabber. If the problem persists, try another Mac computer or another communication tool. This problem appears to happen with regular web cams as well.

Affecting Ubuntu

- Ubuntu 14.04 LTS: With the exception of the first capture after system reboot, the very first captured frame is always green.
    - ○ **Workaround**: Remove the green frame in post-production editing. If streaming the captured video, begin streaming after the initial green frame as already been captured.

- Ubuntu 15.04 (with an Etron EJ168A USB 3.0 controller only): Video cannot be resumed if stopped during a Skype call.

  - **Workaround**: Do not stop video during the call, if this is not posisble or happens accidentally, disconnect and reconnect the device. You may need to restart the video call.

- Ubuntu 15.04 Video capture fails when the capture computer recovers from sleep mode, even if capture was stopped prior to sleep mode.

  - **Workaround**: Simply disconnect and re-connect AV.io SDI's USB 3.0 cable to the capture computer.

Affecting Chromebook

- Google Chrome OS v43.0.2357.125 (64 bit): When using Chromebook Apps Clipchamp and WebRTC, AV.io SDI is not detected as a valid audio device.

  - **Workaround**: Use Clipchamp and WebRTC for capturing video only, or use a different Chromebook app to capture both video and audio, such as Screencastify or MediaCore Capture.

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March 28, 2014

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2. This device must accept any interference received, including interference that may cause undesired operation.

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