

SDI2USB 3.0™ User Guide



Epiphan Technical
Documentation

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- Complete description of the problem you are experiencing.

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1. SDI2USB 3.0 Overview

SDI2USB 3.0™ Epiphan's newest external frame grabber uses an SDI input connection to transmit data to a video capture workstation through a USB 3.0 port or a USB 2.0 port. The video capture workstation can capture, record and broadcast uncompressed production-quality images and videos directly from 3G-SDI, HD-SDI and SD-SDI sources. Both audio and video capture is supported and no peripheral component interface (PCI) is required.

SDI2USB 3.0 captures video from an SDI video source. Meeting greater demands for transferring larger files at faster speeds, this external frame grabber supports USB 3.0 technology, capable of transferring uncompressed data with speeds of up to 5.0 (Gbits/s) - about ten times faster than USB 2.0.

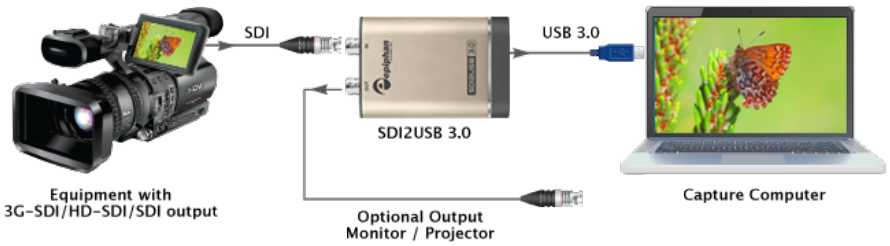
Note: In practice, transfer speeds are dependent on factors such as the task and hardware configuration.

SDI2USB 3.0 is versatile and can be used with multiple workstation configurations. It is backward compatible with USB 2.0 connections, however it transfers compressed video with a lower quality when using USB 2.0.

SDI2USB 3.0 supports full HD capture rate of 60 frames per second. All captured data is converted to RGB 24-bit color format. When SDI2USB 3.0 is configured to capture and transfer video to third-party software, such as Window Media Encoder configured for YUV color format, SDI2USB 3.0 converts RGB 24-bit color format to YUV color format. When YUV 4:2:0 chroma subsampling is applied, video can be captured and recorded up to 60 frames per second.

In addition to an input port, the SDI2USB 3.0 offers an SDI output port that can be used for confidence monitoring. In the example below, a monitor connected to the output port allows you to monitor the input signal and make quick adjustments if required.

Figure 1 SDI2USB 3.0 sample configuration including confidence monitoring



The SDI2USB 3.0 frame grabber is fully compatible with DirectShow on Windows, Video4Linux on Linux, and QuickTime on Mac OS X.

SDI2USB 3.0 is part of Epiphan's complete line of video and audio signal capture products. For more information about all Epiphan's video signal capture products, refer to [Frame Grabbers Overview](#) on Epiphan's website.

1.1 Package Contents

Epiphan SDI2USB 3.0 device package includes the following:

1. SDI2USB 3.0 frame grabber
2. One SDI cable (3G compliant)
3. USB 3.0 cable

2 Physical Attributes

2.1 System Hardware Features

The SDI2USB 3.0 device measures 90mm x 60mm x 23mm (3.54" x 2.36" x 0.91"), and features a single input and a single output BNC type connector, a USB 3.0

connector and an LED indicator. The SDI2USB 3.0 can be connected to the USB 3.0 or USB 2.0 port on the video capture workstation.

Figure 2 Front panel of the SDI2USB 3.0



Figure 3 Rear view of the SDI2USB 3.0



Connectors and indicators

Number	Interface	Status Description
1	LED	<p>The following describes the LED indicators when the SDI2USB 3.0 device is connected to a USB 3.0 port:</p> <p>Flashing blue: firmware has successfully loaded, device is idle.</p> <p>Flashing green - video mode detection is in progress.</p> <p>The following describes the LED indicators when the SDI2USB 3.0 device is connected to a USB 2.0 port:</p> <p>Flashing green - firmware has successfully loaded, device is idle.</p> <p>Solid green: video mode detection is in progress.</p> <p>The following LED indicators apply regardless of the USB port type:</p> <p>Solid red - the frame grabber is powered on, however it is not functional. The driver is either not installed or failed to load.</p> <p>Flashing red - the frame grabber signature validation has failed. Possible reasons:</p> <ul style="list-style-type: none"> • On-board EEPROM failure; or • Incorrect initialization at the factory. <p>In either case the device should be replaced.</p> <p>Solid yellow - image capture or data transfer is in progress.</p>
2	USB 3.0 Output	<p>Connects the SDI2USB 3.0 device to the video capture workstation to enable data transfer from the video source to the video capture workstation.</p>

3	SDI Output	Connect an SDI output source, such as a monitor, to the SDI2USB 3.0 device. Note: the SDI output port is active when the SDI2USB 3.0 is connected to a powered up video capture workstation running the SDI2USB 3.0 driver.
4	SDI Input	Connect an input source with an SD-SDI, HD-SDI or a 3G-SDI signal.

2.2 USB 2.0 Backwards Compatibility

SDI2USB 3.0 is USB 2.0 backwards-compatible; you can connect it to the USB 2.0 port in situations when a laptop or workstation has a USB 2.0 port only. It will not prevent you from using the frame grabber in these circumstances. SDI2USB 3.0 uses green and blue LEDs to indicate whether it is connected to a USB 2.0 or 3.0 port. Refer to section [System Hardware Features](#) for information on LED indicators.

Configuration Tips:

- The SDI2USB 3.0 cannot transfer uncompressed video when connected to the workstation's USB 2.0 port. This standard provides lower transfer speed than the USB 3.0 standard therefore the frame grabber will compress the captured data before transferring. To choose compression options refer to [Configuring Recording Options](#).
- The SDI2USB 3.0 must be connected to the USB 3.0 port on the video capture workstation when capturing video and audio from an SDI source, otherwise only video is captured. For information about configuring a video capture workstation to capture video and audio from an SDI source, refer to section [Windows Capture Application](#).

2.3 Cables and Connectors

High speed data transfer (up to 5 GB/s) is supported by USB 3.0 when you connect your SDI2USB 3.0 to the USB 3.0 port on the video capture workstation.

This section describes compatible connectors and cables.

2.3.1 ***USB AM-BM Cable***

The USB AM-BM cable connects the SDI2USB 3.0 frame grabber to the USB 3.0 or 2.0 port on the video capture workstation.

Figure 4 USB AM-BM cable



2.3.2 ***SDI to SDI Cable***

Connects an SDI source to the SDI2USB 3.0 SDI in port. This cable is included with the SDI2USB 3.0.

Figure 5 SDI to SDI cable



3 System Requirements

Epiphan's SDI2USB 3.0 frame grabber requires the following hardware and software:

Video source	any SDI video source
Video capture workstation	compatible USB 3.0 host controller for SuperSpeed operation; USB 2.0 controller for High Speed operation.
Processor frequency	2 GHz or faster 32-bit (x86) or 64-bit (x64) processor
RAM memory	2 GB RAM (32-bit and 64-bit)
Available hard disk space	16 GB available hard disk space (32-bit) or 20 GB (64-bit)
Video capture workstation operating system	Windows XP SP2 or later version; Mac OS X 10.8 (Mountain Lion) or later version; A list of precompiled Linux drivers is

	available from the Software Download page.
--	--

3.1 USB 3.0 controllers

To take advantage of the high transfer rate of USB 3.0, ensure your video capture workstation is equipped with an adequate USB 3.0 controller capable of supporting the transfer rate. This is especially important when capturing high-definition video and large audio files, and capturing 60 fps. Epiphan recommends the following USB 3.0 controller.

Linux requirements: kernel version 3.5 or later (Ubuntu 12.10+)

Recommended high performance controller:

- Intel® USB 3.0 eXtensible Host Controller

4 Getting Started

This chapter describes basic steps for installing drivers and the Epiphan capture software, and connecting a SDI2USB 3.0 frame grabber to the video source and the video capture workstation. The video capture workstation is a computer that runs the drivers and Epiphan capture software and is used to display and record images and audio captured by the SDI2USB 3.0 frame grabber.

Basic steps:

1. Review the **Package Contents** section; verify you received all items.
2. Review the **System Requirements** section; verify that your video capture workstation will work normally with the frame grabber. The video capture workstation can be running Windows, Mac OS, or Linux.

3. Install the Epiphan drivers and capture software for the SDI2USB 3.0 on the video capture workstation. These procedures are specific to the workstation OS and are explained in the following chapters.
4. Connect the SDI2USB 3.0 to the video source. Refer to [Connecting SDI2USB 3.0](#).
5. Connect the SDI2USB 3.0 to the video capture workstation. Refer to [Connecting SDI2USB 3.0](#).
6. Launch the capture software by clicking on the desktop icon.
7. Start capturing images.

5 Installing SDI2USB 3.0 on a video capture workstation running Windows

Follow the step-by-step procedures in this section if you are using a Windows PC as the video capture workstation to view and record video and audio captured by a SDI2USB 3.0 frame grabber.

Note: Install the drivers and capture software on the Windows video capture workstation **before** connecting the frame grabber to the workstation USB port.

5.1 *To install the Windows drivers and capture software*

1. Find the latest Windows drivers and Epiphan Capture software. Browse to <http://www.epiphan.com/products/dvi-frame-grabbers/sdi2usb-3-0/downloads>.
2. Click on the Download tab. The Download page opens.
3. Scroll down the page to the Windows section.
4. Select the applicable version of the drivers and capture software that will run on the video capture workstation. Note the download destination folder.

5. Unzip the downloaded file. Right-click on the .zip file and choose **Extract All**.
6. Run the Setup Utility (setup.exe) and follow the prompts to install the software.
7. The Windows drivers and Epiphan Capture Tool is now installed.

5.2 To upgrade to the latest Windows software version

From time to time Epiphan releases new versions of Epiphan capture software available from the Epiphan web site. To confirm you have the latest capture software, select Check for Updates from the Help menu.

Note: Check for Updates will only recommend an update if Epiphan recommends that you install a new version. This will happen if the latest version contains significant bug fixes or enhancements. If a new Epiphan Capture Tool version contains only minor changes, Check for Updates may not recommend that you install a new version.

You can upgrade the Epiphan software on your Windows video capture workstation by uninstalling the previous version. If you have problems upgrading the Windows version of the software, see the detailed driver update instructions and install/uninstall instructions available at

<http://www.epiphan.com/downloads>.

5.3 Finding Software Updates

To find the latest versions of all Epiphan software for Windows go to <http://www.epiphan.com/downloads>. You can also browse to the download page for your SDI2USB 3.0 product - browse to <http://www.epiphan.com> and select **Products > Frame Grabbers > SDI2USB 3.0**. On these pages you will find the most recent versions of:

- Epiphan SDI2USB 3.0 User Guide.
- Epiphan USB device driver and Epiphan Capture Tool for Windows.

5.4 Troubleshooting a Windows Installation

If you experience any difficulty viewing captured images with the Windows capture application, review the following items prior to contacting technical support.

If the capture application cannot find the frame grabber:

- Confirm that the frame grabber is connected to a video capture workstation USB port and has power connected and the device LEDs are lit.
- Disconnect and re-connect the frame grabber. This prompts Windows to install the device drivers for the frame grabber if they haven't already been installed.
- Observe the behaviour of the frame grabber LED indicators.
- Check the Windows Device Manager to verify that the frame grabber has installed successfully and that the PC supports USB 3.0.

If, after following the installation steps, you are still experiencing problems, close all applications and restart the video capture workstation. When the video capture workstation has started up, open the Windows Device Manager to confirm that the frame grabber is detected.

6 Mac OS X Video Capture Workstation Installation

Follow the step-by step procedures in this section if you are going to use a Mac as a video capture workstation to view and record images captured by the frame grabber.

6.1 To Install the Mac Drivers and Application

A single download from the Epiphan web site includes the capture application command line capture application (v2u), the SDI2USB 3.0 system preferences and the QuickTime digitizer (vdig).

1. Find the latest Mac drivers and application software. Browse to <http://www.epiphan.com/products/dvi-frame-grabbers/sdi2usb-3-0/downloads/> and scroll down to the Mac section of the download page.
2. Download the latest version of the drivers and application that will run on the video capture workstation. Make sure you note the download destination folder.
3. Double-click on the .dmg file to unpack it if it does not unpack automatically.
4. Double-click on the .pkg file and follow the prompts.

Note: The final step of the installation requires restarting the video capture workstation.

To install the SDI2USB 3.0 in the video capture workstation, refer to the section **Connecting SDI2USB 3.0**.

6.2 To Start the Mac OS Capture Application

On the video capture workstation, run the capture application, from the Applications folder, select **SDI2USB.app**. The capture application starts up. If the SDI2USB 3.0 frame grabber is connected and powered on, the capture application should automatically find the frame grabber and begin displaying captured images. If the frame grabber is operating but not capturing images the device name and serial number should appear in the title bar and the capture application displays **No signal detected**.

6.3 Upgrading to the Latest Mac OS X Software Version

From time to time Epiphan releases new versions of all Epiphan frame grabber software available from the Epiphan web site. In most cases you can upgrade the Epiphan software on your Mac OS X video capture workstation by using normal procedures to download the latest version and install it without uninstalling the previous version.

Note: Some versions of the SDI2USB 3.0 user interface do not install a shortcut on the Mac OS X desktop. You can drag the Epiphan icon from the **Applications** folder to your desktop or add it to the Dock after installing a new version of the SDI2USB 3.0 user interface. You may also need to delete older versions of the Epiphan icon.

6.4 Finding Software Updates

To find the latest versions of all Epiphan software and drivers for Mac OS X, browse to <http://www.epiphan.com/products/dvi-frame-grabbers/sdi2usb-3-0/downloads/>.

On this download page you will find the most recent release of the Epiphan device driver, QuickTime component and SDI2USB 3.0 application compatible with Mac OS X.

7 Linux Video Capture Workstation Software

Epiphan provides the Epiphan USB device driver and the Epiphan capture API for Linux. Epiphan does not provide a video capture application for Linux. However, the USB device driver is compatible with Video4Linux so you can use Video4Linux compatible applications to receive and process captured images. You can also use the Epiphan Linux SDK to write your own custom video capture application that receives captured images from the Epiphan capture API. The following software components operate on a video capture workstation running Linux:

- The Epiphan USB device driver
- Video4Linux
- The Epiphan capture API
- V4L custom video capture applications

7.1 The Epiphan USB Device Driver

The Linux Epiphan USB device driver receives images from an Epiphan SDI2USB 3.0 and delivers the images to the Epiphan capture API and to Video4Linux. Before delivering the images the Epiphan USB device driver also performs image adjustment to improve the quality of the image. Image adjustments include setting the sampling phase, PLL adjustments, and horizontal shift. The USB device driver can also change the color depth of the captured image before sending the image to the video API. For example, if the SDI2USB 3.0 is capturing the frames at a color depth that is different than that required by the video capture application, the USB device driver converts the images to the required color depth.

The Epiphan USB device driver may not be available for your version of Linux. Epiphan does not provide source code for the Epiphan USB device driver. But you can contact Epiphan if you need an Epiphan USB device driver compiled for a specific Linux kernel version or kernel setting. Using the Epiphan software development kit (SDK) you can also create custom USB device drivers that incorporate the functions you need.

7.2 Video4Linux

Video4Linux (V4L) is a Linux video capture API. The Epiphan USB device driver can send captured images directly to Video4Linux. This means that any Video4Linux-compatible application can receive captured images. You can use a Video4Linux-compatible application to record a series of captured images as a video in the video format supported by the Video4Linux application. You can also create your own custom Video4Linux-compatible video capture application to record captured images from Video4Linux.

7.3 The Epiphan Capture API

The Epiphan capture API also receives captured images from the Epiphan USB device driver. The Epiphan capture API is optimized for processing Epiphan SDI2USB 3.0 captured images. The Epiphan capture API analyzes individual images, performs on-device cropping, and handles video mode changes. The Epiphan capture API is an alternative to using Video4Linux to capture images on Linux video capture workstations. You can use the Epiphan software development kit (SDK) to create custom video capture applications to record captured images from the Epiphan capture API.

7.4 V4L Custom Video Capture Applications

Epiphan does not provide a video capture application for Linux. However, you can use Video4Linux-compatible applications to perform many video capture operations such as recording images or video, copying, printing and saving images, or broadcasting images over the Internet. You can also use the Epiphan Linux SDK to create your own custom video capture application. The SDK along with some example applications is available from the products Downloads page (<http://www.epiphan.com/products/dvi-frame-grabbers/dvi2usb-3-0/downloads/>).

8 Connecting SDI2USB 3.0

This section describes how to connect an SDI source and video capture workstation to the SDI2USB 3.0. Ensure the Epiphan capture software is installed on the video capture workstation before connecting the SDI2USB 3.0.

1. Connect the SDI2USB 3.0 to the video source.
2. Connect an SDI source directly to the IN port on the SDI2USB 3.0 using the SDI cable included in the package.
3. Optionally, connect an external monitor, for confidence monitoring, to the OUT port on the SDI2USB 3.0 using a standard SDI cable.

4. Connect the SDI2USB 3.0 to the video capture workstation by connecting the USB AM-BM cable from the SDI2USB 3.0 to the workstation's USB 3.0 or 2.0 port.

If you installed the drivers and Epiphan Capture Tool software, the video capture workstation should automatically recognize the SDI2USB 3.0 and install drivers for it.

Note: You can use a high-quality SDI splitter to split the SDI signal between an external monitor and the frame grabber, or you can connect an external monitor directly to the SDI out port located on the SDI2USB 3.0 device for confidence monitoring. The SDI out port is a practical way to simultaneously display the video to a remote monitor while it is captured, recorded and streamed.

9 Windows Capture Application

This chapter describes common functions and features of the Epiphan Capture Tool. It supports the Windows XP, Vista, 7 and 8 versions. This chapter assumes that you have followed the installation and connection instructions described above. Before you get started make sure you have:

- video signal source
- video capture workstation running Windows; connected to a SDI2USB 3.0.
- SDI2USB 3.0 drivers and Epiphan Capture Tool installed on the video capture workstation.

9.1 *Start the Windows Capture Application*

To start the application, from the Windows Start menu select **Start > Epiphan Capture Tool**. The application starts up and looks for the SDI2USB 3.0 frame grabber connected to your PC.

If the SDI2USB 3.0 is operating, the capture application should find it and the image captured by the SDI2USB 3.0 should appear on the application display.

If the SDI2USB 3.0 device is not capturing images, the application window displays **No signal**.

As the application starts, the following messages may appear:

- **Capture device not found** as the application attempts to connect with the SDI2USB 3.0 device.
- **Detecting Video Mode** as the application connects to a device and then determines the video mode of the device.
- **Tuning Capture Parameters** as the application synchronizes and tunes capture settings and image adjustments.
- **No Signal Detected** when the application is connected to an SDI2USB 3.0 that is not connected to an active video source.


If the application successfully connects to and synchronizes with the SDI2USB 3.0 device, it begins displaying captured images.

9.2 Record captured images as image files

Before recording captured images as a series of image files, you must first configure the recording options.


1. Select **Options** from the **Tools** menu.
2. Select the **Recording** tab.
3. Select **Record as Images**. You can also select the image file format, location to save images and other image file settings from this window.

9.2.1 To start a recording


1. Perform one of the following:
 - a) Select **Start Recording** from the **Capture** menu;
 - b) Select the Record icon  from the toolbar; or
 - c) Use the key combination **CTRL+R**.

Images are captured by the frame grabber and recorded as a series of image files. The Status bar displays the name and location of the last saved file.

9.2.2 *To pause a recording*

1. Perform one of the following:
 - a) Select **Pause** from the **Capture** menu;
 - b) Select the Pause icon  from the toolbar; or
 - c) Use the key combination **CTRL+U**.

9.2.3 *To stop a recording*

1. Perform one of the following:
 - a) Select **Stop Recording** from the **Capture** menu; or
 - b) Select the Stop icon  from the toolbar.

When you stop recording images, the status bar displays the number of image files saved.

9.3 *Record captured images as video*

Before recording captured images as a video, you must first configure the recording options on the Epiphan Capture Tool.


1. Select **Options** from the **Tools** menu.
2. Select the **Recording** tab.
3. Select the arrow next to **Record as** field. A dropdown menu appears.
4. Select **Video**. Configure other options as required.
5. Click Apply.

9.3.1 *To capture video and audio from an SDI source*


SDI2USB 3.0 supports audio recording when SDI2USB 3.0 is connected to the USB 3.0 port.

Configure audio input on the video capture workstation

1. From the Windows toolbar, right-click on the volume icon. A dropdown menu appears.

2. Select Recording devices. A Sound window opens with the Recording tab displayed.
3. Choose one of the following:
 - a) Select SDI In to capture system audio; or
 - b) Select Microphone to capture audio from a built-in microphone.
4. Click on the Set Default button.
5. Click OK. The sound window closes.
6. From the capture software select **Audio Input Device** from the **Capture** menu. A list of audio devices appears.
7. Choose one of the following:
 - a) Select Default Windows Device to capture system audio (SDI In).
 - b) Select microphone to capture audio from a built-in microphone.
8. From the toolbar ensure the audio icon  is enabled.

9.3.2 *To start a recording*

1. Perform one of the following:
 - a) Select **Start Recording** from the **Capture** menu;
 - b) Select the Record icon  from the toolbar; or
 - c) Use the key combination **CTRL+R**.
2. A **Save as** dialog box appears, enter the file name and select the location for saving the video file,
3. Click **Save**. The capture tool begins to record the source video.

As images are captured by the frame grabber they are recorded to the video file. The status bar displays the name and location of the video file, the elapsed recording time and the number of frames (or images) recorded.


When video file reaches the AVI file size limit one of the following occurs based on recording configuration settings:

- recording stops;
- recording continues and a new video file is created; or


- recording continues and the original video file is overwritten.

To set recording options refer to **Configuring Recording Options**.

9.3.3 *To pause a recording*

1. Perform one of the following:
 - a) Select **Pause** from the **Capture** menu;
 - b) Select the Pause icon  from the toolbar; or
 - c) Use the key combination **CTRL+U**.

9.3.4 *To stop a recording*

1. Perform one of the following:
 - a) Select **Stop Recording** from the **Capture** menu; or
 - b) Select the Stop icon  from the toolbar.

When you stop recording, the status bar displays the name and location of the saved video file, number of frames recorded, and elapsed recording time. For example:
Wrote c:\temp\example.avi (85 sec, 464 frames).

9.4 *Pausing, Copying, Saving, and Printing Images*

Once the application is displaying images captured by the frame grabber, you can pause, copy, save, and print the current image.

9.4.1 *To pause and resume the image capture*




1. Select **Pause Capture** from the **Capture** menu or from the toolbar select  .
2. While image capture is paused, the application stops receiving new images from the device. Pause also pauses video recording, and image recording. While paused, you can save, print, and copy the captured image.
3. To resume image capture select **Resume Capture** from the **Capture** menu or from the toolbar select  . You can use the following procedure to copy the


image currently displayed by the application to the video capture workstation clipboard.

9.4.2 *To copy a snapshot of the current image*

1. Select **Copy** from the **Edit** menu or select  from the toolbar. You can also use the key combination **CTRL+C**. The current image is copied to the clipboard.
2. Paste the image into a document or other application as a bitmap image. The image is pasted as a device independent bitmap image.


9.4.3 *To save a snapshot of the current image as an image file*

You can use the following procedure to save the current image as a .bmp, .png, or .jpg file on the video capture workstation. You can optionally pause the image capture before saving the image.

1. Select **Save** from the **File** menu or from the toolbar select  or use the key combination **CTRL+S**. The status bar shows the location and name of the saved file.
2. The first time you save an image, the **Save As** dialog appears and you can specify the file name, file type, and location of the saved image file.
3. When you select **Save** again, the application saves the new image with the same file name and location, overwriting the previously saved file. You can select **Save As** to save the image with a different file name, file type, or location or use the key combination **CTRL+Shift+S**.
4. You can open the saved image file with a bitmap image editing application.

9.4.4 *To print a snapshot of the current image*

Use the following procedure to print the current image on any printer that is connected to the video capture workstation. You can optionally pause the image capture before printing the image.

1. Select **Print** from the **File** menu, select  from the toolbar or use the key combination **CTRL+P**. The current image is sent to the default printer. You can select **Print Setup** from the file menu or use the key combination **CTRL+Shift+P** to select a different printer and set printer options.

Note: You can also configure the application to invert colors for printing. From the **Tools** menu select **Options**, then select the **Display** tab and select **Invert colors for printing**. By reversing or inverting the colors of an image, the colors are made complementary of the original value. After performing picture color inversion, black becomes white, yellow becomes blue, red becomes aqua.

9.5 Menus

This section describes the commands available from the following Windows SDI2USB 3.0 user interface menus:

9.5.1 File Menu

Use the File menu commands to save and print the current image displayed by the SDI2USB 3.0 user interface and to exit the SDI2USB 3.0 user interface.

Save	<p>Save a snapshot of the current image to a file on the video capture workstation. Select a location for the file and select a file format. You can save the snapshot as a bitmap (*.bmp), portable network graphics (*.png), or JPEG (*.jpg) file.</p> <p>The first time you select Save after starting the SDI2USB 3.0 user interface, you are prompted for a file name and you can change the file location and format. After saving the first file, every time you select Save, the video capture software saves a snapshot using the same file name in the same location replacing the previously saved file. When you select Save, the status bar shows the location and name of the saved file.</p>
Save As	Save a snapshot of the current image to a file on the video capture

	<p>workstation. Using Save As you can enter a file name and select a file location and format.</p> <p>Save As resets the file name, location, and file format used by the Save command and the Save snapshot toolbar button. When you select Save As the status bar shows the location and name of the saved file.</p>
Print Setup	<p>Configure printer settings used when you select the Print command or the Print snapshot toolbar button. You can also configure the SDI2USB 3.0 user interface to invert colors for printing. By reversing or inverting the colors of an image, the colors are made complementary of the original value. After performing picture color inversion, black becomes white, yellow becomes blue, red becomes aqua. From the Tools menu select Options, then select the Display tab and select Invert colors for printing.</p>
Print	Print a snapshot of the current image using the configured printer.
Exit	Close the SDI2USB 3.0 user interface.

9.5.2 *Edit Menu*

From the Edit menu you can copy a snapshot of the current image. You can also use the key combination **CTRL+C**.

Copy	<p>Copy a snapshot of the current image to the video capture workstation clipboard.</p> <p>You can paste this image into a document or other application as a bitmap image.</p>
------	---

9.5.3 *View Menu*

Use the commands on the **View** menu to control the parts of the SDI2USB 3.0 user interface window that are displayed.



Toolbar	Change the size of the toolbar icons or hide the toolbar. You can select small, large, or huge icons. If the toolbar is hidden, select an icon size to display the toolbar.
Status Bar	Enable or disable displaying the status bar.
Full Screen	Enable full screen mode, Ctrl+F .
Image Only	<p>Change the SDI2USB 3.0 user interface to operate in the Image only mode. In the Image only mode the SDI2USB 3.0 user interface displays the captured image only. The window borders, toolbar, status bar and menu bar are not displayed. Scroll bars are displayed if required.</p> <p>The Image only mode can be useful for applications such as integrating the SDI2USB 3.0 user interface into a custom system. You can still use all of the shortcut keys to save and print images, start and stop recordings, and to exit from the image-only mode. You can always press Alt+F4 to exit from the SDI2USB 3.0 user interface.</p> <p>You can also use the --borderless command line option to start the SDI2USB 3.0 user interface in image only mode.</p>

9.5.4 *Capture Menu*

Use the commands on the capture menu to start, stop or pause the capturing and recording of images. From the capture menu you can also select the device that the SDI2USB 3.0 user interface receives captured images from if you have more than one SDI2USB 3.0 or other Epiphan frame grabbers connected to the network. You can also view image adjustment settings and VGA mode settings for the selected device.

The record functions on the capture menu record the current image as a video or as a series of consecutive image files. Select **Options** from the **Tools** menu and use the settings on the **Recording** tab to configure what the SDI2USB 3.0 user interface records.

Start recording	Start recording the current image to a video file or a series of
-----------------	--

	image files.
Pause capture	Pause or resume image capturing. If you select pause, the SDI2USB 3.0 user interface stops displaying newly captured images and the image captured when you selected Pause is displayed. Pause also pauses the recording of a video and the saving of image files. Select pause again to resume the displaying of captured images and to resume recording.
Select device	You can use Select Device or the key combination Ctrl+D to choose the device that the SDI2USB 3.0 user interface receives captured images from. The command finds and lists available SDI2USB 3.0 devices. The list displays the serial number, device type, captured image resolution and frequency or status and location of each device. You can also use this command to select the device to configure with the Configure Device command.
Connect network device	Connect a device recognized on the network.
Disconnect network device	Disconnect current device.
Recent network devices	Displays a list of recently viewed devices.
Enable audio capture	When enabled, captured audio is played on the video capture workstation and can be recorded. The toolbar icon  indicates enabled. When disabled, captured audio is not played on the video capture workstation and is not recorded. The toolbar icon  indicates disabled.
Audio input device	From the dropdown menu select the audio source device. For example if you are capturing audio from a built-in microphone, choose microphone. If you are capturing video and audio from an SDI source, select SDI In or Default Windows device, if you set SDI In as the Windows default.
Play captured audio	When enabled, captured audio is played on the video capture workstation and is recorded. When disabled, audio is not played on

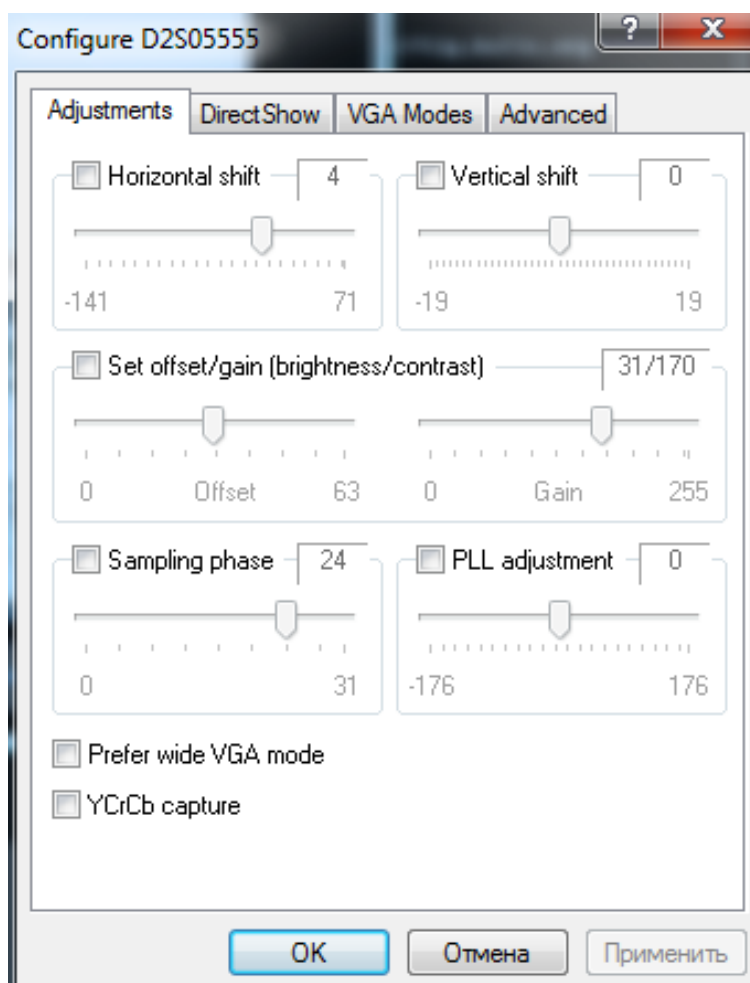
	<p>the video capture workstation, however it is recorded. Use this setting to choose whether or not to play the audio while capturing.</p> <p>Enable audio capture must be enabled for the Play captured audio settings to take effect.</p>
Configure device	<p>You can view image adjustments for the selected device. You can configure image adjustments from the Web admin interface or from the Network Discovery Utility.</p> <p>You can also select and configure VGA modes for the selected device.</p> <p>See the following section for more information regarding this function.</p>

9.5.5 *Configure Device*

This window allows you to perform various image adjustments and select a required VGA mode. The following section illustrates and describes what can be configured using which tab.

Adjustments tab:

Figure 6 Adjustments tab



Horizontal shift

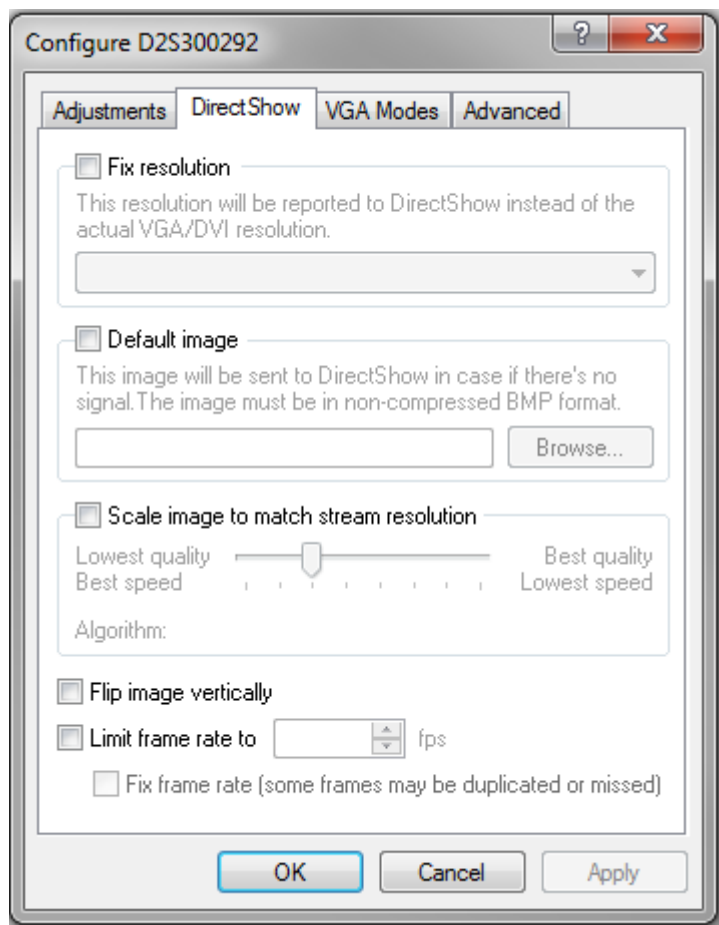
Configure horizontal shift to offset the captured image position. For example, a captured image shifted slightly to the right (horizontally) can be corrected with minor adjustments to the horizontal shift settings.

	Increasing or decreasing the value entered in the Horizontal Shift field shifts the image to the right or left.
Vertical shift	<p>Configure vertical shift to offset the captured image position. For example, a captured image shifted slightly downward (vertically) can be corrected with minor adjustments to the vertical shift settings.</p> <p>Increasing or decreasing the value entered in the Vertical Shift field shifts the image up or down.</p>
Set offset/gain (brightness/contrast)	The offset and gain settings control the image brightness and contrast respectively. Increasing the offset control causes the image to become darker. Increasing the Gain control gives the image more contrast.
Sampling phase	This setting adjusts the vertical synchronization properties of the image. You may need to change it when there is a repetitive distortion or blurriness on the horizontal axis of the image. Adjust the setting in small steps until a sharper image is displayed.
PLL adjustment	This setting is used to squeeze or stretch the image horizontally.
Prefer wide VGA mode	This checkbox, when enabled, allows Wide Aspect Ratio VGA modes to be displayed by the video capture application window. The Epiphan USB device driver may not be able to determine whether the video source is sending a wide video mode signal. You can select this option if your video source uses a wide video mode to make sure that the Epiphan USB device driver selects a wide video mode.
YCrCb capture	Select this checkbox to capture video with YCrCb encoding.

Note: During capture SDI2USB 3.0 converts 30-bit YUV 4:2:2 color format to 24-bit RGB.

DirectShow tab:

Figure 7 DirectShow tab

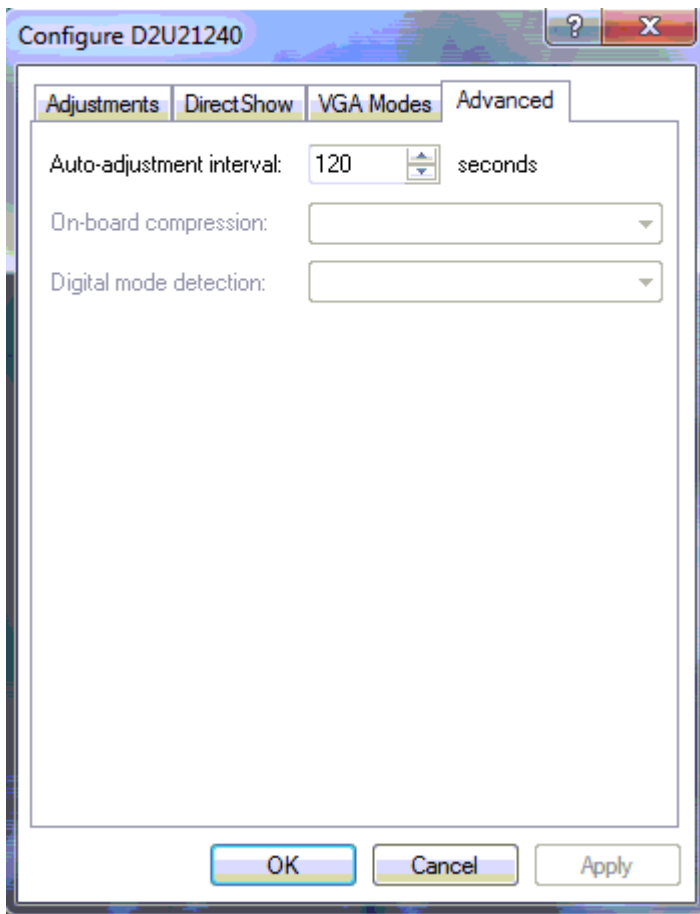


Fix resolution

Resolution that is reported to DirectShow.

Default image	Image sent to DirectShow if there is no signal.
Scale image to match stream resolution	Use the slider to scale the image.
Flip image vertically	Select the checkbox to flip the image.
Limit frame rate to	Specify the frame rate limit.
Fix frame rate	Select the checkbox to fix frame rate.

Figure 8 Advanced tab



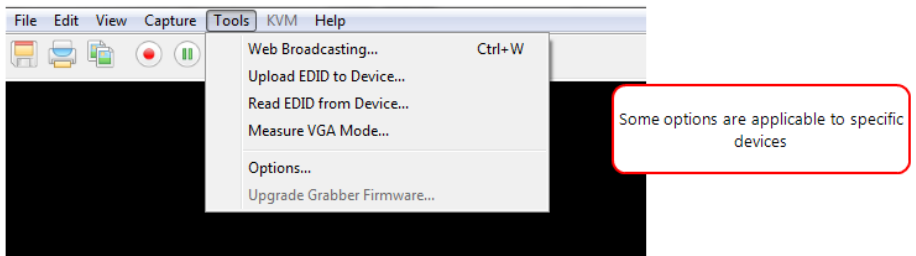
Auto-	Specify the interval value.
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adjustment interval	
On-board compression	Select this checkbox to enable on-board compression of the incoming signal.
Digital mode detection	<ul style="list-style-type: none"> - Automatic - Single Link - Dual Link
Sync level adjustment	Adjust sync level (HSync and VSync).

9.5.6 *Tools Menu*

Use the Tools menu to customize basic SDI2USB 3.0 user interface operating settings.

Figure 9 Tools menu



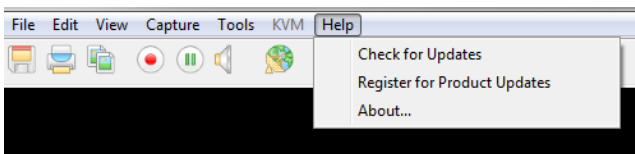
Web Broadcasting	Use this command to stream the captured signal, refer to Chapter 5, Web Broadcasting , for more details.
Upload EDID to device	<p>Use this command to upload an extended display identification data (EDID) file to your device.</p> <p>Extended display identification data (EDID) is a data structure provided by a digital display to describe its capabilities to a video source. It is what enables a modern</p>

	personal computer to know what kinds of monitors are connected to it. EDID is defined by a standard published by the Video Electronics Standards Association (VESA).
Read EDID from device	Use this command to read an extended display identification data (EDID) file from the device.
Measure VGA Mode	When requested by Epiphan technical support, you can use this command to display low-level information about the VGA mode that you are capturing with your frame grabber. You can copy this information into an email to send it to Epiphan technical support.
Options	Configure video recording and display settings. See the section, Capture, Record, and Display Options for more information.
Upgrade Grabber Firmware	Select this option to download the latest FPGA program.

9.5.7 *Help Menu*

Use the Help menu to check for updates and to display information about the version of the SDI2USB 3.0 user interface that you are running.

Figure 10 Help Menu

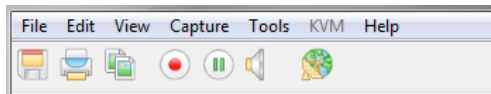







Note: **Check for Updates** function will only recommend an update if Epiphan recommends that you install a new version. This will happen when the latest version contains significant bug fixes or enhancements. If a new SDI2USB 3.0 user interface version only contains minor changes or if you are running the current version, **Check for Updates** may not recommend that you install a new version and will not display any information.

9.6 Toolbar

The toolbar can be used to save, print, or copy the current captured image; to start, pause, and stop the recording of the currently captured image. You can use the **Toolbar** command on the **View** menu to change the size of the toolbar icons or to hide the toolbar. You can select small, large, or huge icons. If the toolbar is hidden, you can select an icon size to display the toolbar.

Figure 11 Toolbar



	<p>Save a snapshot of the current image captured by the SDI2USB 3.0 user interface to a file on the video capture workstation. Select a location for the file and select a file format. You can save the snapshot as a Windows bitmap (*.bmp), portable network graphics (*.png), or JPEG (*.jpg) file.</p>
	<p>Print a snapshot of the current image to the configured printer.</p>
	<p>Copy a snapshot of the current image to the video capture workstation's clipboard. You can paste this image into a document or other application as a bitmap image.</p>
	<p>Start or stop recording the images captured by the SDI2USB 3.0. When you start recording, the status bar displays RECORDING and also displays information about the image or video file being recorded. When you stop recording, the status bar displays information about the saved image files or video file.</p>
	<p>Pause or resume image capturing. If you select pause, the SDI2USB 3.0 user interface stops displaying captured images. Pause also pauses the recording of a video and the saving of image files. Select pause again to resume the displaying of captured images and to resume the recording of a video.</p>



Enable web broadcasting of the captured signal. Refer to Chapter 5, **Web Broadcasting**, for details.

9.7 Status Bar

The status bar is located at the bottom of the user interface window.

Figure 12 Status Bar indicates status of the SDI2USB 3.0



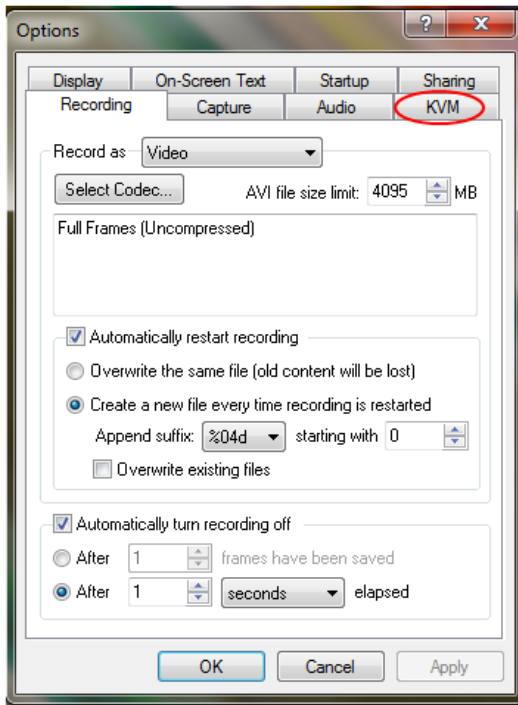
The status bar displays information about the SDI2USB 3.0 user interface:

- The location and file name of image or video files saved while recording.
- Recording status. “RECORDING” means that the SDI2USB 3.0 user interface is recording captured images.
- The data rate is the rate (in MB/s, KB/s, Mbps, and Kbps) that the SDI2USB 3.0 user interface is receiving data from the device capturing images.
- The frame rate that the SDI2USB 3.0 user interface is operating at in frames per second (fps).
- The number of frames or images that the SDI2USB 3.0 user interface has displayed since the SDI2USB 3.0 user interface was last started. The number of frames is only visible if you select **Number of captured frames** on the status bar from the **Display** tab of the **Options** dialog. The number of frames stops incrementing and starts flashing if you have paused the image capture. Use the **Reset counter button** to reset the number of frames from the **Display** tab of the **Options** dialog.
- The VGA mode and refresh rate of the video source.

9.8 Capture, Record, and Display Options

This section introduces the options available from the **Tools** menu when you select the **Options** command. These options control how the SDI2USB 3.0 user interface records images, displays images. Note that this application is common to a number of different products. The **KVM** tab functionalities do not apply to the SDI2USB 3.0 product.

Figure 13 Options window



Some options are applicable to specific devices

9.8.1 Configuring Recording Options

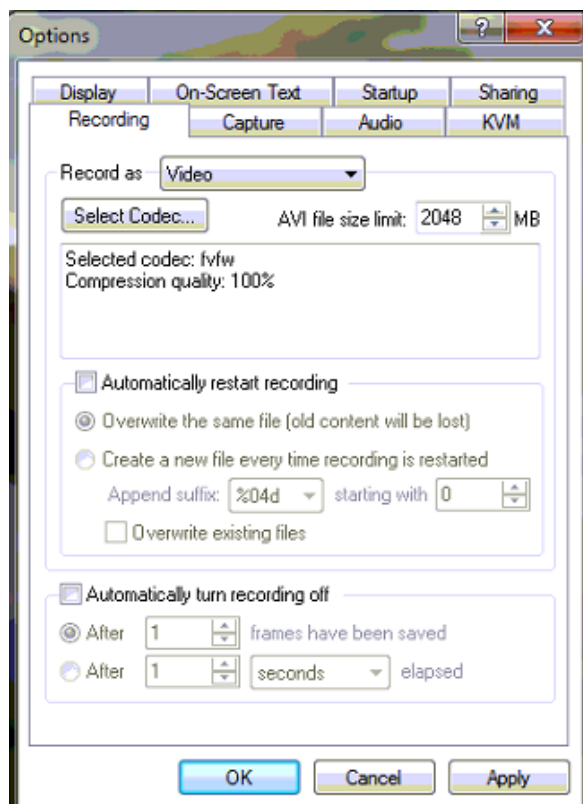
To control how the SDI2USB 3.0 user interface records captured images, select **Options** from the **Tools** menu and then select the **Recording** tab. You can record captured images as a series of consecutively saved graphic files or as a video file.

How the SDI2USB 3.0 user interface records images when you start recording from the Toolbar or the capture menu depends on how you set the recording options.

On this tab you can select a codec which is used to encode the captured video stream. Codecs are not included in the software package provided by Epiphan for the SDI2USB 3.0 frame grabber. You must download them before using the frame grabber. For example, you can download an x264 codec pack - a free library for encoding H.264/MPEG-4 AVC video streams.

If your computer is running under the 32-bit OS, download a 32-bit codecs pack. For the 64-bit OS, download a 64-bit codecs pack.

Figure 14 Recording tab



You can select the following options:

Record as	Specify whether video or images are recorded.
Select Codec...	Select the codec that is applied for compressing the signal. Click on the Select Codec button; a Video Compression window opens. Select the type of compression and quality applied to the recording, Choose how often a key frame (a frame that contains all the pixels) is used when recording and streaming the video. The longer the key frame interval the smaller the video

	<p>file size, and vice versa.</p> <p>Configure the Data Rate to set transmission speed, the lower the transmission speed the lower the bandwidth and system resource usage and vice versa.</p>
AVI file size limit	Specify the size limit of the .AVI file where the data is recorded.
Automatically restart recording	Select the checkbox to restart recording automatically. This checkbox enables the five fields below.
Overwrite the same file (old content will be lost)	After the video file size limit is reached, delete the original file and start recording a new video file with the same name. If you select this option the original saved video data is lost.
Create a new file every time recording is restarted	After the video file size limit is reached, start a new video file. You can use the append suffix setting to create a unique name for the new file or files.
Append suffix...	<p>When you start a video recording session you are prompted to enter a file name. If the file exceeds the AVI file size limit, the SDI2USB 3.0 user interface starts another file named with the original file name appended with a sequential numeric suffix. Use the append suffix options to specify the format of this suffix.</p> <p>Each suffix starts with a % sign and can include the following characters:</p> <p>02, 04, 06, or 08 indicates the number of digits to use in numbering the suffix. You can specify 2, 4, 6, or 8 digits.</p> <p>“d” means decimal numbers are used in the</p>

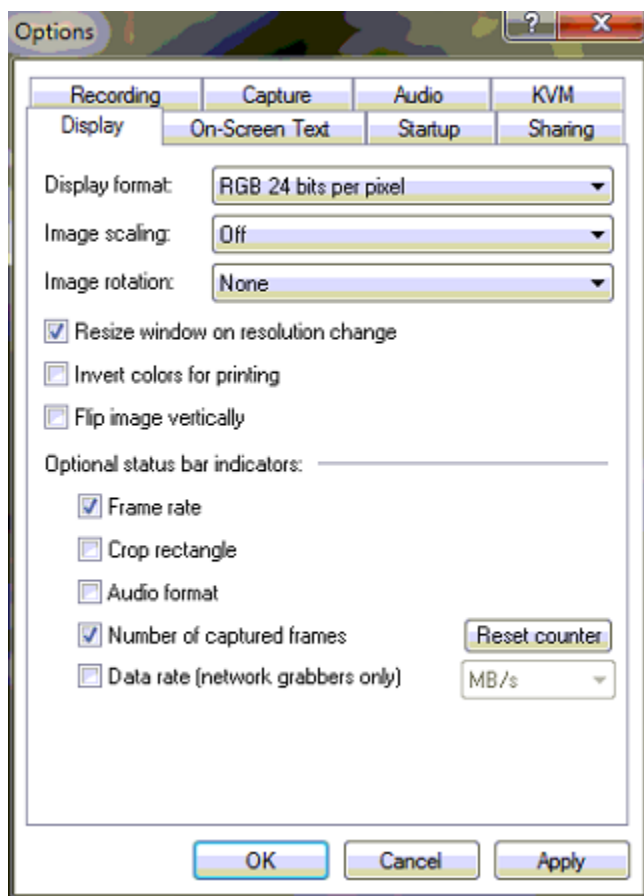
	<p>suffix.</p> <p>“X” means hexadecimal numbers are used in the suffix.</p> <p>The suffix %02d means the saved file names end with two-digit decimal numbers, for example: 01, 02, 03, ..., 10, 11 and so on. The suffix %04X means the saved file names end with 4-digit hexadecimal numbers, for example: 0001, 0002, 0003, ..., 000A, 000B and so on.</p>
...starting with	<p>Enter the starting number used in the file name suffixes in decimal format. If the suffixes include hexadecimal numbering this decimal number is automatically converted to hexadecimal.</p> <p>For example, if you named the video file VID, set the suffix to %02d and set starting with to 1, the video file names would be VID.avi, VID01.avi, VID02.avi, etc.</p>
Overwrite existing files	<p>If you select overwrite existing files, files are saved according to the video file recording options. Existing files are replaced with the new files.</p> <p>If you do not select overwrite existing files, the file number in the suffix of the file name is incremented until a file can be saved without overwriting an already saved file.</p>
Automatically turn recording off	Specify under what conditions recording turns off automatically.
After ... frames have been saved	Enter a number of frames that can be saved before recording is automatically stopped.
After ... elapsed	Enter the number of milliseconds, seconds,

minutes or hours to elapse before recording is automatically stopped.

9.8.2 *Configuring Display Options*

To change display options from the **Tools** menu, select **Options** and then select the **Display** tab.

Figure 15 Display tab



The following display options are available:

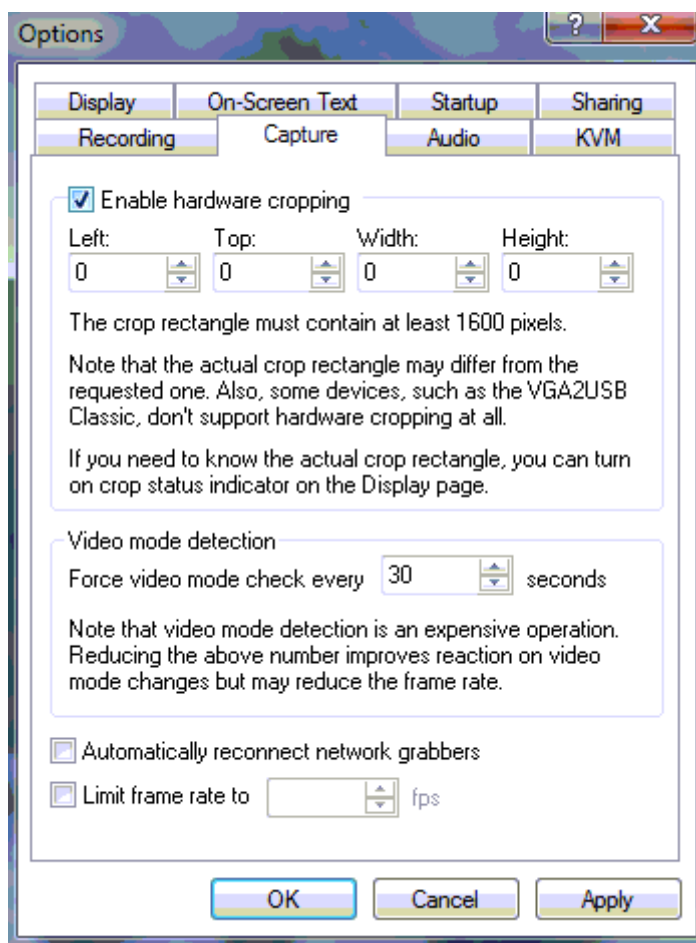
Display format	<p>Specify in which color format the video or image is displayed.</p> <p>Note: When SDI2USB 3.0 is configured to transfer video to third-party software, such as Window Media Encoder configured for YUV color encoding, SDI2USB 3.0 converts RGB 24-bit color format to YUV color format.</p> <p>The following lists possible expectations when color space conversion is used:</p> <ul style="list-style-type: none"> • When YUV 4:2:0 chroma subsampling is applied, video can be streamed and recorded up to 60 frames per second. • When YUV 4:2:2 chroma subsampling is applied, video can be streamed and recorded up to 45 frames per second. • When chroma subsampling is not applied, video can be streamed and recorded up to 30 frames per second.
Image scaling	Specify whether the image should be scaled and how it should be scaled.
Image rotation	Specify whether the image should be rotated and how it should be rotated.
Resize window on resolution change	Select the checkbox to resize window when the image resolution is changed.
Invert colors for printing	Select the checkbox to change dark colors to light colors and light colors to dark colors.
Flip image vertically	Flip the image at its vertical axis.

Select the check boxes below to add optional indicators to the status bar...	
Frame rate	Displays frame rate
Crop rectangle	Displays crop status
Audio format	48000Hz, stereo, SDI2USB 3.0 supports 16 bit format.
Number of captured frames	Displays number of captured frames
Data rate (network grabbers only)	Displays data rate

9.8.3 *Configuring Capture Options*

Open this tab to configure multiple capture options.

Figure 16 Options tab



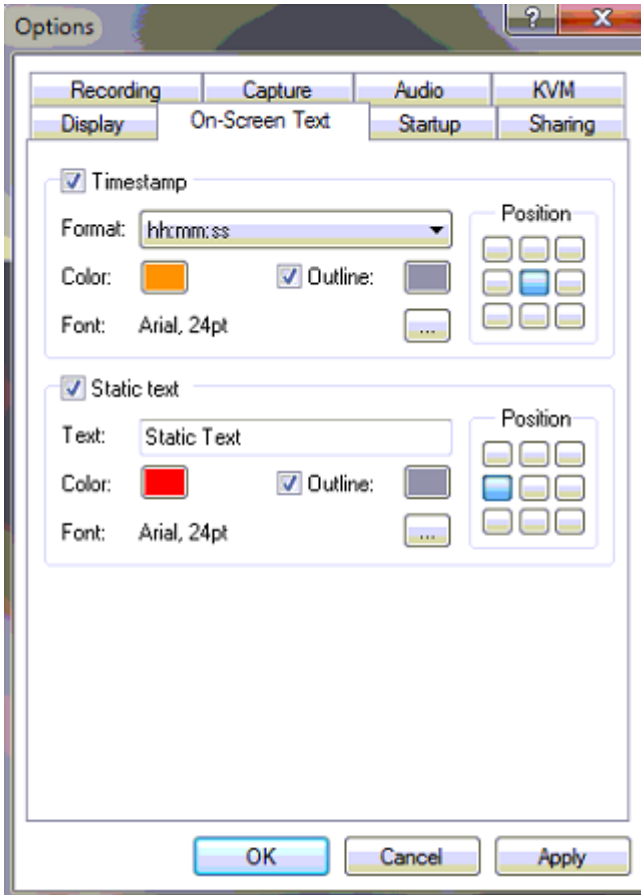
Enable hardware cropping	Select this checkbox to enable cropping functionality.
Left, Top, Width, Height	Enter the values for the crop rectangle.

Force video mode detection	Specify how often the application indicates the type of video signal that is received. Note: increasing the frequency of video mode detection to reduce reaction time when changing video mode, may also reduce the frame rate.
Automatically reconnect network grabbers	Select this checkbox to restore connection with remote frame grabbers when the connection is lost. Otherwise the system connects to the local frame grabber, if one exists or displays a warning “No frame grabbers found”. In this case you need to restore connection manually.
Limit frame rate to	Specify the maximum frame rate for the video signal.

9.8.4 *Setting On-Screen Text Parameters*

Open the On-Screen Text tab, to timestamp the captured video and add static text. This text is displayed on your video output.

Figure 17 On-Screen Text tab



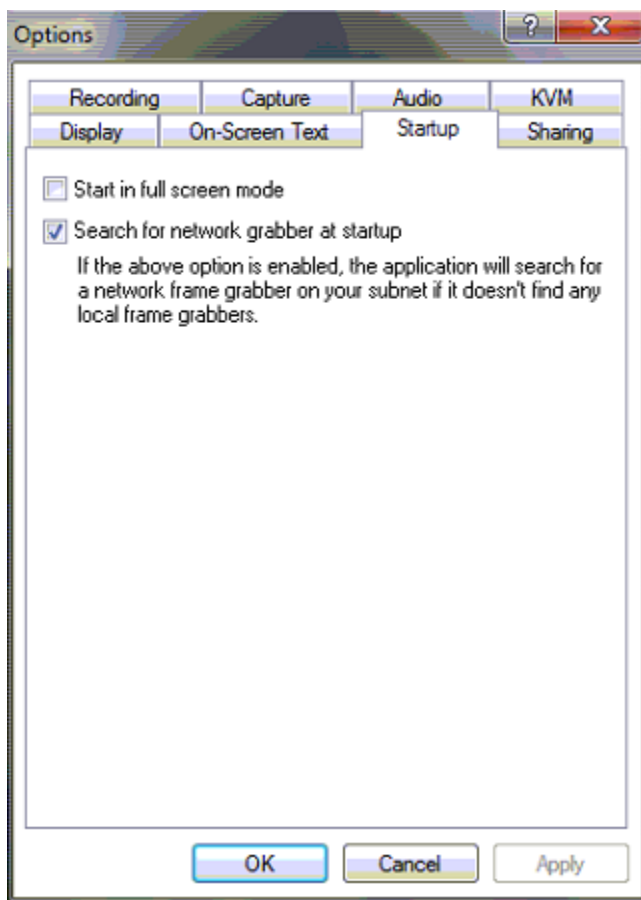
Timestamp	Select this checkbox to set timestamp parameters.
Format	Specify the timestamp format.
Color	Set the color for the timestamp.
Outline	Add an outline to the timestamp. Use an outline to highlight the

	timestamp when the text color is similar to the display background color.
Font	Click the ...button to set the font and the font size.
Position	Set the location on the screen where the timestamp is displayed.
Static text	Select this checkbox to set static text parameters.
Format	Specify the static text format.
Color	Set the color for the static text.
Outline	Add an outline to the static text. Use an outline to highlight the text when the text color is similar to the display background color.
Font	Click the ...button to set the font and the font size.
Position	Set the location on the screen where the static text is displayed.

9.8.5 *Configure Startup*

Open Startup tab to specify what actions the application should perform during startup.

Figure 18 Startup tab

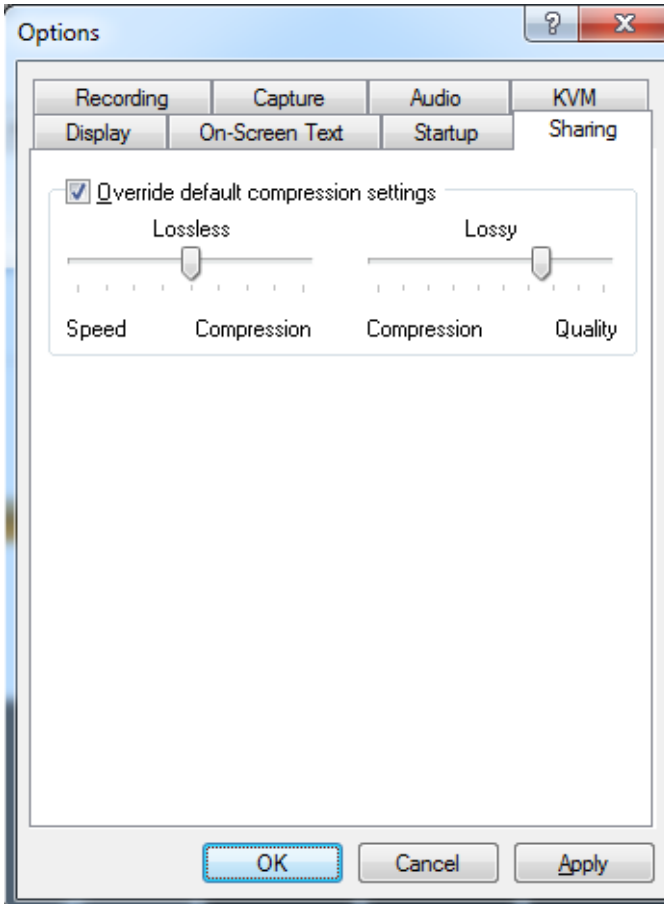


Start in full screen mode	When the application starts, it resizes to the current resolution of the screen.
Search for network grabber at startup	The application will search for network grabbers on your subnet when it does not find local frame grabbers.

9.8.6 *Sharing*

Open the Sharing tab to change web broadcasting compression. Select **Override default compression settings** and adjust the **Lossless** and **Lossy** settings.

Figure 19 Sharing tab



Lossless compression

Compresses the images that are streamed without reducing image quality. Increasing lossless compression may use more of the video capture workstation's CPU resources.

Lossy compression	Compresses the images that are streamed by reducing image quality. Lossy compression is not as CPU intensive as lossless compression.
-------------------	---

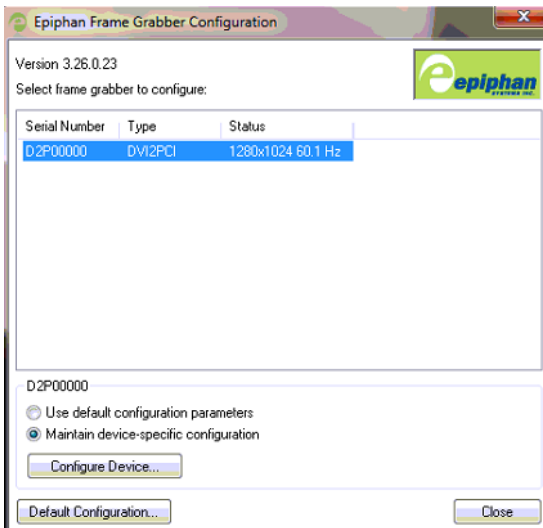
10 Configuring SDI2USB 3.0 from the Control Panel

Your SDI2USB 3.0 can be configured from the Control Panel using the Epiphan frame grabber icon. Here you can verify the device's serial number, type and status as well as setup configuration parameters.

To edit the configuration of the device:

1. From the Start menu, choose Control Panel. The Windows Control Panel window opens with a list of settings.
2. Click Epiphan Frame Grabbers from the list; the following window opens.

Figure 20 Frame grabber configuration

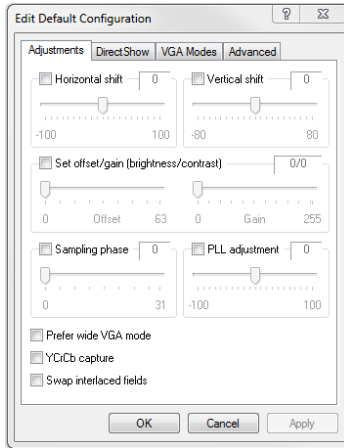


3. Perform one of the following:

- a) Click the **Default Configuration** button to make changes to the default configuration; or
- b) Click the **Configure Device** button to make changes to the normal configuration.

The Edit Default Configuration window opens. It is similar to the Tools > Options > Configure command in the Epiphan Capture Tool.

Figure 21 Edit Default Configuration window



4. Edit the parameters.
5. Click OK; the Edit Configuration window closes and the Epiphan Frame Grabber Configuration window reappears.
6. Perform one of the following:
7. Click the **Default Configuration** button to make changes to the default configuration; or
8. Click the **Configure Device** button to make changes to the normal configuration.
9. Select the **Use default configuration parameter** radio button to activate settings.
10. Click **Close**.

To edit device-specific configuration:

1. Click the **Configure Device...** button. It is similar to the Tools > Options > Configure command in the Epiphan Capture Tool.
2. Edit parameters.
3. Click OK and select the **Maintain device-specific configuration** radio button to activate settings.
4. Click **Close**.

11 Mac OS X SDI2USB 3.0 Video Capture Application

This chapter describes the functions and features of the video capture application (Epiphan Capture Tool) for Mac OS X. You can use the Mac OS X version of the video capture application to configure your SDI2USB 3.0 and to record video captured by the SDI2USB 3.0.

This chapter assumes that SDI2USB 3.0 has been properly installed. Please refer to the section: **Connecting SDI2USB 3.0**. To start using this chapter you should have:

- Selected a video capture workstation running Mac OS X with installed SDI2USB 3.0.
- A connected video source.

11.1 Starting the Mac OS X Video Capture Application

Start Epiphan's video capture application as you would start any other application installed on the video capture workstation.

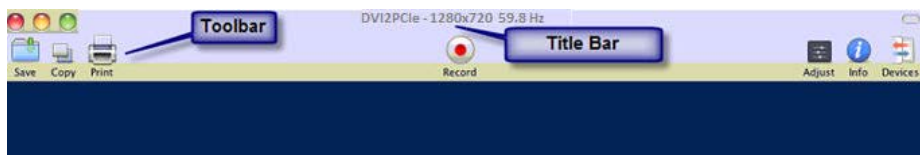
As the application starts the message **Capture Device not Found** appears on the video capture application window. Follow the steps below:

1. Select **Open Network Grabber** from the **File** menu.
2. Select the arrow beside the **Network Address** box to open the list of networked devices.
3. Select a device and select connect.

The following messages may appear in the capture window.

- **Detecting Video Mode** as the video capture application starts up and attempts to connect with the frame grabber.
- **Tuning Capture Parameters** if the video capture application finds the frame grabber and begins synchronizing and tuning capture settings and image adjustments
- **No Signal Detected** if the video capture application cannot connect to the frame grabber or if the frame grabber is not connected to an active video source.

Figure 22 Mac OS X toolbar



If the video capture application successfully connects to and synchronizes with the frame grabber, the video capture application window begins displaying captured images.

Title Bar	Displays the Epiphan product name, screen resolution and refresh rate of the video source.
Toolbar	Use the icons on the toolbar to save, copy or print the currently captured image, to record video, override image adjustments, select devices for connection or to show information about the device.

11.2 Menus

This section describes the commands available from the video capture application menus for Mac OS X.

11.2.1 File Menu

Use the **File** menu commands to save the current image, print the current image, open new capture windows and start a recording. Also included are the commands to connect to other frame grabbers on the network and disconnect from any available frame grabber.

New Capture Window	Opens another capture window. The window opens displaying the same image as the original window. You can open a different device in each capture window. Having a large number of Capture Windows open simultaneously can eventually slow performance on the video capture workstation.
Open Network Grabber	Connect to a SDI2USB 3.0 device on the network.
Recent Network Grabbers	Select from the list of recently opened frame grabber devices.
Disconnect Network Grabber	Disconnect the SDI2USB 3.0 device on the network. The device serial number will be shown next to the Disconnect menu item. If you have multiple capture windows open, make sure you select the capture window containing the device from which you want to disconnect.
Record Movie	Record captured video in a file.
Save Image	Save a snapshot of the current image to a file on the video capture workstation. Select a name and a location for the file and select a file format. You can save the snapshot as a bitmap (*.bmp), portable network graphics (*.png), JPEG (*.jpg) file, or tiff (*.tiff) file.
Page Setup	Configure the printer settings used when you select the

	Print command or the Print toolbar button.
Print	Send a snapshot of the current image to the configured printer.

11.2.2 *Edit Menu*

From the **Edit** menu you can copy a snapshot of the current image.

Copy	Copy a snapshot of the current image to the video capture workstation clipboard.
------	--

11.2.3 *View Menu*

Use the commands on the **View** menu to control what information is displayed in the SDI2USB 3.0 user interface window.

Show Device Information	View the information about hardware type, location, serial number, video mode, and frame rate.
Hide Device Information	Hide the information about hardware type, location, serial number, video mode, and frame rate.
Adjustment Controls	Display the Adjustments tab (refer to Configure Device for details).
Enter Full Screen	Enter full screen mode

11.2.4 *Tools Menu*

Use the **Tools** menu to customize basic SDI2USB 3.0 user interface operating settings.

Show VGA Mode Information	View low-level VGA mode information
Upload EDID to Device	Use this command to upload an extended

	<p>display identification data (EDID) file to your device.</p> <p>Extended display identification data (EDID) is a data structure provided by a digital display to describe its capabilities to a video source. It is what enables a modern personal computer to know what kinds of monitors are connected to it. EDID is defined by a standard published by the Video Electronics Standards Association (VESA).</p>
Read EDID from Device	Use this command to read an extended display identification data (EDID) file from the device.

11.2.5 *Window Menu*

Minimize	Minimize the window.
Zoom	Zoom in on your screen.
Bring all to Front	Brings all of the windows of the current application to the front.


11.2.6 *Help Menu*

Search	Search SDI2USB 3.0 Help
--------	-------------------------

11.3 *Toolbar*


Use the toolbar to save, copy, print the current captured image, override image adjustments, or show information about the device.

11.3.1 *Save*


Use this button () to save a copy of the current image. The following information will be requested when this toolbar icon is clicked.

Save As	Enter the file name for saving data.
Where	Enter the path where the file is saved.
Format	Select the format for the recorded file.


11.3.2 *Copy*

Use this button () to copy the snapshot of the image to the workstation's clipboard.


11.3.3 *Print*

Use this button () to specify printing settings and print the image.

11.3.4 *Record*


Click this button () to start the recording of a captured video.

11.3.5 *Adjust*

This button () allows configuring horizontal/vertical shift to offset the captured image position. Select the checkboxes to adjust shifting automatically. Please refer to the **Configure Device** section for details.


11.3.6 *Info*



Click this button () to display information about the frame grabber, its location, serial number and image characteristics.

11.3.7 *Devices*



Click this button () to display all frame grabber devices that are currently available on the network.

12 Setting QuickTime Options for Recording Videos

Before recording videos, saving or printing images, you should configure the Epiphan QuickTime integration options by opening **System Preferences**, selecting Epiphan under **Other**, and configuring the QuickTime settings.

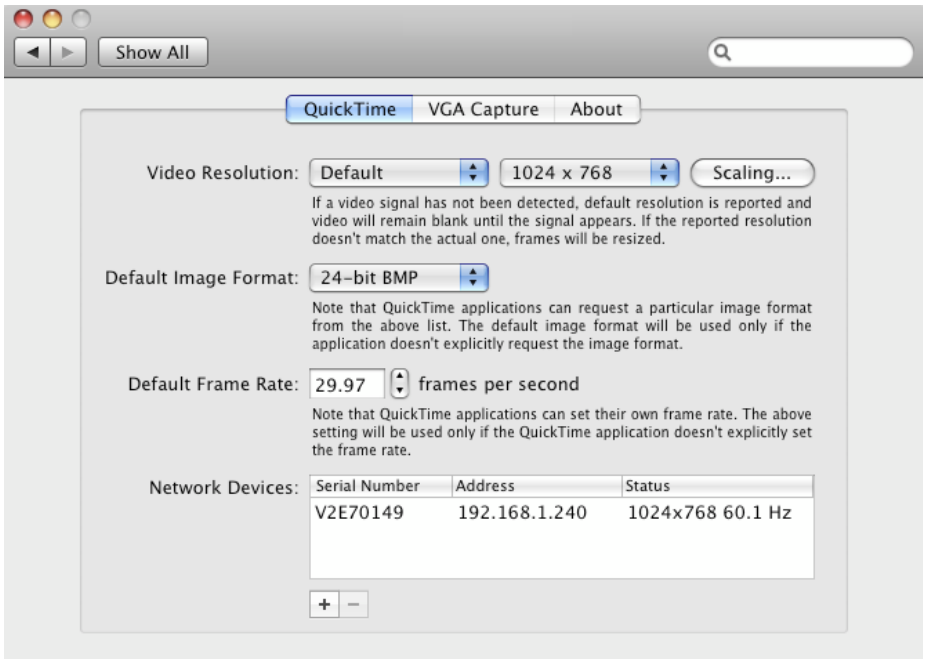
You can also select **About** to view information about the current software and driver versions.

12.1 To add or remove a network device

1. To add a device, select the plus sign at the bottom left of the window.

2. Enter the IP Address of the device you want to add or click on the triangle beside the Network Address box and select the device from the list of networked devices.
3. Select Connect.
4. To remove a device select the device and select the minus sign.

Figure 23 QuickTime settings



Configure the following QuickTime recording options:

Video resolution	<p>Select a video resolution option:</p> <p>Actual: The actual resolution of the video source as reported to QuickTime. No scaling is performed. If, at any point during a recording session, no signal is detected an error will occur that could interrupt the recording session.</p> <p>Default: If a video signal is not detected, the default resolution is reported and the video remains blank until a signal is detected. If the default resolution</p>
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Setting QuickTime Options for Recording Videos

	<p>does not match the actual resolution, images are resized to the default resolution.</p> <p>Fixed: The same resolution is reported to QuickTime, regardless of the actual resolution of the image and whether or not a video signal is present. All images are scaled to the fixed resolution.</p> <p>For Default or Fixed resolution, you can select the resolution to use.</p>
Scaling	<p>Select a Scaling Algorithm. When Video Resolution is set to Default or Fixed, you can move the slider to select a scaling algorithm from a set of algorithms that range from Lowest quality and Best speed to Best quality and Lowest speed. You can choose from:</p> <ul style="list-style-type: none"> • Nearest pixel • Fast bilinear • Weighted average • Bilinear • Luma bicubic, chromabilinear • Bicubic • Lanczos • Natural bicubic spline • Sinc
Default Image Format	<p>Select a Default Image Format. The Default Image Format will only be used if the QuickTime compatible application doesn't specifically request an image format.</p>
Default Frame Rate	<p>Usually you can set the frame rate in the</p>

	<p>QuickTime-compatible video recording application. If you cannot set the frame rate in the application, set the default frame rate that the Epiphan device driver sends to QuickTime. This default frame rate is only used if the application does not explicitly set the frame rate.</p>
Network Devices	<p>Add or remove Epiphan devices connected to the network. The Display shows the serial number, IP address and status (screen resolution and refresh rate of the video source) of each device. To add devices select the plus sign. To delete devices, select the minus sign.</p>

13 Web Broadcasting

You can use the information in this chapter to share or stream the images captured by your SDI2USB 3.0 over the Internet. Note that web broadcasting is available only on video capture workstations running Windows.

To stream captured images over the Internet, the video capture application sends captured images to an Epiphan web broadcasting portal. Each web broadcasting session is labelled with the serial number of the SDI2USB 3.0 that is capturing the images. The card's serial number appears on the video capture application title bar.

Web broadcasting sends the currently captured images or video only. You cannot stream saved recordings and the SDI2USB 3.0 web broadcasting feature does not include sound, even when audio and video is captured for SDI sources.

Note: The web broadcasting feature included with the Epiphan video capture application is intended for demonstration only and has a 10-hour time limit.

It is important to note that the images streamed over the Internet are not secure. Potentially anyone can view the web stream if they know the correct URL. The web broadcasting feature included with the Epiphan video capture application provides basic features and functionality. For a richer web broadcasting feature set, refer to Epiphan's broadcasting products.

13.1 To set the display format for web broadcasting

1. Open the SDI2USB 3.0 capture tool application on a video capture workstation running Windows.
2. From the **Tools** menu select **Options**.
3. Select the **Display** tab.
4. Set Display Format to RGB 24 bits per pixel.
5. Optionally limit the frame rate to reduce the number of images sent over the Internet and to reduce bandwidth usage. Depending on your requirements it may not be necessary to change any other display settings. Refer to section, **Configuring Display Options** for all available display settings.
6. Select **OK** to save your changes.

13.2 Start a web broadcast session

All that is required to stream your video to the web is a video capture workstation connected to the Internet. The video capture workstation can be connected directly to the Internet or to a LAN that is connected to the Internet.

Before streaming your video to the Internet you need to set the display format to 24 bits per pixel, refer to the previous section.

To start a web broadcast:

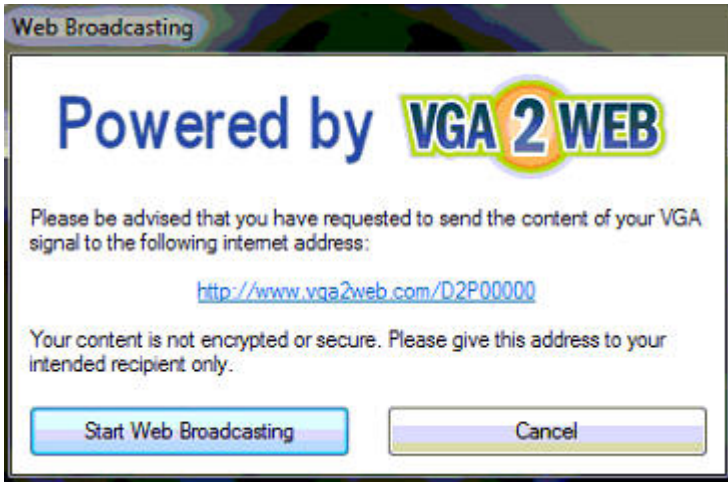
1. Connect the Epiphan frame grabber to the video source that you want to stream and to the video capture workstation.
2. Launch the Epiphan capture tool.

3. Select **Web Broadcasting** from the **Tools** menu or from the toolbar select



The **Start web broadcasting** dialog appears.

Figure 24 Web broadcasting



13.3 Viewing a web broadcasting session

You can view a web broadcasting session from a web browser running under Windows 2000, XP, Vista, 7 and 8 versions. The following browsers are now supported: Internet Explorer, Firefox, Opera, Chrome, and Safari. Mobile browsers are also supported if the mobile device is compatible with Java SE. The workstation and web browser should be running the most recent version of the Java plug-in. You can download the latest plugin from <http://www.java.com>.

To view a web broadcast:

1. Open a web browser and browse to the required URL, for example: <http://www.vga2web.com/D2P00000>. This URL is supplied by the vga2web application and can be advertised to potential viewers of the broadcast.

A second web browser window appears displaying the message **Applet is loading. Please wait...** The broadcasted image should appear within 10 to 20 seconds.

The first web browser window in which the web broadcast URL address was entered, displays a message indicating that the web presentation has been opened in a new window. You can also use the first window to refresh the broadcast or re-open the broadcast window if it is accidentally closed.

13.4 Changing web broadcasting compression and performance

Normally you should not need to change the default web broadcasting compression settings. The default settings reduce the amount of Internet bandwidth used for web broadcasting by applying a combination of lossless and lossy compression to the images being broadcasted.

To change the web broadcasting compression, from the **Tools** menu of the SDI2USB 3.0 capture tool select **Options** and then select **Sharing**. Select **Override default compression** settings and adjust the **Lossless** and **Lossy** settings.

13.5 Troubleshooting web broadcasting performance

Here are three typical reasons for adjusting web broadcasting compression:

- If you have a slow Internet connection or if viewers of the web broadcasts notice delays you can increase lossless or lossy compression to reduce Internet bandwidth usage.
- If viewers of the web broadcast notice poor image quality you can reduce the amount of lossy compression.

- If the video capture workstation CPU usage is too high during web broadcasts or if viewers of the web broadcasts notice delays and you have determined that the delays are not caused by low Internet bandwidth. The delays could be caused by high CPU usage on the video capture workstation resulting in the video capture workstation not being able to process all image data. Lossless compression increases CPU usage, so you can reduce CPU usage during web broadcasting by reducing lossless compression.

Note: You cannot change web broadcasting compression during a web broadcast. You must stop the broadcast, adjust the settings and then start the broadcast again.

Changes made to default web broadcast compression settings are only visible to viewers of the web broadcast. Changing these settings does not change how the video capture application displays, records, or prints captured images.

14 Advanced Topics

14.1 Windows command line options

You can use the following command line options to control how the Windows video capture application starts up. You can add as many command line options as you want in any order. All command line options must start with two dashes. Separate command line options with spaces.

<code>--borderless</code>	Start the video capture application in image only mode. You can press Esc to exit from image only mode.
<code>--sn <sn></code>	To specify which frame grabber to use if more than one frame grabber is connected to the PC. Similar to the Capture menu Select Device command. <sn> is the serial number of the frame grabber.
<code>--hs <#></code>	Set the horizontal shift*.

<code>--vs <#></code>	Set the vertical shift*.
<code>--phase <#></code>	Set the sampling Phase*. The range is 0 to 31.
<code>--pll <#></code>	Set the PLL adjustment*.
<code>--offset <#></code>	Set the offset (brightness)*. The range is 0 to 63.
<code>--gain <#></code>	Set the gain (contrast)*. The range is 0 to 255.
<code>--topmost</code>	To keep the video capture application window on top.
<code>--fullscreen</code>	Start the video capture application in full screen mode.
** – Refer to the Configure device section for more details.	

14.1.1 Creating a Windows Shortcut that Uses Command Line Options

You can use video capture application command line options by creating a Windows shortcut to the video capture application executable file and editing the shortcut to add command line options. In the following procedure, the video capture application executable file v2ugui2.exe has been installed in the folder C:\Program Files\Epiphan:

1. Open Windows Explorer and navigate the following path:
C:\Program Files\Epiphan
2. Right click on the file v2ugui2.exe and select Create Shortcut. Windows creates a shortcut file that, depending on your Windows settings, may be named "Shortcut to v2ugui2.exe.lnk". The ".lnk" may not appear if Windows does not display file extensions. You can change the name of this file and copy it to another location if required. Don't change the file extension.
3. Right click on the shortcut file and select Properties.
4. Edit the Target field and add command line options after the closing quote. For example, to add the --topmost command line option:
"C:\Program Files\Epiphan\v2ugui2.exe" --topmost
For example, to add --topmost and --borderless, set the horizontal shift to -67, and the vertical shift to 10:
"C:\Program Files\Epiphan\v2ugui2.exe" --topmost --borderless --hs -67 --vs 10
5. Select OK to save your changes to the shortcut.

-
6. Double-click on the shortcut to start the video capture application with the command line options.

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August 26, 2014

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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.

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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.

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