

Epiphan AV.io SDI™



January 24, 2018
Release 4.0.0

Terms and conditions

This document, the Epiphan web site, and the information contained therein, including but not limited to the text, videos and images as well as Epiphan System Inc.'s trademarks, trade names and logos are the property of Epiphan Systems Inc. and its affiliates and licensors, and are protected from unauthorized copying and dissemination by Canadian copyright law, United States copyright law, trademark law, international conventions and other intellectual property laws.

Epiphan, Epiphan Video, Epiphan Systems, Epiphan Systems Inc., and Epiphan logos are trademarks or registered trademarks of Epiphan Systems Inc., in certain countries. All Epiphan product names and logos are trademarks or registered trademarks of Epiphan. All other company and product names and logos may be trademarks or registered trademarks of their respective owners in certain countries. For additional terms and conditions, refer to sections at the end of document.

Copyright © 2018 Epiphan Systems Inc. All Rights Reserved.

THE SOFTWARE LICENSE AND LIMITED WARRANTY FOR THE ACCOMPANYING PRODUCT ARE SET FORTH IN THE INFORMATION PACKET OR PRODUCT INSTALLATION SOFTWARE PACKAGE THAT SHIPPED WITH THE PRODUCT AND ARE INCORPORATED HEREIN BY REFERENCE. IF YOU ARE UNABLE TO LOCATE THE SOFTWARE LICENSES OR LIMITED WARRANTY, CONTACT YOUR EPIPHAN REPRESENTATIVE FOR A COPY.

PRODUCT DESCRIPTIONS AND SPECIFICATIONS REGARDING THE PRODUCTS IN THIS MANUAL ARE SUBJECT TO CHANGE WITHOUT NOTICE. EPIPHAN PERIODICALLY ADDS OR UPDATES THE INFORMATION AND DOCUMENTS ON ITS WEB SITE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION AND RECOMMENDATIONS ARE BELIEVED TO BE ACCURATE AT TIME OF WRITING BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

LIMITATION OF LIABILITY

UNDER NO CIRCUMSTANCES SHALL EPIPHAN BE LIABLE FOR ANY INCIDENTAL, SPECIAL, CONSEQUENTIAL, EXEMPLARY OR OTHER INDIRECT DAMAGES THAT RESULT FROM THE USE OF, OR THE INABILITY TO USE, THIS PRODUCT OR THE INFORMATION CONTAINED IN THIS DOCUMENT OR PROVIDED ON EPIPHAN'S WEB SITE, EVEN IF EPIPHAN HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL EPIPHAN'S TOTAL LIABILITY TO YOU FOR ALL DAMAGES, LOSSES, AND CAUSES OF ACTION RESULTING FROM YOUR USE OF THIS PRODUCT, WHETHER IN CONTRACT, TORT (INCLUDING, BUT NOT LIMITED TO, NEGLIGENCE) OR OTHERWISE, EXCEED THE AMOUNTS YOU PAID TO EPIPHAN DURING THE MOST RECENT THREE-MONTH PERIOD IN CONNECTION WITH AMOUNTS WHICH YOU PAID FOR USING THIS PRODUCT.

INFORMATION AND DOCUMENTS, INCLUDING PRODUCT SPECIFICATIONS, PROVIDED IN THIS DOCUMENT OR THE EPIPHAN WEB SITE ARE PROVIDED "AS IS". SPECIFICALLY, BUT NOT WITHOUT LIMITATION, EPIPHAN DOES NOT WARRANT THAT: (i) THE INFORMATION IS CORRECT, ACCURATE, RELIABLE OR COMPLETE; (ii) THE FUNCTIONS CONTAINED ON THE EPIPHAN WEB SITE WILL BE UNINTERRUPTED OR ERROR-FREE; (iii) DEFECTS WILL BE CORRECTED, OR (iv) THIS WEB SITE OR THE SERVER(S) THAT MAKES IT AVAILABLE ARE FREE OF VIRUSES OR OTHER HARMFUL COMPONENTS. EPIPHAN SPECIFICALLY DISCLAIMS ALL REPRESENTATIONS, WARRANTIES, AND CONDITIONS, EITHER EXPRESS, IMPLIED, STATUTORY, BY USAGE OF TRADE OR OTHERWISE INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, TITLE, SATISFACTORY QUALITY OR FITNESS FOR A PARTICULAR PURPOSE.

Thank you for choosing Epiphan Video!

At Epiphan Video, product function and quality are our top priority. We make every effort to make sure that our products exceed your expectations.

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 Epiphan Video website to get the most recent product specifications and additional information about this product.

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

Copyright © 2018 Epiphan Systems Inc. All Rights Reserved

Firmware 4.0.0 release notes

Firmware 4.0.0 is a maintenance release that fixes some minor issues and improves the memory allocation performance of the AV.io SDI.

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.

What's fixed

Corrected display of 1920×1080p 30 fps images from SDI

Images captured at 1920×1080p 30 fps using AV.io SDI display properly now when viewed on Windows 10 in VLC player 2.2.6 and in Pearl-2.

Registering your AV.io SDI

Why should I register my AV.io SDI?

It will allow you to activate your product warranty, give you notifications of firmware and software updates and get you our free personalized customer support.

How to register

1. Go to epiphan.com/register
2. Provide the required information. Your six digit serial number is found on your device. A valid e-mail address is required for product registration.

Table of contents

Registering your AV.io SDI	iii
Getting started	1
About AV.io SDI	1
What's in the box?	1
Hardware	2
<i>Hardware diagrams</i>	2
<i>Indicator LED details</i>	4
Quickstart	5
Technical specifications	6
<i>System requirements</i>	7
Capture	8
How AV.io SDI works	9
Set up your AV.io SDI for capture	10
Resolutions, capture rates and aspect ratios	11
Automatic image scaling & audio resampling	12
Third-party applications	13
Configuration	14
Install the AV.io Config tool	15
<i>Windows</i>	15
<i>Mac</i>	16
<i>Linux</i>	17
Update firmware using the AV.io Config tool	18
Identifying the input resolution on your AV.io SDI	21
Configure settings using AV.io Config tool	22
Advanced configuration options	24
<i>Use input signal resolution (disabled by default)</i>	24
<i>Preserve aspect ratio (enabled by default)</i>	25
<i>Performance mode (enabled by default)</i>	25
<i>Audio selector for multichannel inputs (disabled by default)</i>	25
Set custom resolution user modes	25
Appendices	29
Troubleshooting	30
Limitations and known issues	32
Software license	33

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!

About AV.io SDI

To use AV.io SDI, there's no software to install; simply connect the cables and go. It works on Windows, Mac and Linux and integrates seamlessly with your favorite third-party applications such as Skype, Adobe FMLE, Wirecast, VLC media player and Quicktime.

What's in the box?

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

Table 1 Description of included purchase contents (for identification only, color and appearance of individual cables/adapters may vary).

AV.io SDI video grabber	 A blue and silver AV.io SDI video grabber device. It has a blue top section with the 'AV.io' logo and 'SDI' text, and a silver bottom section with the 'epiphan video' logo. A small metal clip is attached to the top edge.	Your video capture device!
-------------------------	--	----------------------------

SDI cable (0.5 m)		Connects an SDI source to your AV.io SDI.
USB 3.0 cable (1 m / 3 ft)		The USB 3.0 cable connects your AV.io SDI video grabber with your computer's USB 3.0 or 2.0 port.

Hardware

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

Topics covered include:

- [Hardware diagrams](#)
- [Indicator LED details](#)

Hardware diagrams

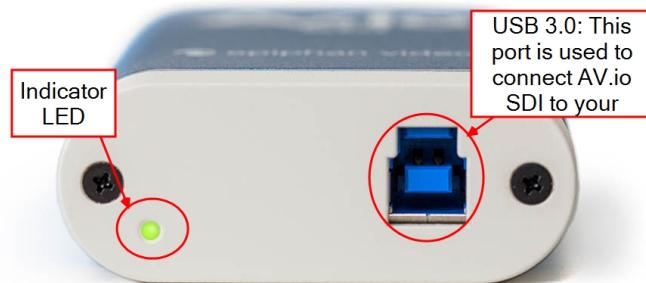
Your AV.io SDI device includes an input, an output and an indicator light.

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.

From the operating system's UVC drivers, the application will receive the AV.io SDI supported color space, resolution and frame rates. 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	N/A	USB 2.0 connection active
Blinking green	N/A	Video and/or audio transferring successfully
Solid blue	USB 3.0 connection active	N/A
Blinking blue	Video and/or audio transferring successfully	N/A

Quickstart

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

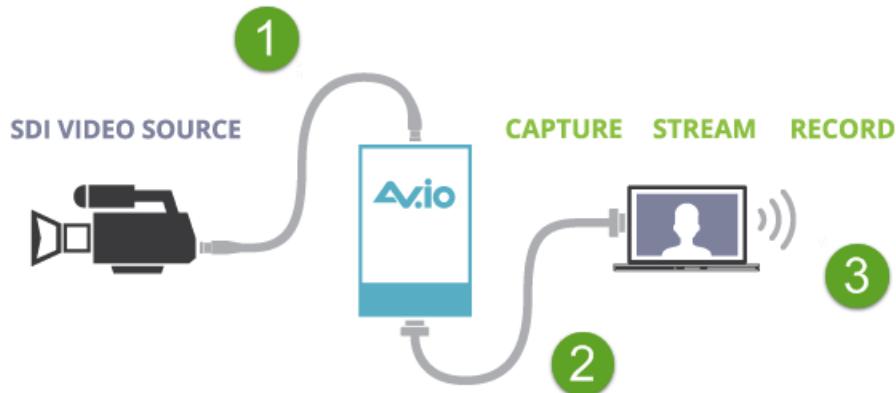
Before you begin the connection process, you will require:

- A 3G-SDI, HD-SDI or SD-SDI video source (with or without audio)
- Your AV.io SDI device
- A capture desktop computer, laptop or notebook
- A USB 3.0 cable (included with purchase) to connect to your AV.io SDI to your capture computer
- 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!

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
Capture latency	Near-zero latency, although certain third-party applications may contribute delay
HDCP Compliance	High-bandwidth digital content protection (HDCP) protected content cannot be captured
LED	LED indicates the status of AV.io SDI
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
Input Resolution	Standard and non-standard resolution from 640x360 up to 1920×1080
Supported output resolutions (at 15, 23.97, 24, 25, 29.97, 30, 50, 59.94 or 60 fps)	640×360 960×540 1920×1080 640×480 1280×720
Dimensions	3.54" × 2.36" × 0.91" (90 mm × 60 mm × 23 mm)

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: <ul style="list-style-type: none">• a compatible USB 3.0 host controller for SuperSpeed operation; or,• a USB 2.0 host controller (will limit maximum frame rate and resolution support)
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

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:

- A 3G-SDI, HD-SDI or SD-SDI video source
- Your AV.io SDI device
- A capture computer, laptop or notebook
- A USB 3.0 cable (included with purchase) to connect to your AV.io SDI to your capture computer
- 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!

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 resolution** (size of a single video frame in pixels). Higher frame rate means smoother video capture while resolution determines the aspect ratio of the video output as well as its resolution and degree of definition.

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 and widely compatible output, audio is automatically resampled to 16-bit 48 kHz stereo audio.

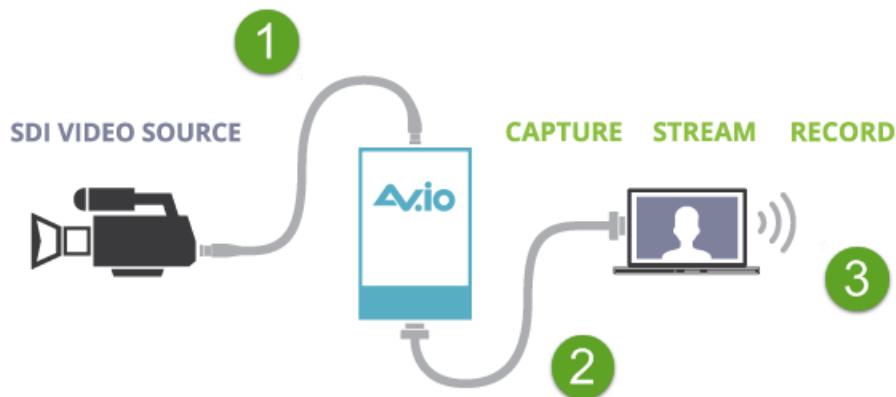
No configuration required!

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 input sources 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!

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.

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. The table below is a color-coded legend for interpreting the table of product resolutions below it:

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

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.

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 SDI 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

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.

Firmware updates and changes to default capture settings can be applied to your AV.io SDI using Epiphan's AV.io Config tool. For settings to persist after power cycling, please allow 5 seconds before disconnecting or restarting device.

You likely won't need to use the AV.io Config tool for more than firmware updates, but advanced settings can help you tweak the performance to get the most out of your AV.io SDI.

Advanced configuration options include:

- **Use input signal resolution**
- **Preserve aspect ratio**
- **Performance mode**
- **Audio selector for multichannel inputs**

Detailed instructions on how to use AV.io Config include:

- Install the AV.io Config tool
- Update firmware using the AV.io Config tool
- Configure settings using AV.io Config tool
- Advanced configuration options
- Set custom resolution user modes
- Advanced settings for VGA capture

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. For settings to persist after power cycling, please allow 5 seconds before disconnecting or restarting device.

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

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 your video grabber is connected to the computer by USB, it is detected.

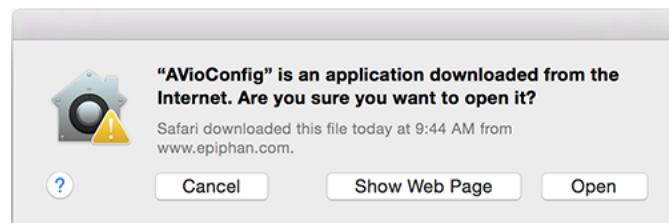


Mac

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 your 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 your video grabber is connected to the computer by USB, it is detected.



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. For updates to persist after power cycling, please allow 5 seconds before disconnecting or restarting device.

To update firmware using the AV.io Config tool:

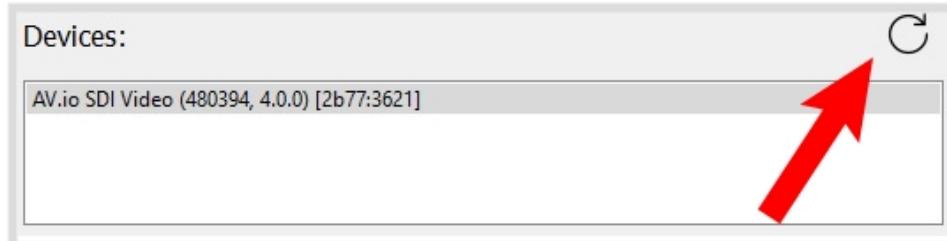
1. If you haven't already done so, download and install the AV.io Config tool. See [Install the AV.io Config tool](#).
2. Download the firmware update file from the Epiphan website, as described in your firmware update notification email or discussion with your vendor.
3. Connect your AV.io SDI device 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 downloaded, 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.



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.

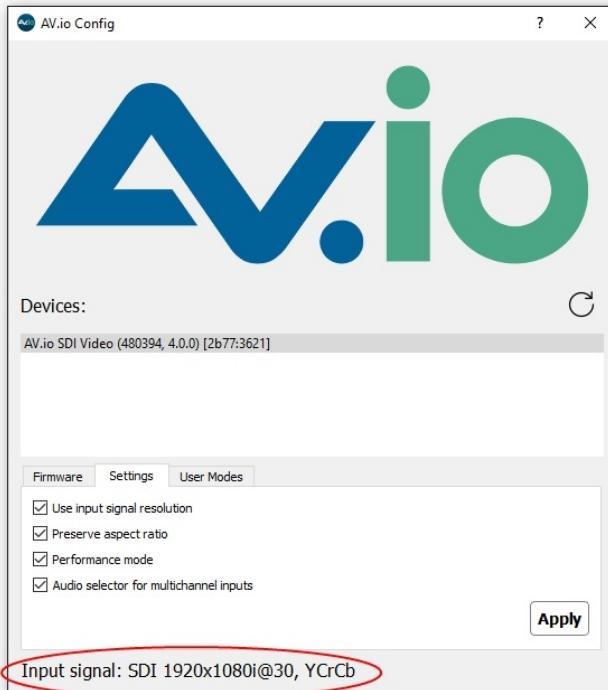
9. When the update is finished the progress bar turns green and displays “Update Completed” (Note the firmware update will not be automatically reflected in the Devices list unless the **Refresh** icon is clicked). You may now safely disconnect your AV.io SDI if needed.



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.

Identifying the input resolution on your AV.io SDI

The AV.io Config tool can help you figure out exactly what information your video source is sending. Plug in the source and select your device. The UI detects information about the source and presents it at the bottom of the window.



The line tells you what connector the video source is using (in this case, HDMI), the exact resolution of the source (1920x1080p), the frame rate the source is outputting (60 fps) and the color model (RGB).

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. For settings to persist after power cycling, please allow 5 seconds before disconnecting or restarting device. See [Advanced configuration options](#) for more details.

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

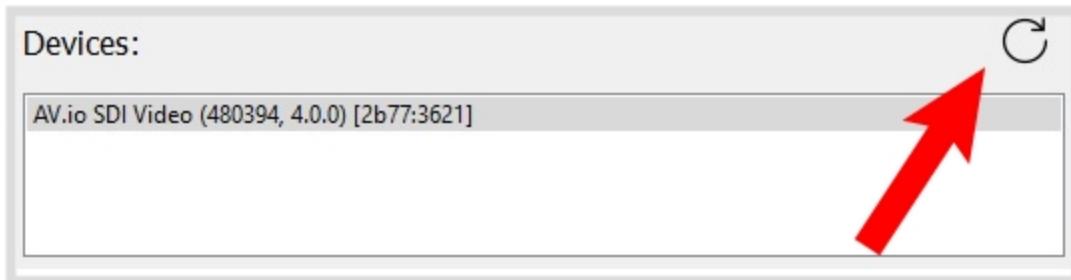
1. If needed, install the AV.io Config tool. For details specific to your OS, see [Install the AV.io Config tool](#).
2. Connect your AV.io SDI device to your computer, laptop or notebook.
3. Open the AV.io Config tool.



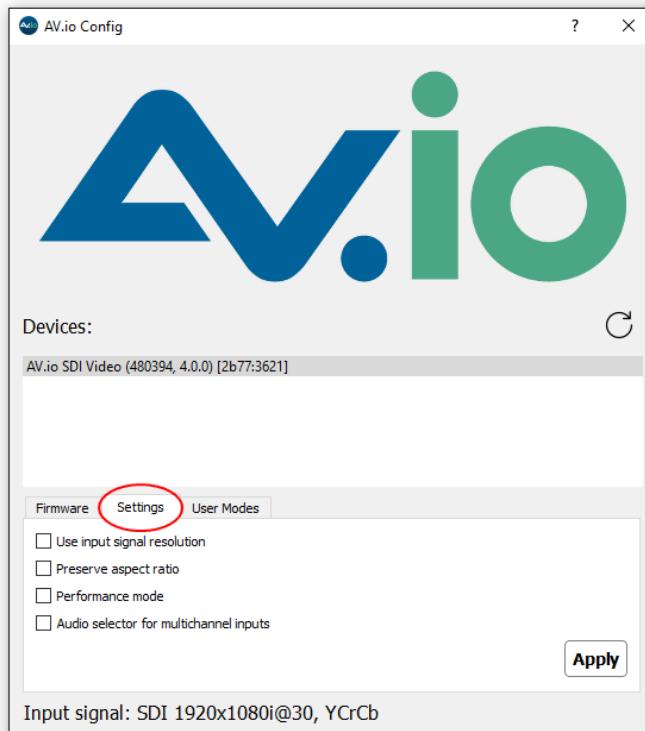
4. Select your AV.io SDI device from the list under the Devices heading.



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, then click **Apply**. See [Advanced configuration options](#) for a description of each setting.

Advanced configuration options

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 options include:

- **Use input signal resolution**
- **Preserve aspect ratio**
- **Performance mode**
- **Audio selector for multichannel inputs**

Use input signal resolution (disabled by default)

There are two key descriptors used in the process of video capture using a UVC-based device:

Extended Display Identification Data (EDID): The EDID describes to the video source, video player or computer which standard video formats (resolutions, frame rates, etc.) are supported by the capture device as video input.

UVC Descriptor: The UVC describes to the capture host computer which formats are available at the capture device USB port.

AV.io SDI does not enforce a direct relationship between the input and output signals. The list of EDID and UVC descriptions are identical so that if the input and output formats are the same, the signal can pass through without scaling. However, if input and output are set to different formats, AV.io SDI will automatically upscale or downscale video to the format requested as output by the capture software.

The **Use Input Signal Resolution** option allows you to use a video format that is not included on the EDID or UVC descriptors. When **Use Input Signal Resolution** is selected in the AV.io config tool, the input signal format is added to the UVC descriptor, which allows a 1:1 capture from the input video source. If the program you are using is compatible with the signal, you can capture your source in its original format.

For example, if your video resolution was 1680×1200, a resolution which is not on the EDID or UVC descriptor list, normally you would have to select the closest possible resolution from the provided output descriptor list in your capture application, and then AV.io SDI would automatically scale the video up or down to that format. However, if you select the **Use Input Signal Resolution** option, your capture application's list will have 1680×1200 as an option for output format.

There are two scenarios in which this feature will not perform as expected.

1. Not all third-party applications are able to support custom resolutions. AV.io SDI will send the custom resolution to the application, but if it is unable to use the resolution, the application will override any AV.io SDI custom capture settings.
2. In a Windows environment, due to restrictions set by Microsoft's Windows Hardware Quality Labs certification, most graphics adapters or drivers will not output resolutions not included in the EDID file of the connected display device. In the scenario where a resolution that is not included in the AV.io SDI

standard resolution is requested, the Graphics adapter and driver will apply the resolution requested and then upscale it to AV.io SDI's default resolution. This means the **Use input signal resolution** feature will not add a custom resolution to the UVC descriptor and the capture software will be limited to the pre-defined resolutions.

Outside of these restrictions, the feature is recommended in any scenario where you wish the resolution of your captured video to be identical to the original video source.

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.

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.

Audio selector for multichannel inputs (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.

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

Set custom resolution user modes

The AV.io Config tool gives users the ability to specify custom resolutions. You can make use of up to three at one time, so you don't have to worry about changing the list every time you change which source you have connected. For settings to persist after power cycling, please allow 5 seconds before disconnecting or restarting device.

To change the custom resolutions with the AV.io Config tool:

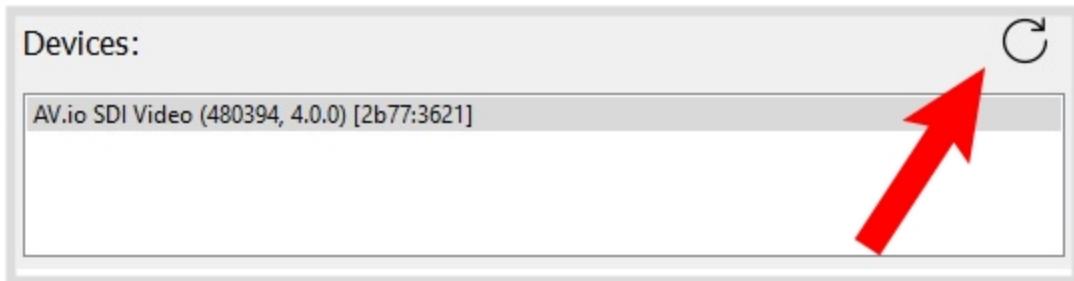
1. If needed, install the AV.io Config tool. For details specific to your OS, see [Install the AV.io Config tool](#).
2. Connect your AV.io SDI device to your computer, laptop or notebook.
3. Open the AV.io Config tool.



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 **User modes** tab; the User modes page appears.



6. To create a custom resolution, click the check box for one of the user modes. The grayed-out area becomes open for changes.
7. Select the text box labeled **Width**, erase the number that is currently in the box, and type out the width of the custom resolution you wish to use. Then do the same for the resolution height in the text box labeled **Height**.
8. Click **Apply**; The custom resolution you defined will now be added to the list of output resolutions that you are allowed to select from the settings menu from the third-party application of your choice.



9. If needed, you may follow the same process for **User mode 2** and **User mode 3**. If all three are checked and applied, all three custom resolutions selected will appear in the list of resolutions. You may change the definition of any of these three resolutions at any time.

There are two scenarios in which this feature will not perform as expected.

1. Not all third-party applications are able to support custom resolutions. AV.io SDI will send the custom resolution to the application, but if it is unable to use the resolution, the application will override any AV.io SDI custom capture settings.
2. In a Windows environment, due to restrictions set by Microsoft's Windows Hardware Quality Labs certification, most graphics adapters or drivers will not output resolutions not included in the EDID file of the connected display device. In the scenario where a resolution that is not included in the AV.io SDI standard resolution is requested, the Graphics adapter and driver will apply the resolution requested and then upscale it to AV.io SDI's default resolution. This means the **User modes** feature will not add the custom resolutions to the UVC descriptor and the capture software will be limited to the pre-defined resolutions.

Outside of these restrictions, the feature is recommended in any scenario where you wish to use a custom output resolution.

Appendices

The following appendices are included in this section:

- Troubleshooting
- Limitations and known issues
- Releases and features

Troubleshooting

Use the follow table for help if you are experiencing problems or unexpected behavior from your AV.io SDI.

Affecting all operating systems

Symptom(s)	Action(s) to resolve
The captured VGA source is too bright/dark or is shifted out of the frame.	See Advanced settings for VGA capture for step-by-step instructions on how to customize VGA capture settings.

Affecting Windows

Symptom(s)	Action(s) to resolve
Incorrect input resolutions detected	If using Windows 8.1 or 10 with VLC Media Player 2.2.1 , downgrade to an earlier version of VLC or use a different capture application, such as Adobe FMLE.
Captured video file displays black screen when opened.	If capturing on Windows 8.1 using Windows Movie Maker with your AV.io SDI connected to an Etron EJ188H USB 3.0/2/0 host controller , switch to a different capture application, connect to a different USB port, or upgrade to Windows 10.
Recorded file does not have audio.	If capturing on Windows 8.1 using Windows Camera with your AV.io SDI connected to a Texas Instruments TSub USB 3.0 controller , switch to a different capture application (such as VLC Media Player) or upgrade to Windows 10.
Firmware update fails	If updating on a computer running Windows 8.1 or 10 with your AV.io SDI connected to an Etron 3.0 host controller , 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

Symptom(s)	Action(s) to resolve
AV.io SDI is specified as the capture device in the application, but capture occurs using a different device connected to the computer (such as a web cam).	If using VLC Media Player 2.2.1 , disconnect all capture devices except AV.io SDI, downgrade to an older version of VLC media player or use a different

	capture application.
Recorded file does not have audio.	If using VLC Media Player 2.2.1 , downgrade to an earlier version or use a different capture application, such as Quicktime.
Quicktime crashes when using a frame grabber to record video in MacOS 10.12	This issue is with the Operating System itself, and affects all brands of video grabbers. Quicktime is able to show a preview of the recording, but then sometimes crashes as soon as the recording starts. This problem can be circumvented by selecting the Maximum Quality Recording option in the Quicktime drop-down menu.
Video doesn't update (appears frozen) when using AV.io SDI as the video source for Skype video calls.	Disconnect and reconnect AV.io SDI. If the problem persists, use a different capture computer. This problem appears to happen with regular web cams as well.

Affecting Ubuntu

Symptom(s)	Action(s) to resolve
Video cannot be resumed if stopped during a Skype call.	If capturing on Ubuntu 14.04 LTS with your AV.io SDI connected to an Etron EJ168A USB 3.0 controller , switch to a different USB port or simply avoid stopping the Skype call. If it is not possible to stop the Skype call or if it stops accidentally, disconnect and reconnect the device. You may need to restart the video call.
Video capture fails when the capture computer recovers from sleep mode, even if capture was stopped prior to sleep mode	If capturing on Ubuntu 15.04 with your AV.io SDI connected to a Texas Instruments TUSB7320 USB 3.0 host controller , switch to a different USB port or simply disconnect and re-connect AV.io SDI's USB 3.0 cable to the capture computer.

Affecting Chromebook

Symptom(s)	Action(s) to resolve
AV.io SDI is not detected as a valid audio device.	If capturing using Chromebook Apps Clipchamp and WebRTC on Google Chrome OS v43.0.2357.125 (64 bit) , use a different Chromebook app to capture both video and audio, such as Screencastify or MediaCore Capture .

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

- **UVC-314:** 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 has already been captured.

Affecting Windows

- **UVC-270:** Windows 10: Sometimes, Windows 10 will not recognize the grabber properly when connected by a Fresco FL1100 USB 3.0 controller.
 - **Workaround:** Press the refresh icon to refresh the device list or unplug and reconnect the USB. If neither of these work, a different USB 3.0 host controller might be required.

Affecting Mac

- Your grabber works best with systems that are running the latest version of the Mac OS. If your system is running an older version and you experience issues with your grabber, we recommend that you update your system to the latest Mac OS.
- **UVC-613:** VLC doesn't play audio for video that is captured using AV.io SDI when connected to a USB 2.0 port on the Mac.
 - **Workaround:** Use another media player such as QuickTime.
- **UVC-601:** The grabber doesn't capture audio and video when using an AMD Ryzen™ 3.0 USB host controller on Ubuntu.
 - **Workaround:** A different USB 3.0 host controller must be used.

Software license

ATTENTION: THE SOFTWARE AND DOCUMENTATION PROVIDED UNDER THIS AGREEMENT ARE BEING LICENSED TO YOU BY EPIPHAN SYSTEMS INC. ("LICENSOR") AND ARE NOT BEING SOLD. THIS AGREEMENT CONTAINS LIMITATIONS ON REPRESENTATIONS, WARRANTIES, CONDITIONS, REMEDIES, AND LIABILITIES THAT ARE APPLICABLE TO THE SOFTWARE AND DOCUMENTATION.

Epiphan Systems Inc.

Software License

IMPORTANT: BEFORE DOWNLOADING, INSTALLING, OR USING THE SOFTWARE AND DOCUMENTATION, PLEASE CAREFULLY READ THIS AGREEMENT WHICH CONTAINS THE TERMS AND CONDITIONS UNDER WHICH YOU ARE ACQUIRING A LICENSE TO USE THE SOFTWARE AND DOCUMENTATION. IF YOU DO NOT ACCEPT THE TERMS AND CONDITIONS OF THIS AGREEMENT PLEASE DO NOT DOWNLOAD, INSTALL, OR USE THE SOFTWARE AND DOCUMENTATION AND PROMPTLY RETURN OR DESTROY THE SOFTWARE AND DOCUMENTATION. IF YOU DOWNLOAD, INSTALL, OR USE THE SOFTWARE AND/OR DOCUMENTATION, YOU WILL HAVE ACCEPTED AND AGREED TO THESE TERMS AND CONDITIONS. THE SOFTWARE, HARDWARE AND DOCUMENTATION ARE ALSO PROTECTED BY COPYRIGHT LAWS AND INTERNATIONAL COPYRIGHT TREATIES, AS WELL AS OTHER INTELLECTUAL PROPERTY LAWS. IF YOU ARE AN AGENT OR EMPLOYEE OF AN ENTITY, YOU REPRESENT AND WARRANT THAT (I) THE INDIVIDUAL ACCEPTING THIS AGREEMENT IS DULY AUTHORIZED TO ACCEPT THIS AGREEMENT ON SUCH ENTITY'S BEHALF AND TO BIND SUCH ENTITY, AND (II) SUCH ENTITY HAS FULL POWER, CORPORATE OR OTHERWISE, TO ENTER INTO THIS AGREEMENT AND PERFORM ITS OBLIGATIONS UNDER THIS AGREEMENT.

1. Definitions: In this Agreement:

"Agreement" means this Epiphan Systems Inc. Software License;

"API" means an application programming interface;

"Documentation" means the technical publications delivered to You with the Software relating to the installation and operation of the Software and/or Hardware, such as reference, user, installation and technical guides and release notes;

"Epiphan" means Epiphan Systems Inc;

"Epiphan Hardware Product" means an Epiphan hardware product (including enclosure and mechanical parts, circuitry and electrical and electronic components contained therein) purchased by You, which is intended to be used in conjunction with the licensed Software and Documentation;

"License Key" means a series of computer-generated characters used for the purpose of controlling the operation of Epiphan Hardware Products and/or related Software;

"Software" means the Licensor binary and/or bytecode software and/or firmware programs that are (i) specified in Your Order or that are included with or in the Epiphan Hardware Products specified in Your Order, (ii) are made available to You for download after acceptance of this Agreement, (iii) are packaged with this Agreement, (iv) pre-installed on Epiphan Hardware Products, (v) embed this Agreement in their installer(s) and which are installed after acceptance of this Agreement, or (vi) embed this Agreement in their product documentation. Software also includes the related Documentation;

"You" or "Your" means the individual acquiring the Software license or any entity on whose behalf such individual is acting. In the case of an entity, "You" includes any entity that by majority voting interest controls, is controlled by, or is under common control with You; and

"Your Order" means (i) the web forms provided by Epiphan or its applicable reseller or distributor for ordering Epiphan Hardware Products and related Software licenses, or (ii) written documents executed by Epiphan, or one of its resellers or distributors, and You in respect to Your purchases of Epiphan Hardware Products and/or related Software licenses.

2. Grant of Software License: Subject to the terms and conditions of this Agreement, including payment of any applicable fees specified in Your Order, Licensor grants You a non-exclusive, non-transferable, non-sublicensable, internal license to use the number of copies of the Software specified in Your Order and to use the Software functions specified in Your Order solely for operation on the Epiphan Hardware Products for which such Software has been designed as specified in the Documentation for such Software. If the number of copies of Software is not specified in Your Order, then the number of copies shall be a reasonable number of copies. You acknowledge and agree that the ability to use certain Software functions is controlled by a Licensing Key and that You will not be able to use such functions unless You have paid the applicable fees charged by Epiphan for the right to use such functions and to receive a Licensing Key to enable such functions. For functions

that are controlled by a Licensing String You shall only use that Licensing String with the copy of the Software for which it was issued and You shall not use that copy of the Licensing String with any other copies of the Software that You may have or make. All copies of the Software made by You shall include all trademarks, copyright notices, restricted rights legends, proprietary markings and the like exactly as they appear on the copy of the Software originally provided to You. No other rights in the Software or Documentation are granted to You.

3. Open Source Software: Binary, bytecode and source code versions of certain open source software packages may be embedded in or distributed with the Software ("Open Source Software"). If a separate license agreement for an item of open source software is: delivered to You with the Software; included in the download package for the Software; referenced in any material (including the Documentation) that is included in the download or distribution package for the Software; or listed at www.epiphan.com/opensource, then such open source software shall be Open Source Software and such separate license agreement shall govern Your use of that item or version of such open source software. The Open Source Software may include free software (i.e. software licensed under the GNU Lesser General Public License or other free software licenses) for which the applicable free software license may also require that the source code for such free software be made available to those receiving only executable versions of such free software. If the source code for any free software distributed with the Software is not provided with the Software, then upon request, within a three (3) year period from the original receipt of the binary or bytecode version of such Open Source Software from Licensor, for a fee that shall not exceed Licensor's costs associated with the shipping of the source code for such free software, Licensor will provide a copy of the source code for such free software to You.

4. Restrictions: The terms set forth in this Section 4 are additional conditions to the licenses granted in Section 2. Your right to use the Software is conditioned upon Your timely payment of the full amount of fees due for: (i) the Epiphan Hardware Product(s) on which You want to use the Software; (ii) all support agreements You have entered into with Licensor or any of its distributors and/or resellers; (iii) licensed Software and Documentation.

You shall not reverse engineer, disassemble, reverse translate, decompile or in any other manner decode any Epiphan Hardware Product or Software except to the extent the Software is distributed with any Open Source Software that prohibits the imposition of such a restriction or to the extent the foregoing restriction is expressly prohibited by applicable law notwithstanding a contractual obligation to the contrary. You acknowledge and agree that no rights in respect to the source code of the Software are granted to You. You acknowledge and agree that the rights in respect to use of the Software and Documentation are granted only for use in conjunction with Epiphan Hardware Products. You shall not distribute, lease, rent, grant a security interest in, assign, or otherwise transfer the Software except as expressly provided in this Agreement. You shall not modify or create any derivatives works of the Software or merge all or any part of the Software with another program. Notwithstanding the foregoing, You may call public APIs made available by Epiphan in the Software from applications developed by or on Your behalf provided that such applications do not embed any of the Software other than the minimum linkage materials required to call separately running instances of the Software. You shall not use the Software or make the Software available to any third parties as part of any service bureau, time sharing service, application service provider offering, software-as-a-service offering or any other managed service offering. You shall not disclose any performance, benchmarking, or feature-related information about the Software. You further agree not to disclose, transfer or otherwise provide to any third party any portion of the Software, except as expressly permitted herein.

Some Epiphan Hardware Products and Software embed third-party APIs that integrate with third-party party services ("Third-Party Services") to allow users of such Epiphan Hardware Products and Software to interact with such Third-Party Services for various capabilities offered by such Third-Party Services, such as, and without limitation, authentication, uploading and downloading of video content and other features made available by such Third-Party Services. If You access or use any Third-Party Service and/or related APIs using an Epiphan Hardware Product and/or the Software then You shall comply with all of the terms and conditions for such Third-Party Service and/or related APIs.

5. Disclaimer of Warranties: EXCEPT FOR ANY WARRANTIES THAT MAY BE PROVIDED IN ANY COMMERCIAL AGREEMENT EXECUTED BETWEEN YOU AND LICENSOR (OR BETWEEN YOU AND ONE OF LICENSOR'S RESELLERS OR DISTRIBUTORS), THE EPIPHAN HARDWARE PRODUCTS, SOFTWARE AND/OR DOCUMENTATION ARE PROVIDED "AS IS", WITHOUT ANY REPRESENTATIONS, CONDITIONS, AND/OR WARRANTIES OF ANY KIND. WITHOUT LIMITATION, LICENSOR AND ITS AFFILIATES AND ITS AND THEIR LICENSORS, SUPPLIERS, SUBCONTRACTORS, RESELLERS AND DISTRIBUTORS DISCLAIM ANY AND ALL IMPLIED REPRESENTATIONS, CONDITIONS AND/OR WARRANTIES OF MERCHANTABILITY, MERCHANTABILITY QUALITY, NON-INFRINGEMENT, DURABILITY, COMPATIBILITY, TITLE, SATISFACTORY QUALITY AND/OR FITNESS FOR A PARTICULAR PURPOSE WHETHER ARISING BY STATUTE, COURSE OF DEALING, USAGE OF TRADE OR OTHERWISE. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN ANY COMMERCIAL AGREEMENT EXECUTED BETWEEN YOU AND LICENSOR (OR BETWEEN YOU AND ONE OF LICENSOR'S RESELLERS OR DISTRIBUTORS), THE ENTIRE RISK OF THE USE OF THE EPIPHAN HARDWARE PRODUCTS, SOFTWARE AND/OR DOCUMENTATION SHALL BE BORNE BY YOU. EXCEPT AS OTHERWISE EXPRESSLY PROVIDED IN ANY COMMERCIAL AGREEMENT EXECUTED BETWEEN YOU AND LICENSOR (OR BETWEEN YOU AND ONE OF LICENSOR'S RESELLERS OR DISTRIBUTORS), NEITHER LICENSOR NOR ANY OF ITS AFFILIATES NOR ANY OF

ITS OR THEIR LICENSORS, SUPPLIERS, SUBCONTRACTORS, RESELLERS AND/OR DISTRIBUTORS MAKE ANY REPRESENTATIONS OR PROVIDE ANY CONDITIONS AND/OR WARRANTIES ABOUT THE SUITABILITY OF THE EPIPHAN HARDWARE PRODUCTS, SOFTWARE, SERVICES AND/OR DOCUMENTATION. NEITHER LICENSOR NOR ANY OF ITS AFFILIATES NOR ANY ITS OR THEIR LICENSORS, SUPPLIERS, SUBCONTRACTORS, RESELLERS AND/OR DISTRIBUTORS MAKE ANY REPRESENTATIONS OR PROVIDE ANY CONDITIONS AND/OR WARRANTIES WHATSOEVER ABOUT ANY INFORMATION AND/OR DATA THAT MAY BE PROCESSED BY OR MADE AVAILABLE USING ANY EPIPHAN HARDWARE PRODUCT AND/OR SOFTWARE OR ABOUT ANY THIRD-PARTY SERVICE THAT MAY BE ACCESSIBLE USING ANY EPIPHAN HARDWARE PRODUCT AND/OR SOFTWARE.

6. LIMITATION OF LIABILITY: NEITHER LICENSOR NOR ANY OF ITS AFFILIATES NOR ANY OF ITS OR THEIR LICENSORS, SUPPLIERS, SUBCONTRACTORS, RESELLERS AND/OR DISTRIBUTORS SHALL HAVE ANY LIABILITY TO YOU OR ANY OTHER PERSON OR ENTITY FOR ANY DAMAGES ARISING FROM THIS AGREEMENT, RELATING TO THE HARDWARE, SOFTWARE OR DOCUMENTATION, OR RELATING TO ANY SERVICES PROVIDED TO YOU BY LICENSOR (INCLUDING ITS AFFILIATES AND ITS AND THEIR LICENSORS, SUPPLIERS, SUBCONTRACTORS, RESELLERS AND/OR DISTRIBUTORS) IN RELATION TO THE EPIPHAN HARDWARE PRODUCTS, SERVICES, SOFTWARE AND/OR DOCUMENTATION FOR ANY INDIRECT, RELIANCE, INCIDENTAL, SPECIAL, PUNITIVE, EXEMPLARY OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF REVENUE OR PROFIT, LOSS OF OR DAMAGE TO DATA, BUSINESS INTERRUPTION, LOSS OF DATA, REPLACEMENT OR RECOVERY COSTS, OR OTHER COMMERCIAL OR ECONOMIC LOSS, WHETHER ARISING FROM CONTRACT, EQUITY, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR ANY OTHER THEORY OF LIABILITY, EVEN IF LICENSOR (INCLUDING ITS AFFILIATES AND ITS AND THEIR LICENSORS, SUPPLIERS, SUBCONTRACTORS, RESELLERS AND/OR DISTRIBUTORS) HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, OR THEY ARE FORESEEABLE. THE LIMITATIONS IN THIS SECTION SHALL APPLY WHETHER OR NOT THE ALLEGED BREACH OR DEFAULT IS A BREACH OF A FUNDAMENTAL CONDITION OR TERM OR FUNDAMENTAL BREACH. SOME JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, SO THESE LIMITATIONS MAY NOT APPLY TO YOU. IN NO EVENT SHALL THE TOTAL CUMULATIVE LIABILITY OF LICENSOR (INCLUDING ITS AFFILIATES AND ITS AND THEIR LICENSORS, SUPPLIERS, SUBCONTRACTORS, RESELLERS AND DISTRIBUTORS) TO YOU OR ANY OTHER PERSON OR ENTITY FOR ANY DAMAGES ARISING FROM THIS AGREEMENT, RELATING TO THE EPIPHAN HARDWARE PRODUCTS, SOFTWARE, DOCUMENTATION AND/OR RELATING TO ANY SERVICES PROVIDED TO YOU BY LICENSOR (INCLUDING ITS AFFILIATES AND ITS AND THEIR LICENSORS, SUPPLIERS, SUBCONTRACTORS, RESELLERS AND DISTRIBUTORS) IN RELATION TO THE EPIPHAN HARDWARE PRODUCTS, SOFTWARE AND/OR DOCUMENTATION, EXCEED THE LICENSE FEES PAID BY YOU FOR THE SOFTWARE.

NOTWITHSTANDING ANY OTHER PROVISION IN THIS AGREEMENT, NEITHER LICENSOR NOR ANY OF ITS AFFILIATES OR ITS OR THEIR LICENSORS, SUPPLIERS, SUBCONTRACTORS, RESELLERS AND/OR DISTRIBUTORS SHALL HAVE ANY LIABILITY TO YOU OR ANY OTHER PERSON OR ENTITY WHATSOEVER IN RESPECT TO ANY DIRECT, INDIRECT, RELIANCE, INCIDENTAL, SPECIAL, PUNITIVE, EXEMPLARY OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO, LOSS OF REVENUE OR PROFIT, LOSS OF OR DAMAGE TO DATA, BUSINESS INTERRUPTION, LOSS OF DATA, REPLACEMENT OR RECOVERY COSTS, OR OTHER COMMERCIAL OR ECONOMIC LOSS, ARISING FROM OR RELATING TO ANY INFORMATION AND/OR DATA THAT MAY BE PROCESSED BY OR MADE AVAILABLE USING ANY EPIPHAN HARDWARE PRODUCT AND/OR SOFTWARE OR ARISING FROM OR RELATING TO ANY THIRD-PARTY SERVICE THAT MAY BE ACCESSIBLE USING ANY EPIPHAN HARDWARE PRODUCT AND/OR SOFTWARE.

THE DISCLAIMER OF REPRESENTATIONS, WARRANTIES AND CONDITIONS AND LIMITATION OF LIABILITY CONSTITUTE AN ESSENTIAL PART OF THIS AGREEMENT. YOU ACKNOWLEDGE THAT BUT FOR THE DISCLAIMER OF REPRESENTATIONS, WARRANTIES AND CONDITIONS AND LIMITATION OF LIABILITY, NEITHER LICENSOR NOR ANY OF ITS AFFILIATES OR ITS OR THEIR LICENSORS, SUPPLIERS, RESELLERS OR DISTRIBUTORS WOULD GRANT THE RIGHTS GRANTED IN THIS AGREEMENT.

7. Term and Termination: This Agreement shall continue for as long as You use the Software, however, it may be terminated sooner as provided in this Section 7. You may terminate this Agreement by destroying all copies of the Software and Documentation under Your control and providing certification of such destruction to Licensor or by returning the Software to Licensor. Licensor may terminate this Agreement immediately by providing You with written notice if: (a) You are in material breach of any provision of this Agreement, which breach, if capable of being cured, is not cured within thirty (30) days after Licensor gives You written notice thereof; or (b) You have committed a non-curable material breach of this Agreement. Upon termination You shall destroy all copies of the Software and Documentation. In addition to this Section, the Sections entitled Definitions, Disclaimer of Warranties, Limitation of Liability, Title, Indemnities, High-Risk Activities, Intellectual Property, and General shall continue in force even after any termination of this Agreement. No termination of this Agreement will entitle You to a refund of any amounts paid by You to Licensor or any reseller or distributor or affect any obligations You may have to pay

any outstanding amounts owing to Licensor or any reseller or distributor. Upon any termination of this Agreement, Your license to the Software and Documentation will terminate and You shall destroy all copies of the Software and Documentation under Your control and certify such destruction to Licensor.

8. Support and Updates: This Agreement does not grant You the right to any updates or enhancements of the Software or the right to receive any technical support for the Software. Such updates and other technical support services, if available, may be purchased separately from Licensor or one of Licensor's resellers or distributors. Use of any updates or enhancements to the Software provided pursuant to any technical support You may procure from Licensor or one of Licensor's resellers or distributors shall be governed by the terms and conditions of this Agreement. Licensor reserves the right at any time not to release or to discontinue the release of any Software and to alter prices, features, specifications, capabilities, functions, licensing terms, release dates, general availability or other characteristics of the Software.

9. Title: All right, title, and interest (including all intellectual property rights) in, to, and under the Software (including all copies thereof) shall remain with Licensor and its licensors.

10. Indemnities: You shall indemnify, defend and hold Licensor, its affiliates, its and their licensors, suppliers, subcontractors, resellers and/or distributors and all of the directors, officers, employees of all of the foregoing (collectively the "Indemnified Parties") harmless from and against any damages, losses, liabilities, expenses, costs, claims, demands, actions, suits and/or proceedings incurred by the Indemnified Parties as a result of (i) Your use of the Epiphan Hardware Products, Software and/or Documentation, (ii) any use of the Epiphan Hardware Products, Software and/or Documentation on Your behalf, (iii) the use of the Epiphan Hardware Products, Software and/or Documentation by anyone to whom You give the Epiphan Hardware Products, Software and/or Documentation, and/or (iv) the use of the Epiphan Hardware Products, Software and/or Documentation on behalf of anyone to whom You give the Epiphan Hardware Products, Software and/or Documentation, including, without limitation, in all of the foregoing cases, any damages, losses, liabilities, expenses, costs, claims, demands, actions, suits and/or proceedings arising from or relating to any information and/or data that may be processed by or made available using any Epiphan Hardware Product and/or Software or arising from or relating to any Third-Party Service that may be accessible using any Epiphan Hardware Product and/or Software (collectively, each matter falling within any of the foregoing, a "Claim"), including, without limitation, indemnifying, defending and holding the Indemnified Parties harmless from and against any settlements agreed by You in connection with any Claims and/or any damages, costs or other amounts (including reasonable attorneys' fees) awarded to a third party against any of the Indemnified Parties by a court or tribunal of competent jurisdiction in respect to any Claim. If You do not timely defend against or resist a Claim after notice from Licensor, Licensor shall be entitled to investigate, defend, compromise, settle, or otherwise dispose of the Claim, and incur costs in connection therewith, at Your expense, in such manner as Licensor deems in its best interests until a reasonable time after You comply with its obligations under this Section 10. You shall not enter into a settlement of any Claim without the Licensor's written consent unless such settlement is solely for monetary payment by You and contains an express, complete, unconditional release of all of the Indemnified Parties and which does not impose any obligations or restrictions on any of the Indemnified Parties.

11. High-Risk Activities: The Software and Epiphan Hardware Products are not fault-tolerant and are not designed, manufactured or intended for use in or in conjunction with on-line control equipment in hazardous environments requiring fail-safe performance, such as in the operation of nuclear facilities, aircraft navigation systems, air traffic control, or direct life support machines. Licensor, its licensors, suppliers, subcontractors, resellers and distributors specifically disclaim any express or implied representations, warranties and/or conditions for such uses.

12. U.S. Government End-Users: The Software and Documentation are each a "commercial item" as that term is defined at FAR 2.101, consisting of "commercial computer software" and "commercial computer software documentation" as such terms are defined in FAR 12.212, and are provided to the U.S. Government only as commercial end items. Government end users acquire the rights set out in this Agreement for the Software, Epiphan Hardware Products and Documentation consistent with: (i) for acquisition by or on behalf of civilian agencies, the terms set forth in FAR 12.212; or (ii) for acquisition by or on behalf of units of the Department of Defense, the terms set forth in DFARS 227.7202. Use of the Epiphan Hardware Products, Software and Documentation is further restricted by the terms and conditions of this Agreement and the applicable commercial purchase agreement for the Epiphan Hardware Products. For the purposes of any applicable government use, the Epiphan Hardware Products, Software and Documentation were developed exclusively at private expense, and are trade secrets of Epiphan Systems Inc. for the purpose of any Freedom of Information legislation or any other disclosure statute, regulation or provision.

13. Export Restrictions: The Epiphan Hardware Products, Software, Documentation and related information are subject to export and import restrictions. By downloading, installing, or using the Software, Epiphan Hardware Products, Documentation and/or related information, You are representing and warranting that You are not located in, are not under the control of, and are not a national or resident of any country to which the export of the Epiphan Hardware Products, Software, Documentation and/or related information would be prohibited by the laws and/or regulations of Canada or the United States. You are also representing and warranting that You are not an individual to whom the export of the Epiphan Hardware Products, Software, Documentation or related information would be prohibited by the laws and/or regulations of Canada or the United States. You

shall comply with the export laws and regulations of Canada and the United States that are applicable to the Epiphan Hardware Products, Software, Documentation and related information and You shall also comply with any local laws and/or regulations in Your jurisdiction that may impact Your right to export, import, or use the Epiphan Hardware Products, Software, Documentation or related information, and You represent and warrant that You have complied with any such applicable laws and/or regulations. The Epiphan Hardware Products, Software, Documentation and related information shall not be used for any purposes prohibited by export laws and/or regulations, including, without limitation, nuclear, chemical, or biological weapons proliferation. You shall be responsible for procuring all required permissions for any subsequent export, import, or use of the Epiphan Hardware Products, Software, Documentation or related information.

14. Intellectual Property: Epiphan, Epiphan Systems and Epiphan Video are tradenames, trademarks or registered trademarks of Epiphan Systems Inc. in certain countries. All Licensor product names and logos are trademarks or registered trademarks of Epiphan Systems Inc. in certain countries. All other company and product names and logos are trademarks or registered trademarks of their respective owners in certain countries. You shall not disclose, transfer or otherwise provide to any third party any portion of the Software, except as expressly permitted in this Agreement.

15. General: This Agreement is the entire agreement between You and Licensor in respect to the Software, superseding any other agreements or discussions, oral or written. The terms and conditions of this Agreement shall prevail over any pre-printed terms on any quotes, orders, purchase orders, or purchase order acknowledgements, and shall prevail over any other communications between the parties in relation to the Software. You may not assign this Agreement whether voluntarily, by operation of law, or otherwise without Licensor's prior written consent. Licensor may assign this Agreement at any time without notice. The failure of a party to claim a breach of any term of this Agreement shall not constitute a waiver of such breach or the right of such party to enforce any subsequent breach of such term. If any provision of this Agreement is held to be unenforceable or illegal, such decision shall not affect the validity or enforceability of such provisions under other circumstances or the remaining provisions of this Agreement and such remaining provisions shall be reformed only to the extent necessary to make them enforceable under such circumstances. This Agreement shall be governed by the laws of the Province of Ontario and the laws of Canada applicable therein. No choice or conflict of laws rules of any jurisdiction shall apply to this Agreement. You shall only be entitled to bring any action or proceeding arising out of or relating to this Agreement, the Epiphan Hardware Products, Software, Documentation or any services provided in respect to the Epiphan Hardware Products, Software and/or Documentation in a court in Ottawa, Ontario, Canada, and You consent to the jurisdiction of such courts for any such action or proceeding. You waive all rights that You may have or that may hereafter arise to contest the jurisdiction of such courts for any action or proceeding brought by You. You hereby waive any right You may have to request a jury trial with respect to any action brought by You in connection with this Agreement, the Epiphan Hardware Products or Software or any services provided in respect to the Epiphan Hardware Products or Software. The application of the United Nations Convention on Contracts for the International Sale of Goods to this Agreement is expressly excluded.

Environmental Information

The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment. In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way. The crossed-out wheeled bin symbol invites you to use those systems. If you need more information about collection, reuse and recycling systems, please contact your local or regional waste administration. You can also contact us for more information on the environmental performance of our products.

Important Safety Warnings

WARNING: This product has no user-serviceable parts and the battery used in this device is not replaceable. Do not attempt to disassemble. Return the device for service.

CAUTION, RISK OF ELECTRIC SHOCK: This device may have multiple AC power cords installed. All power sources shall be disconnected before servicing to avoid shock hazard.

ATTENTION: Cet appareil ne contient aucun composant pouvant être entretenue ou réparé par l'utilisateur. En cas de panne, retourner l'appareil pour réparation.

ATTENTION, RISQUE DE CHOC ÉLECTRIQUE: Cet appareil peut être équipé de multiples cordons d'alimentation en courant alternatif. Pour placer cet appareil hors tension, débrancher tous les cordons d'alimentation sans exception.

FCC Compliance Statement

47 CFR Section 2.1077 Compliance Information

Unique identifier: AV.io SDI

This device complies with Part 15 of the FCC Rules. 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.

Responsible party (US contact):

Epiphan Video
459 Hamilton Avenue, Suite 301
Palo Alto, CA
94301, USA

www.Epiphan.com

FCC CAUTION

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Innovation, Science and Economic Development Canada:

This device complies with ICES-003 of the ISED rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Cet appareil est conforme à la norme ISED NBM-003 pour les appareils radio agréés. Son fonctionnement est sujet aux deux conditions suivantes:

- (1) le dispositif ne doit pas produire de brouillage préjudiciable, et
- (2) ce dispositif doit accepter tout brouillage reçu, y compris un brouillage susceptible de provoquer un fonctionnement indésirable.

CE Compliance Statement

Marking by the symbol  indicates compliance of this device with the applicable directives of the European Community and meets or exceeds the following technical standards:

Directive 2014/30/EU - Electromagnetic Compatibility

Directive 2011/65/EU - RoHS, restriction of the use of certain hazardous substances in electrical and electronic equipment



Other Jurisdictional Issues

Epiphan makes no representation that its products or information in this document or its web site is appropriate or available for use in your jurisdiction. Those who choose to access the Epiphan web site or use Epiphan products do so on their own initiative and are responsible for compliance with local laws, if and to the extent local laws are applicable.

Submissions to Epiphan and Affiliated Servers

Any information, including but not limited to remarks, suggestions, ideas, graphics, or other submissions, communicated to Epiphan through their Epiphan web site is the exclusive property of Epiphan. Epiphan is entitled to use any information submitted for any purpose, without restriction (except as stated in Epiphan's Privacy Statement) or compensation to the person sending the submission. The user acknowledges the originality of any submission communicated to Epiphan and accepts responsibility for its accuracy, appropriateness, and legality.

Third Parties and Links to Third-Party Web Sites

Mention of non-Epiphan Systems Inc. products or services on their website, or this document site is for informational purposes and does not constitute an endorsement or recommendation.

This document may contain links to non-Epiphan web sites. These links are provided to you as a convenience, and Epiphan is not responsible for the content of any linked web site. Any outside web site accessed from the Epiphan web site is independent from Epiphan, and Epiphan has no control over the content of that web site. In addition, a link to any non-Epiphan web site does not imply that Epiphan endorses or accepts any responsibility for the content or use of such a web site.

In no event shall any reference to any third party or third party product or service be construed as an approval or endorsement by Epiphan of that third party or of any product or service provided by a third party.

Miscellaneous

It is the user's responsibility to ascertain whether any information downloaded from the Epiphan web site or other websites is free of viruses, worms, trojan horses, or other items of a potentially destructive nature.

Enforcement of Terms and Conditions

These Terms and Conditions for use of this document and the associated Epiphan Product are governed and interpreted pursuant to the laws of the province of Ontario, Canada, notwithstanding any principles of conflicts of law.

All disputes arising out of or relating to these Terms and Conditions shall be finally resolved by arbitration conducted in the English language in Ottawa, Ontario, Canada under the commercial arbitration rules of the Canada. The parties shall appoint as sole arbitrator a retired judge who presided in the province of Ontario. The parties shall bear equally the cost of the arbitration (except that the prevailing party shall be entitled to an award of reasonable attorneys' fees incurred in connection with the arbitration in such an amount as may be determined by the arbitrator). All decisions of the arbitrator shall be final and binding on both parties and enforceable in any court of competent jurisdiction. Notwithstanding this, application may be made to any court for a judicial acceptance of the award or order of enforcement. Notwithstanding the foregoing, Epiphan shall be entitled to seek injunctive relief, security, or other equitable remedies from any court of competent jurisdiction.

If any part of these terms is unlawful, void, or unenforceable, that part will be deemed severable and will not affect the validity and enforceability of the remaining provisions. Epiphan may, at its sole discretion and without notice, revise these terms at any time by updating this posting.

Copyright © 2018 Epiphan Systems Inc.

All Rights Reserved.

© and ™ 2018, Epiphan Systems, Inc