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DVI2USB 3.0™ User Guide

epiphan SYSTEMS INC.

Epiphan Technical Documentation

March 2013

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Specifications

You can go to the Frame Grabbers page of the Epiphan website to get information about DVI2USB 3.0.

Warranty

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Epiphan is staffed by a professional support team. If, after checking the FAQs for your product on the Epiphan website and re-installing the Epiphan driver software (where applicable), you continue to have outstanding issues, email a problem report to support@epiphan.com. To help us solve the problem efficiently, include the following info:

- Your DVI2USB 3.0 serial number.
- Technical description of the signal source including resolution, refresh rate, synchronization, type of hardware.
- Complete description of the problem you are experiencing.

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1 Table of Contents

1. Introduction

Epiphan Systems' DVI2USB 3.0™ is Epiphan's external frame grabber with a single-link DVI input. It transmits captured data to the video capture workstation over a USB 3.0 port. This dual-mode (VGA & DVI/HDMI) digital video capture device can capture and broadcast uncompressed diagnostic-quality images and videos from a VGA, DVI, HDMI video source and transfer to a USB 3.0 port on another computer. No peripheral component interface (PCI) is required. This product is designed specifically for applications that require the support of a DVI/VGA/HDMI input.

DVI2USB 3.0 can capture video from any single link DVI, unencrypted HDMI video, VGA video source. Meeting greater demands for transferring larger files at faster speeds, this external frame grabber supports USB 3.0 technology for transferring uncompressed video. This technology is developed for data transfer speeds up to 5.0 (Gbits/s) - about ten times faster than USB 2.0.

Full HD can be captured at a capture rate of 30 frames per second for 1080p video and video sources at any resolution up to 1920x1200 are supported. The DVI2USB 3.0 frame grabber is fully compatible with DirectShow in Windows, Video4Linux in Linux, and QuickTime in Mac OS X, and can be used in conjunction with any third party software.

DVI2USB 3.0 is a versatile product which you can use with different workstation configurations. It is backward compatible with the USB 2.0 connectors. In this case it transfers compressed video with lower quality due to using the USB 2.0 standard.

Besides being able to capture from DVI, VGA, HDMI video sources, DVI2USB 3.0 supports DisplayPort, Mini DisplayPort, and Thunderbolt sources using a converter cable, sold separately. Resolutions up to 1920x1200 are supported, with a minimum capture rate of 30 frames per second.

DVI2USB 3.0 is part of Epiphan's complete line of video signal capture products.

For more information about all of Epiphan's video signal capture products, please see the Frame Grabbers Overview on the Epiphan website.

1.1 Package Contents

Epiphan DVI2USB 3.0 device package includes the following:

1. DVI2USB 3.0 frame grabber
2. DVI cable
3. DVI-VGA cable
4. DVI-HDMI adapter
5. USB 3.0 cable

2 Physical Attributes

2.1 System Hardware Features

The DVI2USB 3.0 device is a 90mm x 60mm x 23mm (3.54" x 2.36" x 0.91") unit. This frame grabber features a single DVI-I type connector, a USB 3.0 connector and three activity LEDs. The DVI2USB 3.0 card can be connected either to a USB 3.0 or USB 2.0 connector of the video capture workstation.

Figure 1 Front panel of the DVI2USB 3.0

Summary of the Front Panel's connectors and indicators

Number	Interface	Description
1	LED	**Red LED is on:** the frame grabber is powered on, however it is not functional – the driver is either not installed or failed to load. **Red LED is blinking**: the frame grabber signature validation has failed. Possible reasons - on-board EEPROM failure or incorrect initialization at the factory. In either case the device should be replaced.**Yellow LED is on**: image capture or data transfer is in progress. - In case the frame grabber is connected to a USB 3.0 port: **Green LED is on**: video mode detection is in progress. **Blue LED is blinking**: firmware is successfully loaded,

		device is idle. - In case the frame grabber is connected to a USB 2.0 port: **Green LED is blinking**: firmware is successfully loaded, device is idle. **Green LED is on**: video mode detection is in progress.
2	USB 3.0 Output	This port allows the connecting of a video capture workstation to the DVI2USB 3.0.

Figure 2 Rear view of the DVI2USB 3.0

Summary of the Rear Panel's connectors

Number	Interface	Description
3	DVI Input	Connect a DVI, VGA, or HDMI source to the DVI2USB 3.0 device.

2.2 USB 2.0 Backwards Compatibility

The DVI2USB 3.0 frame grabber is a USB 2.0 backwards-compatible device. If necessary you can connect it to the USB 2.0 ports as well. If you are in a situation when only a laptop or workstation with USB 2.0 ports is available, it will not prevent you from using the frame grabber in these circumstances.

The device uses the green and blue LEDs to inform a user in which mode it is currently operating. When the DVI2USB 3.0 is connected to a USB 2.0 or 3.0 port, you can check anytime which USB interface exactly it is using – 2.0 or 3.0. See the LEDs description in System Hardware Features.

ATTENTION! The DVI2USB 3.0 is not able to 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 transfer.

You should always keep in mind that high speed data transfer provided by USB 3.0 (practically it can be up to 1,5 GB/s) is available only if you connect your DVI2USB 3.0 to a video capture workstation's USB 3.0 port. Refer to the Cables, Connectors and Adapters section to know which cables must be used.

2.3 Cables, Connectors and Adapters

The DVI2USB 3.0 can be connected to a number of different types of equipment using a variety of cables, and adapters. This section describes a subset of connectors, cables and adapters that are known to be compatible with the DVI2USB 3.0.

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

The USB AM-BM cable connects the DVI2USB 3.0 frame grabber with the video capture workstation's USB 3.0 or 2.0 port.

Figure 3 USB AM-BM cable

*2.3.2 **VGA to DVI Cable***

Connects a VGA source to the DVI2USB 3.0 DVI port. This cable is included with the DVI2USB 3.0

Figure 4 VGA to DVI cable

2.3.3 ***DVI to DVI Cable***

Connects a DVI source to the DVI2USB 3.0 DVI port. This cable is included with the DVI2USB 3.0.

Figure 5 DVI to DVI cable

*2.3.4 **HDMI to DVI Adapter***

Connects an HDMI source to the DVI2USB 3.0 DVI port. This cable is included with the DVI2USB 3.0.

Figure 6 HDMI to DVI adapter

*2.3.5 **DisplayPort Cable***

Connects a source's DisplayPort to the DVI2USB 3.0 DVI port.

Figure 7 DisplayPort cable

*2.3.6 **Mini DisplayPort***

Connects a source's Mini DisplayPort to the DVI2USB 3.0 DVI port.

Figure 8 Mini Display port cable

*2.3.7 **Thunderbolt Port***

Connects a source's Thunderbolt port to the DVI2USB 3.0 DVI port.

Figure 9 Thunderbolt port

3 System Requirements

Epiphan's DVI2USB 3.0 frame grabber has the following hardware and software requirements:

Video source	any VESA-compatible VGA, DVI, or HDMI 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 OS	Windows XP SP2 or newer; Mac OS X 10.8 (Mountain Lion) or newer; A list of precompiled Linux drivers is available from the Software Download page.

3.1 Controllers USB 3.0

Linux requirements: kernel version not earlier than 3.5 (Ubuntu 12.10+)

Recommended xHCI controllers:

- Intel Corporation 7 Series/C210 Series Chipset Family USB xHCI Host Controller (rev 04)

- Texas Instruments TUSB73x0 SuperSpeed USB 3.0 xHCI Host Controller (rev 02)
- NEC Corporation uPD720202 USB 3.0 Host Controller

Low performance xHCI controllers:

- NEC Corporation uPD720200 USB 3.0 Host Controller (rev 3)
- NEC Corporation uPD720200 USB 3.0 Host Controller (rev 04)

4 Getting Started

This chapter describes basic steps for installing drivers and capturing application, and connecting a DVI2USB 3.0 external frame grabber to the video source and the video capture workstation. The video capture workstation is a computer that runs the drivers and application software for the frame grabber and is used to display and record images captured by the frame grabber.

Basic steps:

1. Review the **Package Contents** section to make sure you have received everything.
2. Review the **System Requirements** section to verify that your video capture workstation will work normally with this frame grabber. The video capture workstation can be running Windows, Mac OS, or Linux.
3. Install the Epiphan drivers and application for the DVI2USB 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 DVI2USB 3.0 to the video source. Refer to Connecting DVI2USB 3.0.
5. Connect the DVI2USB 3.0 to the video capture workstation. Refer to Connecting DVI2USB 3.0.
6. Start the video capture application.
7. Start capturing images.

5 Installation Steps for the Windows Video Capture Workstation

Follow the step-by step procedures in this section if you are going to use a Windows PC as the video capture workstation to view and record images captured by a DVI2USB 3.0 frame grabber.

Note that you should install the drivers and application 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 Application

The drivers and application software includes the Epiphan device drivers and the capture application.

1. Find the latest Windows drivers and Epiphan Capture software. Browse to http://www.epiphan.com/products/dvi-frame-grabbers/dvi2usb-3-0/downloads. Then scroll down to the Windows 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. Unzip the downloaded file. Right-click on the .zip file and choose **Extract All**.

4. Run the Setup Utility (setup.exe) and follow the prompts to install the software.
5. The Windows drivers and application software is now installed.

5.2 Upgrading to the Latest Windows Software Version

From time to time Epiphan makes new versions of all Epiphan Frame Grabber software available from the Epiphan web site. To confirm that you have the latest video capture application version select Check for Updates from the Help menu of the Epiphan Capture Software.

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 video capture application version only contains minor changes, Check for Updates may not recommend that you install a new version.

In most cases you can upgrade the Epiphan software on your Windows video capture workstation by using normal procedures for your operating system to download the latest version and install it without uninstalling the previous version. If you have problems upgrading Windows software, see the detailed driver update instructions and install/uninstall instructions available from the Windows section of 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 DVI2USB 3.0 product - browse to http://www.epiphan.com and select **Products > DVI Frame Grabbers > DVI2USB 3.0**. On these pages you will find the most recent versions of:

• this Epiphan DVI2USB 3.0 User Guide.

• the Epiphan USB device driver and video capture application for, Windows XP, Windows Vista, Windows 7 and 8.

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.

Whenever possible, when splitting the VGA signal, use an active VGA splitter rather than a passive VGA splitter (also called a Yadapter). This will help maintain a cleaner video signal.

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's 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 having 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 DVI2USB 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/dvi2usb-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 DVI2USB 3.0 in the video capture workstation, refer to the section **Connecting DVI2USB 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 **DVI2USB.app**. The capture application starts up. If the DVI2USB 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 DVI2USB 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 DVI2USB 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/dvi2usb-3-0/downloads/.

On this download page you will find the most recent release of the Epiphan device driver, QuickTime component and DVI2USB 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 DVI2USB 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 DVI2USB 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 that 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 DVI2USB 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 your own custom video capture application 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 across 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 product's Downloads page (http://www.epiphan.com/products/dvi-frame-grabbers/dvi2usb-3-0/downloads/).

8 Connecting DVI2USB 3.0

This section describes how to connect a DVI/VGA/HDMI source to DVI2USB 3.0 and connect the frame grabber to the video capture workstation. Make sure that the capture application is installed on the video capture workstation before connecting the frame grabber.

1. Connect the DVI2USB 3.0 to the video source. You can use a high-quality VGA or DVI splitter to split the VGA or DVI signal between an external monitor and the frame grabber.

You can connect a DVI source directly to this DVI IN port using a standard DVI cable. View Figure 5 DVI to DVI cable.

To connect a VGA source, use a VGA to DVI cable. View Figure 4 VGA to DVI cable.

To connect an HDMI source, use an HDMI to DVI adapter. View Figure 6 HDMI to DVI adapter.

2. Connect the DVI2USB 3.0 to the video capture workstation. If you have installed the drivers and application software, the video capture workstation should automatically recognize the frame grabber and install drivers for it.

To connect the frame grabber to the workstation's USB 3.0 or 2.0 port, use USB AM-BM cable. View Figure 3 USB AM-BM cable.

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 in this Guide. To start using this chapter you should have:

- A video signal source started.
- A video capture workstation running Windows with connected DVI2USB 3.0.
- The DVI2USB 3.0 drivers and application installed on the video capture workstation.

9.1 Starting 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 DVI2USB 3.0 frame grabber connected to your PC.

If the DVI2USB 3.0 is operating, the capture application should find it and the image being captured by the DVI2USB 3.0 should appear on the application display.

If the DVI2USB 3.0 device is not capturing images, the application displays **No signal**.

As the application starts, the following messages may appear:

- **Capture device not found** as the application attempts to connect with DVI2USB 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** if the application connects to the DVI2USB 3.0 that is not connected to an active video source.

If the application successfully connects to and synchronizes with the DVI2USB 3.0 device, it begins displaying captured images.

9.2 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.

9.2.1 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.

9.2.2 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.

9.2.3 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 an 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 most bitmap image editing applications.

9.2.4 To print a snapshot of the current image:

You can 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 an 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.

9.3 Recording Captured Images

You can record captured images as a video file or as a series of image files. Before recording captured images as a series of image files, you must configure the recording options by selecting **Options** from the **Tools** menu, then by selecting the **Recording** tab, and by finally selecting **Record as Images**. You should also select the image file format and other image file settings.

9.3.1 To record captured images as a series of image files:

1. Select **Start Recording** from the **Capture** menu, from the toolbar select  or use the key combination **CTRL+R**. As images are captured by the frame grabber they are recorded as a series of image files according to the image file settings on the **Recording** tab of the **Options** dialog from the **Tools** menu. The Status bar shows the name and location of the last saved file. You can pause recording by using the key combination **CTRL+U,** by selecting **Pause** from the **Capture** menu

or  from the toolbar. You can stop recording by selecting repeatedly **Stop Recording** from the **Capture** menu or  from the toolbar. When you stop recording images, the status bar displays the number of image files saved.

9.3.2 To record captured images as a video file:

Before recording captured images as a video file, you must configure the recording options by selecting **Options** from the **Tools** menu, then selecting the **Recording** tab, and finally selecting **Record** as **Video**.

1. Select **Start Recording** from the **Capture** menu or from the toolbar select  .

2. In the **Save as** dialog box enter the file name, select the location for saving the video file, and click **Save**.

As images are captured by the frame grabber they are recorded to the video file. The status bar shows the name and location of the video file. The status bar also displays the amount of time that the video has been recording and the number of frames (or images) being recorded.

When the size of the video file reaches the AVI file size limit, see the AVI file size limit in the section: **Configuring Recording Options** on how this is set. Based on the configurable behavior in that same section, the DVI2USB 3.0 user interface does one of the following:

- stops recording
- starts a new video file and continues recording (**Configuring Recording Options** section describes how to specify the file name)
- overwrites the original video file and continues recording.

You can pause a recording by selecting **Pause Capture** from the **Capture** menu or  from the toolbar.

You can stop recording by selecting **Stop Recording** from the **Capture** menu or  from the toolbar.

When you stop recording, the Status bar shows the name and location of the saved video file, the amount of time that the video file was recording, and the number of frames or images that were recorded. For example: **Wrote c:\temp\example.avi (85 sec, 464 frames)**.

9.4 Menus

This section describes the commands available from the following Windows DVI2USB 3.0 user interface menus:

9.4.1 File Menu

Use the File menu commands to save and print the current image displayed by the DVI2USB 3.0 user interface and to exit the DVI2USB 3.0 user interface.

Save	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. The first time you select **Save** after starting the DVI2USB 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.
Save As	Save a snapshot of the current image to a file on the video capture workstation. Using **Save As** you can enter a file name and select a file

	location and format. **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.
Print Setup	Configure printer settings used when you select the **Print** command or the **Print snapshot** toolbar button. You can also configure the DVI2USB 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**.
Print	Print a snapshot of the current image using the configured printer.
Exit	Close the DVI2USB 3.0 user interface.

*9.4.2 **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	Copy a snapshot of the current image to the video capture workstation clipboard. You can paste this image into a document or other application as a bitmap image.	

*9.4.3 **View Menu***

Use the commands on the **View** menu to control the parts of the DVI2USB 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	Change the DVI2USB 3.0 user interface to operate in the **Image only** mode. In the **Image only** mode the DVI2USB 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. The **Image only** mode can be useful for applications such as integrating the DVI2USB 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 DVI2USB 3.0 user interface. You can also use the --borderless command line option to start the DVI2USB 3.0 user interface in image only mode.

9.4.4 ***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 DVI2USB 3.0 user interface receives captured images from if you have more than one DVI2USB 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 DVI2USB 3.0 user interface records.

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

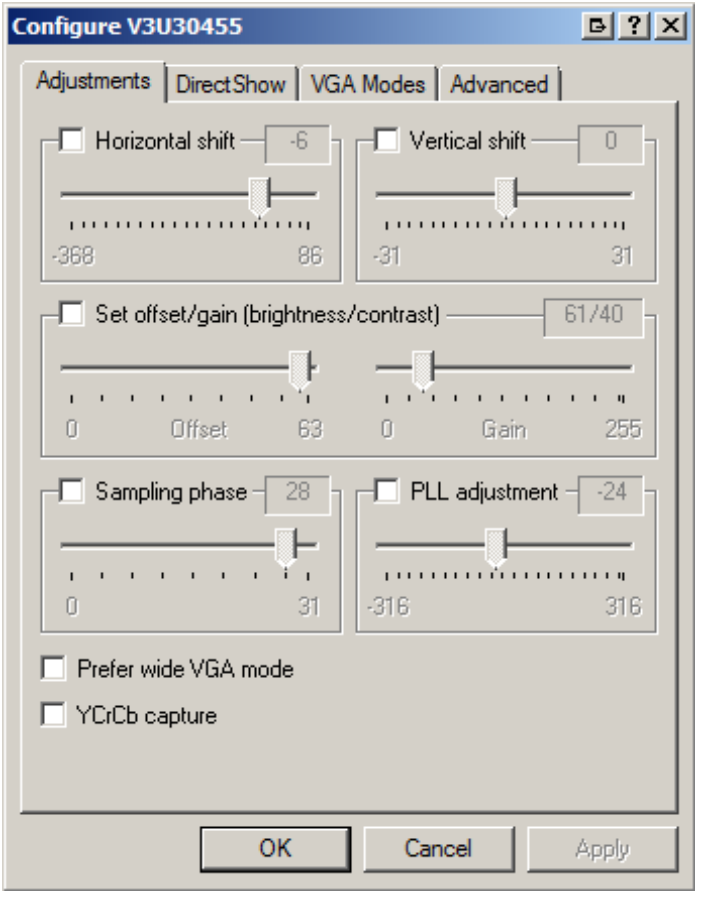
Pause capture	Pause or resume image capturing. If you select pause, the DVI2USB 3.0 user interface stops displaying newly captured images and the image captured when you selected Pause is displayed. Pause also pauses the recording of avideo and the saving of image files. Select pause again to resume 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 DVI2USB 3.0 user interface receives captured images from. The command finds and lists available DVI2USB 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	Not used.
Audio input device	Not used.
Play captured audio	Not used.
Configure device	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. You can also select and configure VGA modes for the selected device. See the following section for more information regarding this function.

9.4.5 ***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 10 Adjustments tab

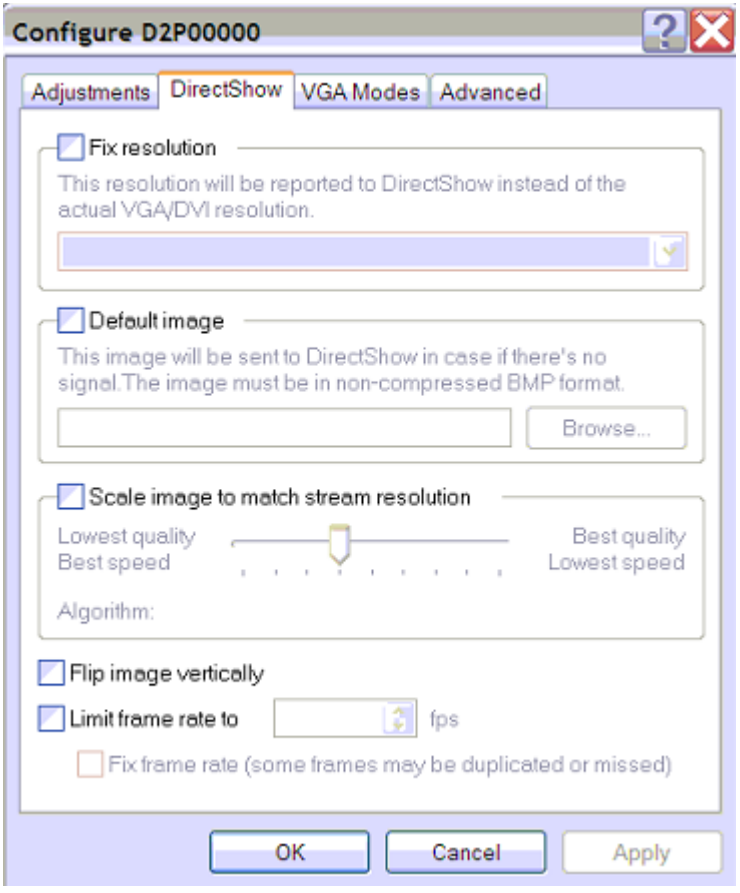


Horizontal shift	Configure horizontal shift to offset the captured image position. For example, a captured image shifted slightly to the right (horizontally) can be corrected with minor adjustments to the horizontal shift settings. Increasing or decreasing the value entered in the Horizontal Shift field shifts the image to the right or left.
Vertical shift	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. Increasing or decreasing the value entered in the Vertical Shift field shifts the image up or down.
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 when you need to capture analogue component video with the YCrCb encoding.

DirectShow tab:

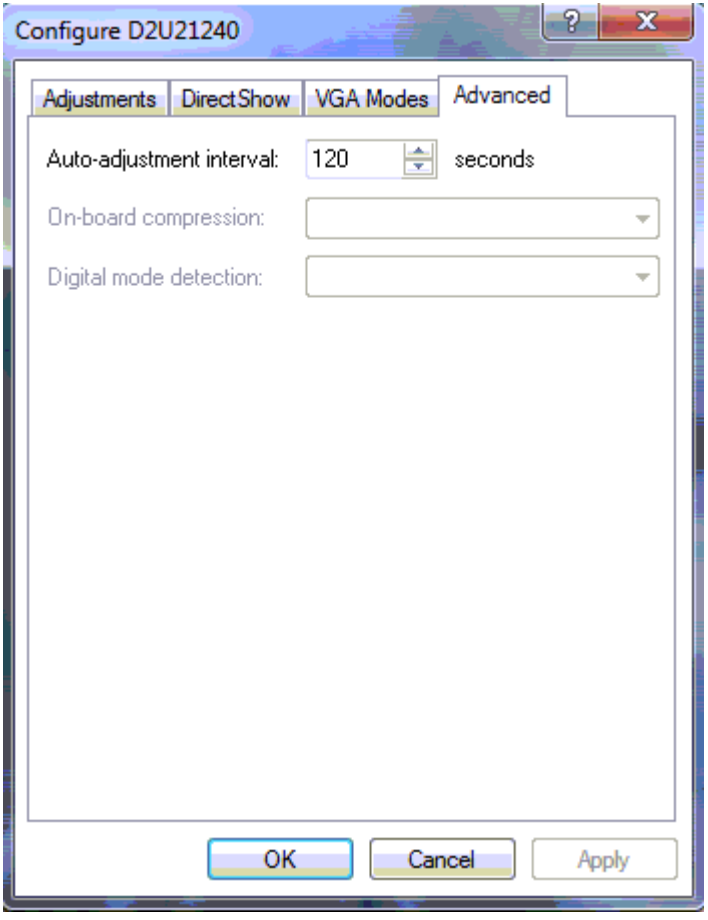
Figure 11 DirectShow tab



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

VGA Modes tab is not applicable to the DVI2USB 3.0 device.

Figure 12 Advanced tab



Auto-adjustment interval	Specify the interval value
On-board compression	Select his checkbox to enable on-board compression of the incoming signal
Digital mode detection	- Automatic - Single Link

	- Dual Link
Sync level adjustment	Adjust sync level (HSync and VSync)

*9.4.6 **Tools Menu***

Use the Tools menu to customize basic DVI2USB 3.0 user interface operating settings.

Web Broadcasting	Use this command to broadcast the captured signal,refer to Chapter 5, Web Broadcasting, for more details.
Upload EDID to device	Use this command to upload an extended display identification data (EDID) file to your device. 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).
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, Recording, and Display Options** for more information.

9.4.7 *Help Menu*

Use the Help menu to check for updates and to display information about the version of the DVI2USB 3.0 user interface that you are running.

Note: **Check for Updates** function 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 DVI2USB 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.

9.5 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.

	Save a snapshot of the current image captured by the DVI2USB 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.
	Print a snapshot of the current image to the configured printer.
	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.
	Start or stop recording the images being captured by the DVI2USB 3.0 user interface. 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.
	Pause or resume image capturing. If you select pause, the DVI2USB 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.
	Enable web broadcasting of the captured signal. Refer to Chapter 5, **Web Broadcasting**, for details.

9.6 Status Bar

The status bar displays information about the DVI2USB 3.0 user interface:

- The location and file name of image or video files saved while recording.
- Recording status. “RECORDING” means that the DVI2USB 3.0 user interface is recording captured images.
- The data rate is the rate (in MB/s, KB/s, Mbps, and Kbps) that the DVI2USB 3.0 user interface is receiving data from the device capturing images.
- The frame rate that the DVI2USB 3.0 user interface is operating at in frames per second (fps).
- The number of frames or images that the DVI2USB 3.0 user interface has displayed since the DVI2USB 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.

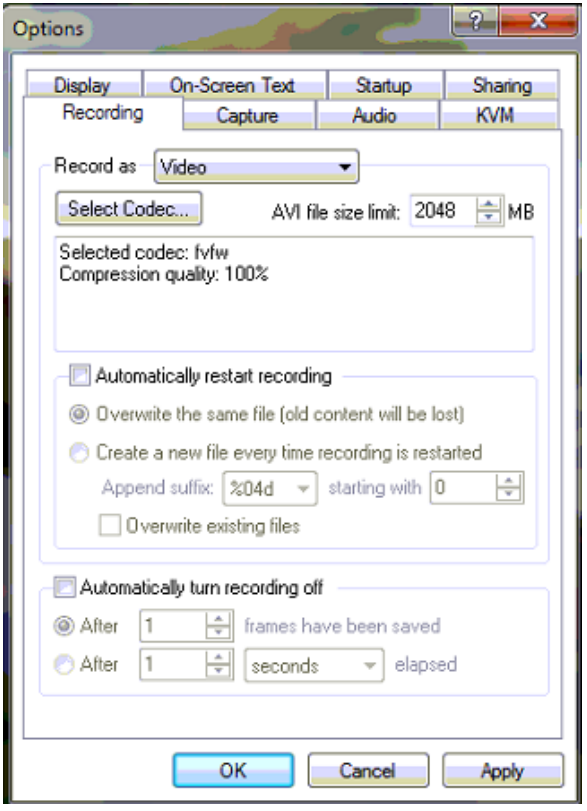
9.7 Capture, Recording, and Display Options

This section introduces the options available from the **Tools** menu when you select the **Options** command. These options control how the DVI2USB 3.0 user interface records images, displays images. Note that this application is common to a number of different products. The **KVM** tab functionalities are not applied to the DVI2USB 3.0 product.

9.7.1 Configuring Recording Options

To control how the DVI2USB 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 DVI2USB 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.

Figure 13 Options 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.
AVI file size limit	Specify the size limit of the .AVI file where the data is recorded to.
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

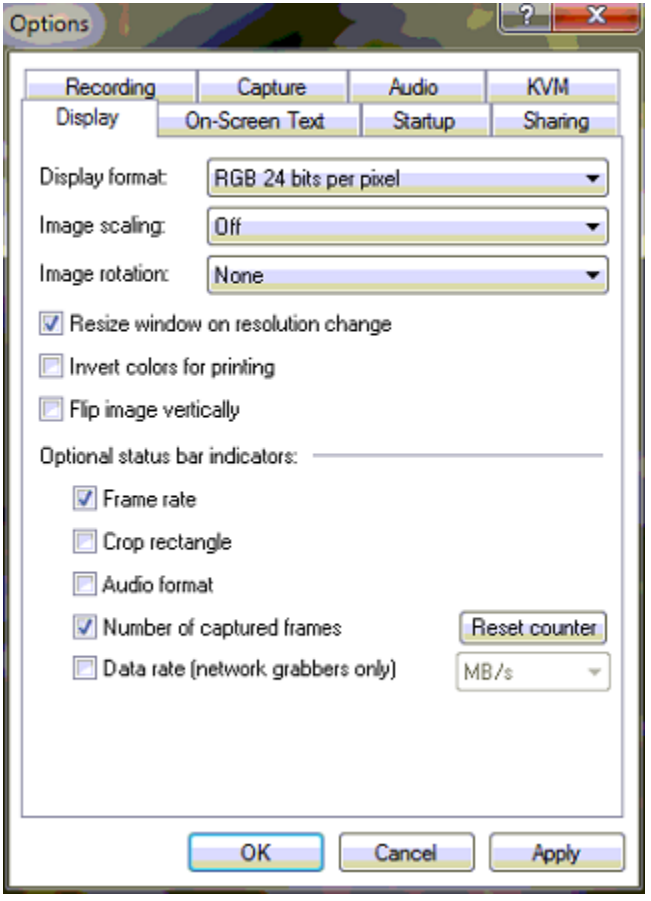
	file with the same name. If you select this option the original saved video data is lost.
Create a new file every time recording is restarted	After the video file size limit is reached, start a new video file. You can use the append suffix setting to create a unique name for the new file or files.
Append suffix…	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 DVI2USB 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. Each suffix starts with a % sign and can include the following characters: 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. “d” means decimal numbers are used in the suffix. “X” means hexadecimal numbers are used in the suffix. The suffix %02d means the saved file names would end with two-digit decimal numbers, for example: 01, 02, 03, ..., 10, 11 and so on. The suffix %04X means the saved file names would end with 4-digit hexadecimal numbers, for example: 0001, 0002, 0003, ..., 000A, 000B and so on.
…starting with	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. 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.
Overwrite existing files	If you select overwrite existing files, files are saved according to the video file recording options. Existing files are replaced with the new files. 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.
Automatically turn recording off	Specify under what conditions recording turns off automatically.
After … frames have been saved	Enter a number of frames.
After … elapsed	Enter a number of time units elapsed.

9.7.2 Configuring Display Options

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

Figure 14 Display tab



The following display options are available:

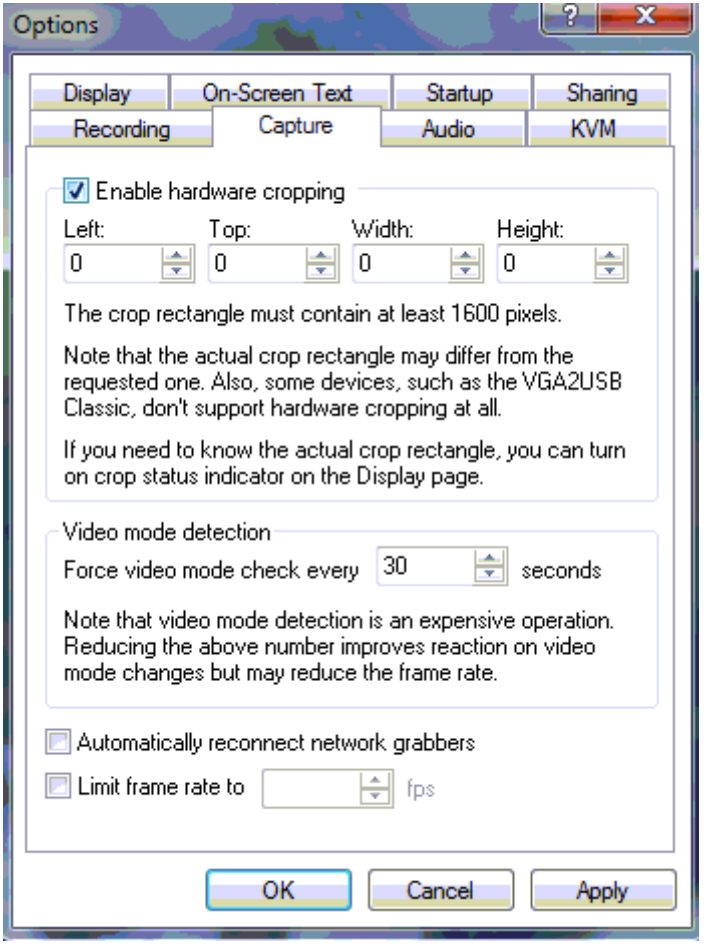
Display format	Specify the format video or image are displayed in
Image scaling	Specify whether the image should be scaled and how
Image rotation	Specify whether the image should be rotated and how
Resize window on resolution change	Select the checkbox to resize window when the image resolution is changed

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	Not used.
Number of captured frames	Displays number of captured frames
Data rate (network grabbers only)	Displays data rate

*9.7.3 **Configuring Capture Options***

Use this tab to configure multiple capture options.

Figure 15 Options tab



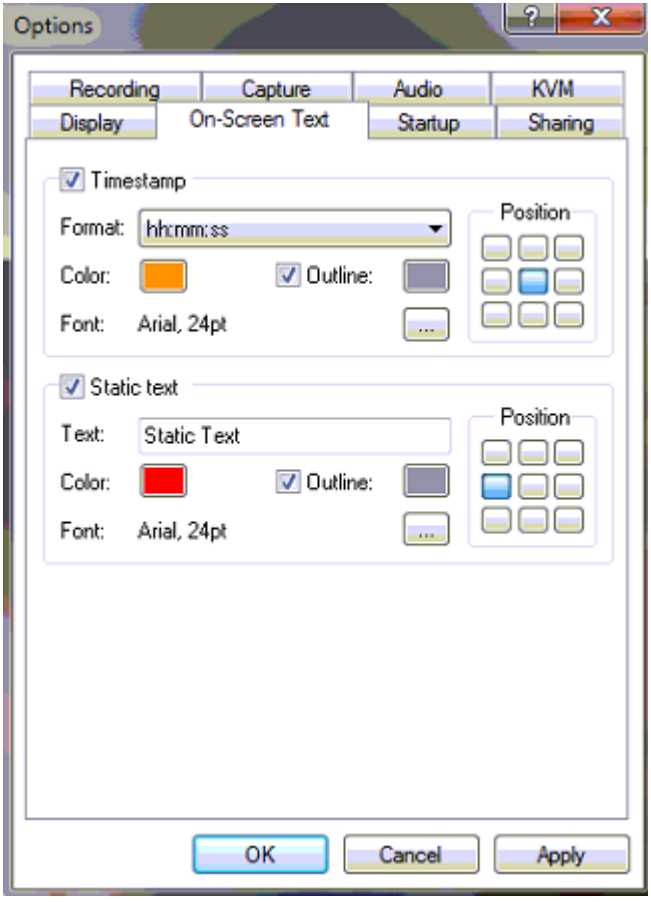
Enable hardware cropping	Select this checkbox to enable cropping functionality
Left, Top, Width, Height	Enter the values for the crop rectangle

Force video mode detection	Specify how often the application indicates the type of the video signal being received. Note that although frequent video mode detection decreases reaction time when changing video mode, it may reduce the frame rate.
Automatically reconnect network grabbers	Select this checkbox to restore connection with the remote frame grabbers in case the connection has been 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	Set up the maximum frame rate for the video signal

9.7.4 *Setting On-Screen Text Parameters*

By using this tab you can timestamp the captured video and add some static text.

Figure 16 On-Screen Text tab



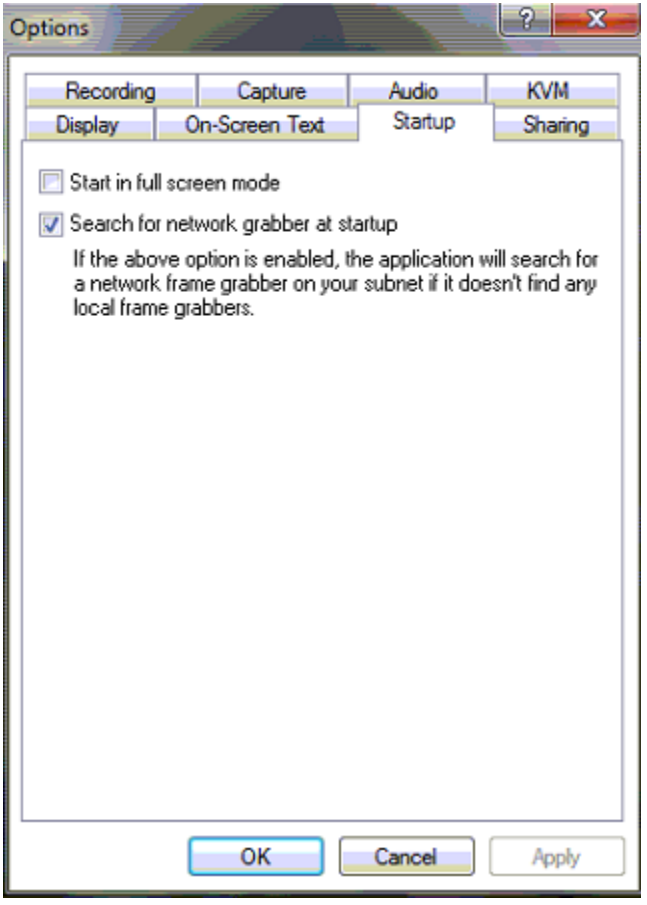
Timestamp	Select this checkbox to enable setting timestamp parameters
Static text	Select this checkbox to enable setting static text parameters
Format	Specify the timestamp format
Color	Set the color
Font	Set the font and the font size

Position	Set the position for the timestamp or text
Outline	Add an outline to the timestamp or text

*9.7.5 **Configure Startup***

Use this tab to specify what actions the application should perform during startup.

Figure 17 Startup tab



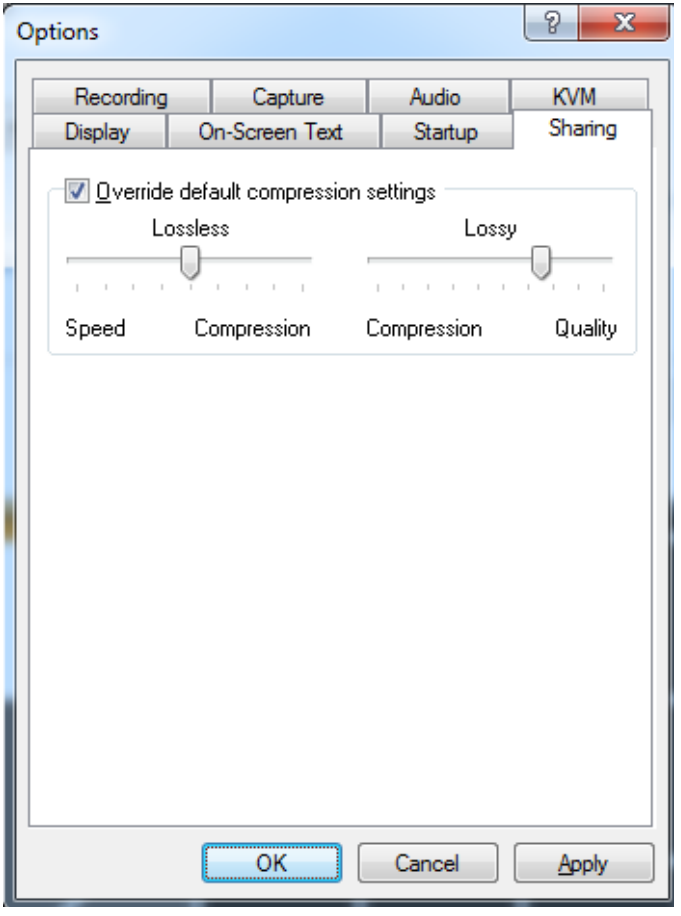
Start in full screen mode	When the application starts, it resizes to the current resolution of the screen

Search for network grabber at startup	The application searches for a network grabber on your subnet if it does not find any local frame grabbers

*9.7.6 **Sharing***

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

Figure 18 Sharing tab

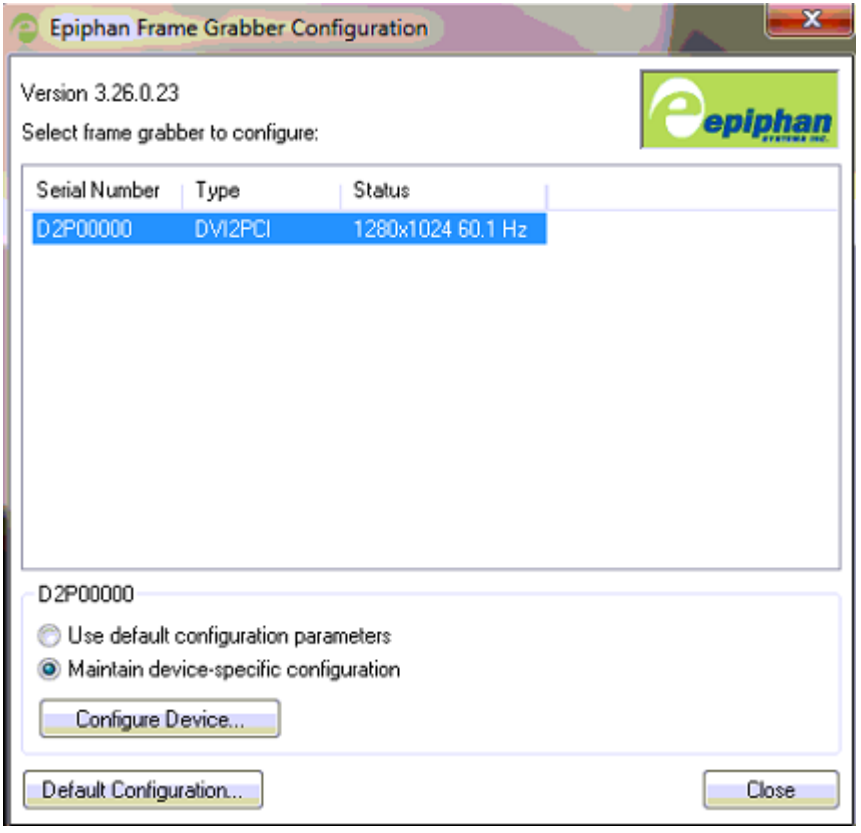


Lossless compression	Lossless compression compresses the images being broadcasted without reducing image quality. Increasing lossless compression can use a considerable amount of the video capture workstation's CPU resources.
Lossy compression	Lossy compression compresses the images being broadcasted by reducing image quality. Lossy compression is not as CPU intensive as lossless compression.

10 Configuring DVI2USB 3.0 from the Control Panel

Your DVI2USB 3.0 can be configured from the Control Panel using the Epiphan Frame Grabbers icon. Here you can verify the device's serial number, type and status as well as setup configuration parameters.

Figure 19 Frame grabber configuration



To edit the default configuration of the device:

1. Click the **Default Configuration** button. It is similar to the Tools > Options > Configure command in the Epiphan Capture Tool.
2. Edit parameters.
3. After editing click OK and select the **Use default configuration parameter** radio button to activate settings. Then click **Close**.

To maintain 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. After editing click OK and select the **Maintain device-specific configuration** radio button to activate settings. Then click **Close**.

11 Mac OS X DVI2USB 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 DVI2USB 3.0 and to record video captured by the DVI2USB 3.0.

This chapter assumes that DVI2USB 3.0 has been properly installed. Please refer to the section: **Connecting DVI2USB 3.0**. To start using this chapter you should have:

- Selected a video capture workstation running Mac OS X with installed DVI2USB 3.0.
- A connected video source.

11.1 Starting the Mac OS X Video Capture Application

Start the 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. Now proceed and do the following:

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 20 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, to print the current image, to open new capture windows and to start a recording. Also included are the commands to connect to other frame grabbers on the network and to disconnect to 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 DVI2USB 3.0 device on the network.
Recent Network Grabbers	Select from the list of recently opened frame grabber devices.
Disconnect Network Grabber	Disconnect the DVI2USB 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 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	Print 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 DVI2USB 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 DVI2USB 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 display identification data (EDID) file to your device. 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).
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 DVI2USB 3.0 Help

11.3 Toolbar

Use the toolbar to save, copy, print the current captured image, to override image adjustments, or to 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 starting to record videos, saving images or printing images, you should configure the Epiphan QuickTime integration options by opening **System Preferences**, selecting Epiphan under **Other**, and configuring the QuickTime settings.

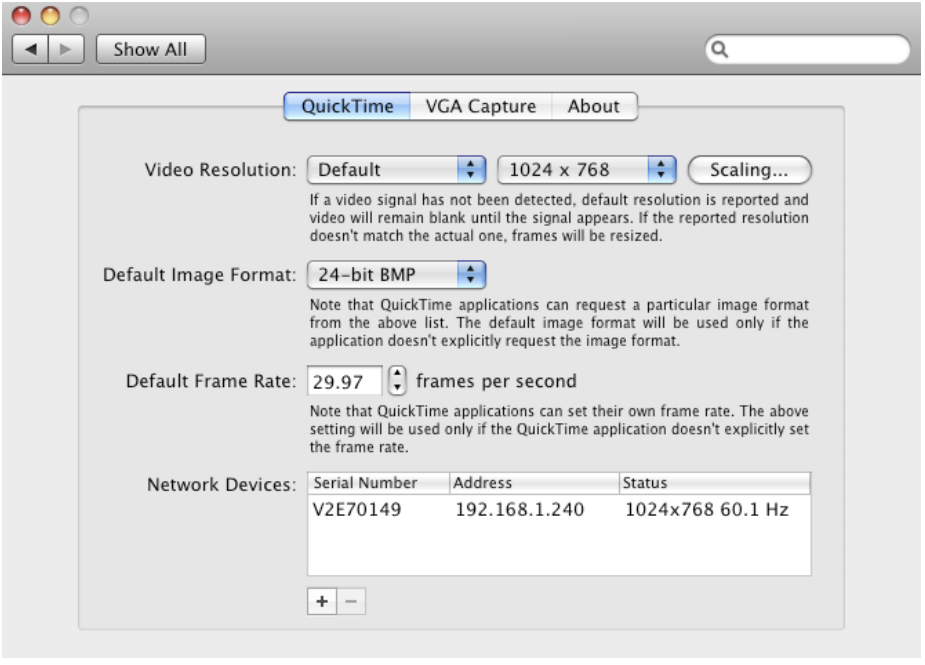
You can also select **About** to view information about the current software and driver versions.

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 21 QuickTime settings



Configure the following QuickTime recording options:

Video resolution	Select a video resolution option: **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. **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 does not match the actual resolution, images are resized to the default resolution. **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. For Default or Fixed resolution, you can select the resolution to use.
Scaling	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: • Nearest pixel • Fast bilinear • Weighted average • Bilinear • Luma bicubic, chromabilinear • Bicubic • Lanczos • Natural bicubic spline • Sinc
Default Image Format	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.
Default Frame Rate	Usually you can set the frame rate in the

	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.
Network Devices	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.

13 Web Broadcasting

You can use the information in this chapter to share or broadcast the images captured by your DVI2USB 3.0 over the Internet. Note that web broadcasting is available only on video capture workstations running Windows.

To broadcast captured images over the Internet, the video capture application sends captured images to an Epiphan web broadcasting portal. Each web broadcast session is labelled with the serial number of the DVI2USB 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 image only. You cannot broadcast saved recordings and the DVI2USB 3.0's web broadcasting feature does not include sound.

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

It is important to note that the images broadcasted over the Internet are not secure. Potentially anyone can view the web broadcast if they know the correct URL. The web broadcasting supported by the video capture application is a relatively limited feature. Epiphan's broadcasting products provide a richer web broadcasting feature set.

13.1 To set the display format for web broadcasting

1. Open the DVI2USB 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 reducing the amount of bandwidth being used. Depending on your requirements you may not have 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 Starting a web broadcasting session

No special setup is required for web broadcasting except that the video capture workstation must be able to connect 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 broadcasting captured images over the Internet you need to set the display format to 24 bits per pixel. Please refer to the previous section **To set the display format for web broadcasting**.

To start a web broadcast:

1. Connect the Epiphan Frame Grabber to the video source that you want to broadcast and to the video capture workstation.
2. Start the Epiphan capture tool application.
3. Select **Web Broadcasting** from the **Tools** menu or from the toolbar select  .

   The **Start web broadcasting** dialog appears.

Figure 22 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 and 7 versions. The following browsers are now supported: Internet Explorer, Firefox, Opera, Chrome, Safari. Mobile browsers are also supported if the mobile device is compatible with Java SE. The working station and web browser should be running the most recent version of the Java plug-in. You can download the plug-in's latest version 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 vg2web 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 DVI2USB 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 EDID

14.1.1 About EDID

Extended display identification data (EDID) is data provided by a video display device (usually a monitor) to describe its capabilities to a video source. The video source uses the EDID to determine the capabilities of the monitor and, therefore, to

determine the resolution, color depth and other settings that the monitor will accept.

EDID is defined by a standard published by the Video Electronics Standards Association (VESA). The EDID includes manufacturer name, product type, phosphor or filter type, timings supported by the display device, display size, luminance data and (for digital displays only) pixel mapping data. EDID is crucial for DVI sources but mostly ignored by VGA sources.

When you connect a DVI2USB 3.0 to a video source, the video source sees the DVI2USB 3.0 as a monitor. Just like a monitor, the DVI2USB 3.0 contains EDID that is used by the video source to determine the video signal to send to the DVI2USB 3.0.

Usually you would operate a DVI2USB 3.0using the factory installed default EDID. However, in some cases when you connect a DVI2USB 3.0 to a video source, the video source may operate using video settings that you do not want it to operate at. For instance, you can control the video source output settings by uploading a custom EDID file to the DVI2USB 3.0. The EDID information in the file restricts the video signal that can be accepted by the DVI2USB 3.0. For example, you can upload a custom EDID file to your DVI2USB 3.0that reports that the DVI2USB 3.0only operates at 1040x768. When the video source reads the EDID from the DVI2USB 3.0, the video source will reset to operate at 1024x768 as set in the EDID.

You can obtain custom EDID files from Epiphan Support. You can also download custom EDID files for DVI2USB 3.0 frame grabber from the frame grabber product page of the Epiphan web site. This page contains custom EDIDs for single video resolutions (for example, 640x480 only, 800x600 only, and 1024x768 only) for each DVI2USB 3.0. This page also contains default EDIDs for each DVI2USB 3.0. You can use the custom EDIDs to restrict the video resolution of the video source connected to the DVI2USB 3.0. You can use the default EDIDs to return your DVI2USB 3.0 to normal operation.

*14.1.2 **Changing the EDID on your Frame Grabber***

Use the following steps to upload a new EDID to your DVI2USB 3.0. The uploaded EDID is permanently installed in the DVI2USB 3.0 and the DVI2USB 3.0 will always share this EDID with the video source.

1. Download an EDID file from the Epiphan web site or obtain an EDID file from Epiphan Support.
2. Disconnect the DVI cable from the DVI2USB 3.0. Keep the DVI2USB 3.0 connected to the video capture workstation USB port.
3. From the video capture application Tools menu, select Upload EDID and select the EDID file.
4. Wait for the EDID update to complete. This can take several minutes.
5. Reconnect the DVI cable to the DVI2USB 3.0.
6. Set the required resolution on the video source. You may need to disable/re-enable or reset the DVI port.

*14.1.3 **An EDID example***

In this example, a user was viewing the video output from a system using a flat panel monitor. The monitor displayed video images at a screen resolution of 640x480. When the user replaced the flat panel monitor with a DVI2USB 3.0, the system changed to produce video images at a screen resolution of 720x400.

It turned out that the video source preferred to output 720x400, but because the original monitor did not support 720x400, the video source was forced to operate at 640x480. The DVI2USB 3.0 supported 720x400 so the system changed to this resolution when the DVI2USB 3.0 was connected to it.

The user wanted to return the video source to operating at 640x480 but could not manually adjust the screen resolution. To solve the problem, Epiphan created a custom EDID for the DVI2USB 3.0 that excluded support for 720x400. When the user

uploaded the custom EDID to the DVI2USB 3.0, the video source returned to operating at 640x480.

14.2 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.

--borderless	Start the video capture application in image only mode. You can press Esc to exit from image only mode.
--sn <sn>	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.
--hs <#>	Set the horizontal shift*. The range is -100 to 100.
--vs <#>	Set the vertical shift*. The range is -80 to 80.
--phase <#>	Set the sampling Phase*. The range is 0 to 31.
--pll <#>	Set the PLL adjustment*. The range is -50 to 50.
--offset <#>	Set the offset (brightness)*. The range is 0 to 63.
--gain <#>	Set the gain (contrast)*. The range is 0 to 255.
--noesc	Enter this parameter so that you can disable exiting image only mode by Pressing the Esc key. You can always press Alt+F4 to exit from the video capture application.
--topmost	To keep the video capture application window on top.
"*" – Refer to the **Configure device** section for more details.	

14.2.1 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\DVI2USB30:

1. Open Windows Explorer and navigate the following path:
   C:\Program Files\DVI2USB30
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\DVI2USB30\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\DVI2USB30\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.

15 Table of Figures

16 Software and Documentation License

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March 11, 2013

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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.

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This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
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(2) This device must accept any interference received, including interference that may cause undesired operation.

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EN 55022 - Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.

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Miscellaneous

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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.
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