



Epiphan Frame Grabber User Guide

VGA2USB



VGA2USB LR



VGA2USB HR



VGA2USB Pro



KVM2USB



DVI2USB



DVI2USB Solo



DVI2USB Duo

www.epiphan.com

Thank you for choosing Epiphan!

At Epiphan, product function and quality are our top priority. We make every effort to make sure that our products exceed our customers expectations. We regularly contact our customers to ensure product performance and reliability. We strive to continually enhance our products to accommodate your needs.

Specifications

Epiphan manufactures a wide range of VGA and DVI Frame Grabbers. You can go to the [Frame Grabbers](#) page of the Epiphan website and use the information in the comparison table to select the optimal Frame Grabber for your requirements.

Warranty

All Epiphan Systems products are provided with a 100% replacement warranty for one year from the date of purchase. We welcome your feedback and suggestions for product improvements. You can email your comments to info@epiphan.com.

Technical Support

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, 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 hardware platform and operating system.
- Your product serial number
- The version of the Video capture application and the USB driver that you are using.
- The behavior of your Frame Grabber product LED indicators.
- Technical description of the VGA or DVI signal source including resolution, refresh rate, synchronization, type of hardware.
- Complete description of the problem you're experiencing. If possible please provide screen captures that show the problem.

Environmental Information

The equipment that you bought has required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

In order to avoid the dissemination of those substances in our environment and to diminish the pressure on the natural resources, we encourage you to use the appropriate take-back systems. Those systems will reuse or recycle most of the materials of your end life equipment in a sound way.

The crossed-out wheeled bin symbol invites you to use those systems.

If you need more information about collection, reuse and recycling systems, please contact your local or regional waste administration.

You can also contact us for more information on the environmental performance of our products.

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1. Introduction

Epiphan Frame Grabbers are compact external devices that you can use to capture video images from virtually any VGA or DVI source. Some example VGA or DVI sources include personal computers running any version of Windows, Mac OS X, or Linux, embedded imaging systems, medical imaging systems, scientific equipment, and more.

Using the Epiphan video capture application installed on a video capture workstation, you can display, record, and print captured images and broadcast captured images on the Internet.

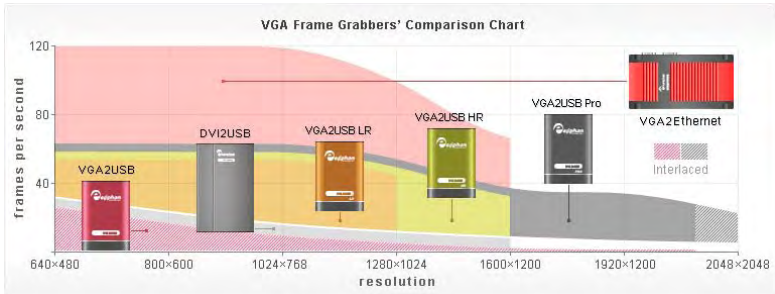
Epiphan Frame Grabbers can be used in a wide range of applications such as:

- Capturing data from a computer screen for educational, training and diagnostic purposes.
- Capturing and recording data from security cameras especially high resolution cameras equipped with VGA signal output.
- Monitoring remote equipment.
- Recording and analyzing data from research and diagnostic equipment.
- Recording and transmitting data from medical equipment for remote diagnoses and emergency help services when medical personnel cannot travel to the patient.
- Quality control and testing.
- Collaborative work.

Comparing Epiphan Frame Grabbers

Epiphan Systems manufactures a wide range of VGA frame grabbers. If you need to capture images from a VGA stream you can use [Figure 1](#) to help select the optimal VGA Frame Grabber for your task.

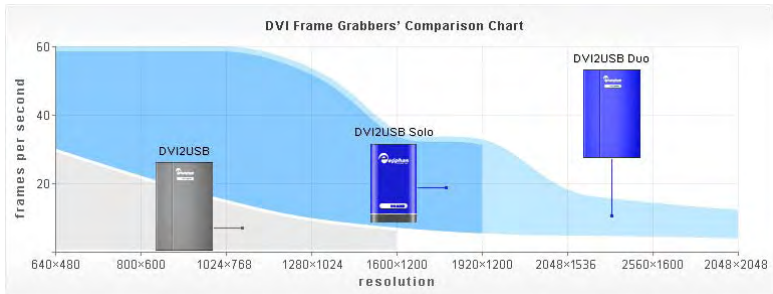
Figure 1: Comparing Epiphan VGA Frame Grabbers



The [VGA Frame Grabber comparison table](#) on the Epiphan VGA Frame Grabbers web page provides more detailed comparisons of all Epiphan Frame Grabbers.

If you need to capture images from a DVI stream you can use [Figure 2](#) to help select the optimal DVI Frame Grabber for your task.

Figure 2: Comparing Epiphan DVI Frame Grabbers



The [DVI Frame Grabber comparison table](#) on the Epiphan DVI Frame Grabbers web page provides more detailed comparisons of all Epiphan Frame Grabbers.

About this Document

This *Epiphan Frame Grabber User Guide* describes the basics of how to install Epiphan Frame Grabbers and how to use the Epiphan video capture application to capture, record, and broadcast images captured by any Epiphan Frame Grabber.

This *Epiphan Frame Grabber User Guide* describes version 3.30.2 of the Epiphan video capture application. Most of the information in this document describes the Windows 2000, XP, and Vista version; however, this document does contain sections and chapters about the Mac OS X version and most of the information can be applied to the Linux version.

This document contains the following chapters:

- [Chapter 2. “System Requirements” on page 11](#), describes hardware and software requirements required to support Epiphan Frame Grabbers.
- [Chapter 3. “Installing the Windows VGA2USB/DVI2USB drivers and application” on page 12](#), describes how to install the Windows VGA2USB/DVI2USB Epiphan device driver and video capture application.
- [Chapter 4. “Installing the Mac OS X VGA2USB/DVI2USB drivers and application” on page 14](#), describes how to the install the Mac OS X VGA2USB/DVI2USB Epiphan drivers and video capture application.
- [Chapter 5. “Connecting a VGA2USB Device” on page 16](#), describes how to connect a VGA2USB, VGA2USB LR, VGA2USB HR, or VGA2USB Pro Frame Grabber to a VGA source and to a video capture workstation.
- [Chapter 6. “Connecting a DVI2USB Device” on page 18](#), describes how to connect a DVI 2USB Frame Grabber to a DVI source and to a video capture workstation.
- [Chapter 7. “Connecting a DVI2USB Solo Device” on page 20](#), describes how to connect a DVI 2USB Solo Frame Grabber to a DVI source and to a video capture workstation.

- [Chapter 8. “Connecting a DVI2USB Duo Device” on page 22](#), describes how to connect a DVI 2USB Duo Frame Grabber to a DVI source and to a video capture workstation.
- [Chapter 9. “Connecting a KVM2USB Device” on page 24](#), describes how to connect a KVM2USB Frame Grabber to a headless server and to a video capture workstation.
- [Chapter 10. “Troubleshooting” on page 26](#), describes troubleshooting a Frame Grabber installation.
- [Chapter 11. “About Epiphan frame grabbing technology” on page 29](#), describes how the components required for capturing, displaying, recording, and broadcasting images from a VGA or DVI source with an Epiphan Frame Grabber work together.
- [Chapter 12. “Windows video capture application” on page 51](#), describes the most commonly used functions and features of the Epiphan Windows video capture application.
- [Chapter 13. “Mac OS X video capture application” on page 79](#), describes the most commonly used functions and features of the Epiphan Mac OS X video capture application.
- [Chapter 14. “Recording image files” on page 91](#), describes how to record the frames captured by your Frame Grabber as individual image files.
- [Chapter 15. “Recording videos” on page 97](#), describes how to record the frames captured by your Frame Grabber as an AVI video file.
- [Chapter 16. “Web Broadcasting” on page 121](#), describes how to share or broadcast the images captured by your Epiphan Frame Grabber over the Internet.
- [Chapter 17. “Using the KVM2USB Frame Grabber” on page 129](#), describes using the KVM2USB Frame Grabber to connect to and operate a server that normally operates without a keyboard, monitor, and mouse.
- [Chapter 18. “Advanced topics” on page 133](#), describes special topics such as upgrading to a new version of the video capture application, EDID, and configuring image adjustments.

2. System Requirements

To get started, make sure your system meets the following hardware and software requirements:

Hardware Requirements

Video source	Any VESA-compatible VGA or DVI source.
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Video capture workstation

Processor speed	VGA/DVI/KVM2USB: 700 MHz. VGA2USB LR/HR/Pro, DVI2USB Solo/Duo: 2.66 GHz.
USB port	One USB 2.0 (also supports USB 1.1)
RAM memory	VGA/DVI/KVM2USB: 256 MB VGA2USB LR/HR/Pro, DVI2USB Solo/Duo: 256 MB DDR2
Hard disk space	5 MB

Software Requirements

Video capture workstation operating system	Windows 2000 SP4, XP SP2, or 32-bit and 64-bit Vista. See “Installing the Windows VGA2USB/DVI2USB drivers and application” on page 12. Mac OS X 10.3 “Panther” or more recent, see “Installing the Mac OS X VGA2USB/DVI2USB drivers and application” on page 14. Linux 2.6.x (i686 and x86_64).
VGA2USB/DVI2USB/ drivers and application	To download the latest version, browse to http://www.epiphany.com/products/ and locate the Downloads page for your product. (Also includes Linux install instructions.)

3. Installing the Windows VGA2USB/DVI2USB drivers and application

You must install the VGA2USB/DVI2USB drivers and application on your Windows video capture workstation before connecting the Frame Grabber to the workstation USB port. This single download includes the video capture application and VGA2USB/DVI2USB USB device drivers.

To install the VGA2USB/DVI2USB drivers and application

- 1 Download the latest software release to your video capture workstation. Browse to <http://www.epiphan.com/products/> and go to the Download page for your Frame Grabber.
- 2 Download the latest version of the VGA2USB drivers and application from the Windows section of the Download page.
Tip: Make sure you note the download destination folder.

 **Windows**

Download VGA2USB/DVI2USB drivers and application. Version 3.20.2.0000 **32-bit** for Windows 2000, Windows XP, and Windows Vista 32-bit. Includes DirectShow integration.

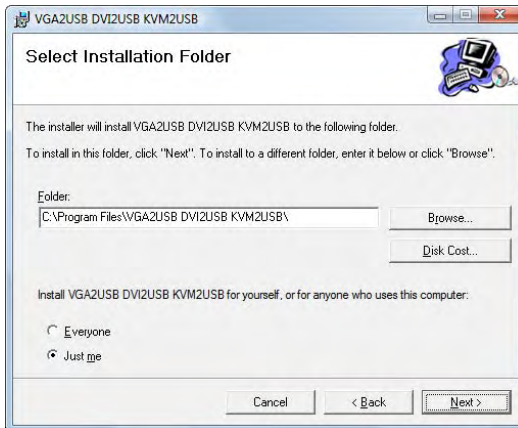
Download VGA2USB/DVI2USB drivers and application. Version 3.19.4.0002 **64-bit** Windows Vista 64-bit. Includes DirectShow integration.

Download VGA2USB/DVI2USB Driver Update Instructions (PDF) for Windows 2000 and Windows XP

Download VGA2USB/DVI2USB Install/Uninstall Instructions (PDF) for Windows 2000 and Windows XP

- 3 Unzip the downloaded file. **Tip:** Right-click on the .zip file and choose Extract All.

4 Run the Setup Utility (setup.exe) and follow the prompts.

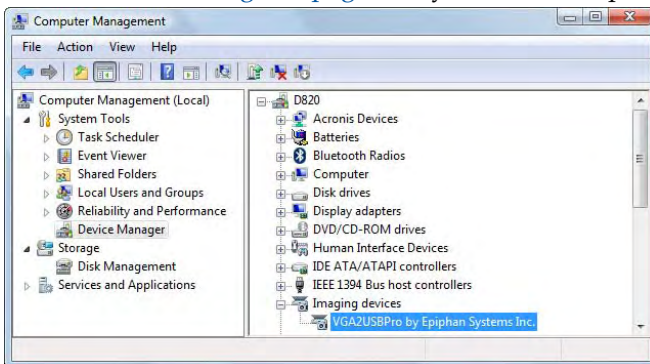


5 Connect your Frame Grabber, refer to the appropriate section:

- 5. "Connecting a VGA2USB Device" on page 16
- 6. "Connecting a DVI2USB Device" on page 18
- 7. "Connecting a DVI2USB Solo Device" on page 20
- 8. "Connecting a DVI2USB Duo Device" on page 22
- 9. "Connecting a KVM2USB Device" on page 24

Tip: If, after connecting your Frame Grabber, Windows displays the Found New Hardware Wizard, respond to the prompts before continuing with Step 6.

6 Open the Windows Device Manager and confirm that Windows has detected your product. **Tip:** Refer to 10. "Troubleshooting" on page 26 if you encounter problems.

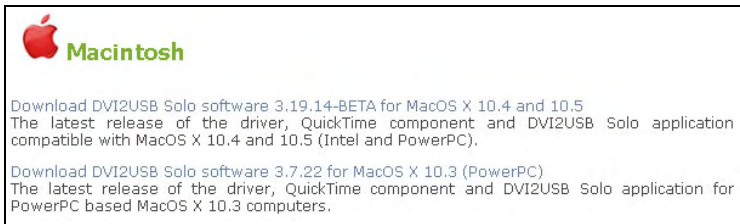


4. Installing the Mac OS X VGA2USB/DVI2USB drivers and application

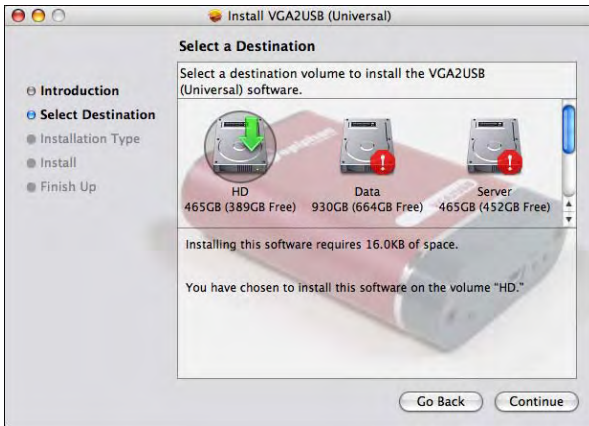
You must install the VGA2USB/DVI2USB software on your Mac OS X video capture workstation before connecting the Frame Grabber to the workstation USB port. This single download includes the video capture application (v2u), the QuickTime digitizer (vdig), and the VGA2USB/DVI2USB USB device driver.

To install the VGA2USB/DVI2USB drivers and application

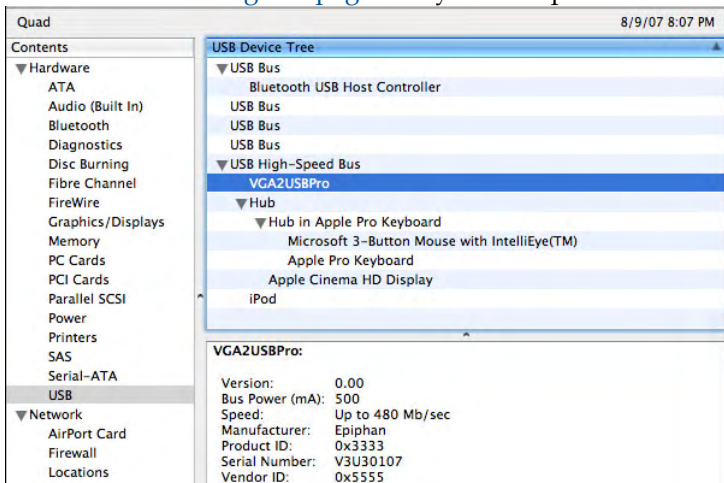
- 1 Download the latest software release to your Mac OS X video capture workstation. Browse to <http://www.epiphan.com/products/> to locate the Download page for your Frame Grabber and scroll down to the Macintosh section.



- 2 Download the latest version of the drivers and application that will run on your system. **Tip:** Make sure you note the download destination folder.
- 3 Untar the downloaded file. **Tip:** Double-click on the .tar file to unpack it.
- 4 Double-click on the .pkg file and follow the prompts.



- 5 Connect your Frame Grabber, refer to the appropriate section:
 - 5. “Connecting a VGA2USB Device” on page 16
 - 6. “Connecting a DVI2USB Device” on page 18
 - 7. “Connecting a DVI2USB Solo Device” on page 20
 - 8. “Connecting a DVI2USB Duo Device” on page 22
 - 9. “Connecting a KVM2USB Device” on page 24
- 6 Open System Profiler and expand the USB Device Tree to confirm that the device is recognized. **Tip:** Refer to 10. “Troubleshooting” on page 26 if you have problems.



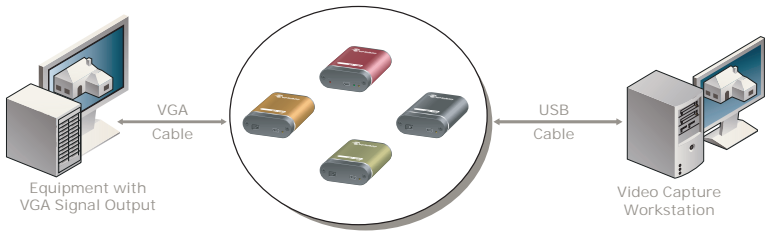
5. Connecting a VGA2USB Device

VGA2USB Frame Grabbers (including LR, HR, and Pro) capture images from most VESA-compatible VGA sources. Using the Epiphan video capture application installed on a video capture workstation you can view and record the captured images. This section shows VGA2USB (including LR, HR, and Pro) package contents and describes and how to connect a VGA2USB Frame Grabber to your VGA source and to a video capture workstation.

VGA2USB (including LR, HR, and Pro) package contents

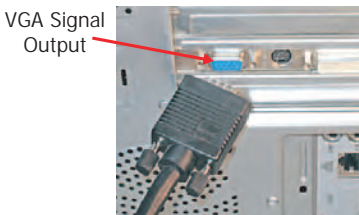


To connect a VGA2USB (including LR, HR, and Pro)



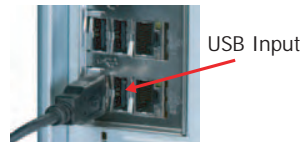
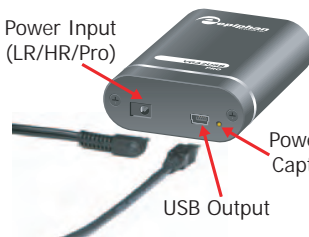
Make sure that the video capture application is installed on the video capture workstation before connecting the Frame Grabber.

- 1 If you are connecting a VGA2USB LR, HR, or Pro Frame Grabber, connect the power adapter to the Frame Grabber.
- 2 Use the VGA cable to connect the VGA signal output source to the Frame Grabber VGA port.



You can use a VGA splitter to split the VGA signal between an external monitor and the Frame Grabber, (not recommended). You can also use the VGA adaptor if your VGA signal output source has a male connector.

- 3 Use the USB cable to connect the Frame Grabber to a USB 2.0 port on the video capture workstation.



6. Connecting a DVI2USB Device

The DVI2USB Frame Grabber captures images from most VESA-compatible DVI sources. You can also use the DVI2USB Frame Grabber to capture VGA images from most VESA-compatible VGA sources using a VGA to DVI cable.

Using the Epiphan video capture application installed on a video capture workstation, you can view and record the captured images.

This section shows DVI2USB package contents and describes how to connect a DVI2USB Frame Grabber to a DVI or VGA source and to a video capture workstation.

DVI2USB package contents



To connect a DVI2USB



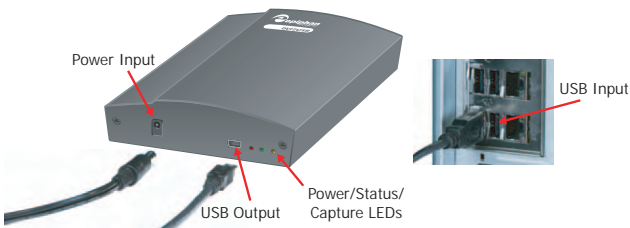
Make sure that the video capture application is installed on the video capture workstation before connecting the DVI2USB Frame Grabber.

- 1 Connect the power adapter to the DVI2USB Frame Grabber.
- 2 Use the DVI cable to connect the DVI signal output source to the DVI2USB DVI port.



If you are connecting the VGA2USB Frame Grabber to a VGA source, use the DVI to VGA cable to connect the VGA signal output source to the DVI2USB DVI port.

- 3 Use the USB cable to connect the DVI2USB to a USB 2.0 port on the video capture workstation.



7. Connecting a DVI2USB Solo Device

The DVI2USB Solo Frame Grabber captures images from most VESA-compatible DVI sources. Using the Epiphan video capture application installed on a video capture workstation, you can view and record the captured images.

This section shows DVI2USB Solo package contents and describes how to connect a DVI2USB Solo to a DVI source and to a video capture workstation.

DVI2USB Solo package contents



DVI2USB Solo

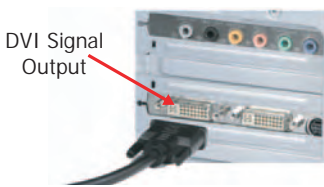


To connect a DVI2USB Solo

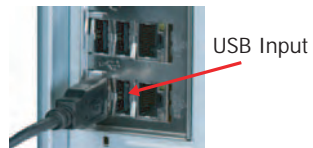
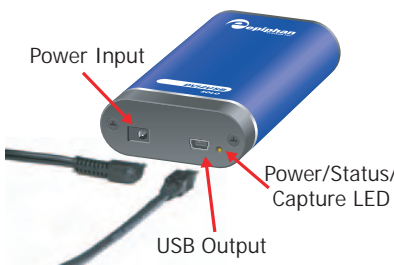


Make sure that the video capture application is installed on the video capture workstation before connecting the DVI2USB Solo Frame Grabber.

- 1 Connect the power adapter to the DVI2USB Solo Frame Grabber.
- 2 Use the DVI cable to connect the DVI signal output source to the DVI2USB Solo DVI port.



- 3 Use the USB cable to connect the DVI2USB Solo to a USB 2.0 port on the video capture workstation.



8. Connecting a DVI2USB Duo Device

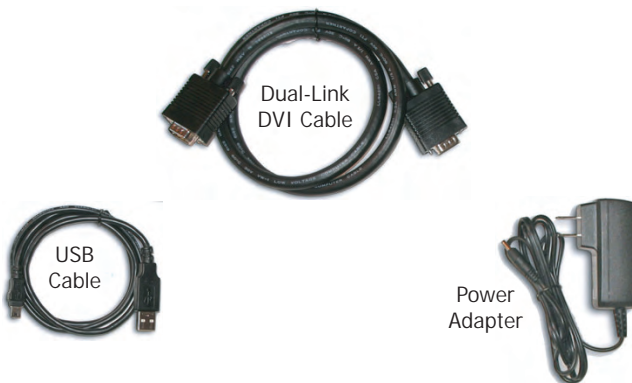
The DVI2USB Duo Frame Grabber captures images from most VESA-compatible dual-link DVI sources. Using the Epiphan video capture application installed on a video capture workstation you can view and record the captured images.

This section shows DVI2USB Duo package contents and describes how to connect a DVI2USB Duo to a dual-link DVI source and to a video capture workstation.

DVI2USB Duo package contents



DVI2USB Duo

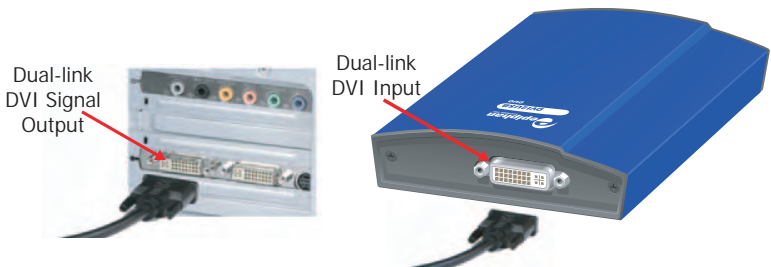


To connect a DVI2USB Duo



Make sure that the video capture application is installed on the video capture workstation before connecting the DVI2USB Duo Frame Grabber.

- 1 Connect the power adapter to the DVI2USB Duo Frame Grabber.
- 2 Use the dual-link DVI cable to connect the dual-link DVI signal output source to the DVI2USB Duo dual-link DVI port.



- 3 Use the USB cable to connect the DVI2USB Duo to a USB 2.0 port on the video capture workstation.



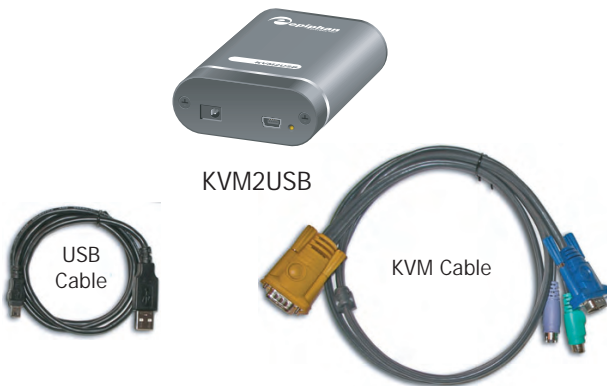
9. Connecting a KVM2USB Device

The KVM2USB Frame Grabber provides full Keyboard-Video-Mouse (KVM) capabilities so that you can use the KVM2USB to manage a headless server from an administrator's PC. The headless server can be a PC running Windows, Linux, or Mac OS X. The administrator's PC can be running Windows or Mac OS X.

- If the headless server has a VGA port and PS2 mouse and keyboard ports you can connect the KVM2USB directly.
- The KVM2USB also comes with PS/2 to USB adapters that you can use if the headless server only has USB ports for mouse and keyboard connections.
- The KVM2USB video connector is a VGA connector. However, the KVM2USB is compatible with most DVI to VGA adapters if the headless server has a DVI port.

This section shows KVM2USB package contents and describes how to connect a KVM2USB to a headless server and to the administrator's PC.

KVM2USB package contents

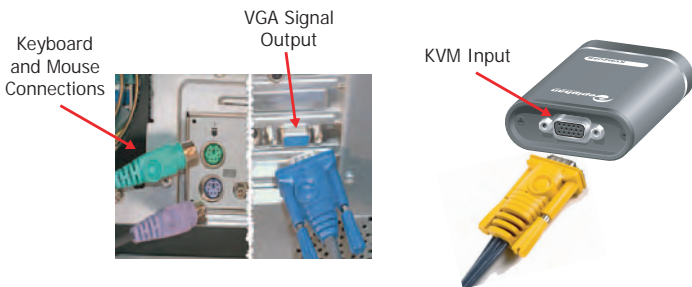


To connect a KVM2USB

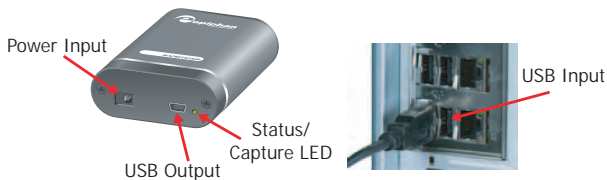


Make sure that the video capture application is installed on the video capture workstation before connecting the KVM2USB Frame Grabber.

- 1 Connect the multi-connector end of the KVM cable to the Headless server keyboard, video, and mouse ports. Use PS/2 to USB and DVI to VGA adapters if required.
- 2 Connect the single-connector end of the KVM cable to the KVM2USB KVM input port.



- 3 Use the USB cable to connect the KVM2USB to a USB 2.0 port on the administrator's PC.



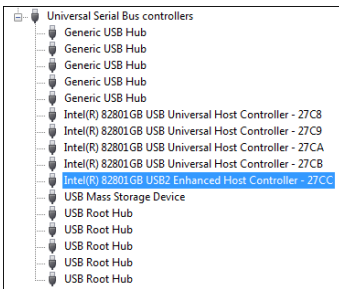
- 4 Start the video capture application and use the options on the KVM menu to start and stop KVM operation.

10. Troubleshooting

If you experience any difficulty installing your Frame Grabber, review the following items prior to contacting technical support:

- Confirm that the Frame Grabber is connected to a USB 2.0 port. As shown below, Windows Device Manager reports a USB 2.0 port as an Enhanced Host Controller and Macintosh System Profiler reports a USB 2.0 port as a High-Speed Bus.

USB 2.0 ports on Windows and Mac OS X



Windows Device Manager



Mac OS X System Profiler

For additional assistance with USB driver troubleshooting, browse to <http://www.epiphany.com/products/> and locate the Download page for your Frame Grabber.

- If included in the Frame Grabber package, always use the power adapter to ensure your Frame Grabber is receiving sufficient power. Also, plug in the power before connecting the Frame Grabber to your equipment.
- Observe the behavior of your Frame Grabber LED indicators before requesting support. See “VGA2USB, DVI2USB, and KVM2USB LEDs” on page 27 for LED information.
- Whenever possible, when splitting VGA connections, use an active VGA splitter rather than a VGA Y-adapter to help maintain a cleaner video signal.

- If, after following the installation steps, you are still having problems, close all applications and restart the video capture workstation. When the workstation comes back online, open the Windows Device Manager or Mac OS X System Profiler to confirm that the Frame Grabber is detected.

VGA2USB, DVI2USB, and KVM2USB LEDs

LED	Activity	Description
Power (PWR)	Red	Normal operation, the Frame Grabber is receiving power.
	Off	Power is disconnected from the Frame Grabber.
Capture (CAP)	Flashing Amber	The video capture application is running and has found the Frame Grabber. The Frame Grabber is capturing images.
	On	The Frame Grabber is not receiving a VGA/DVI signal, or cannot adjust video capture parameters.
Status (STAT)	Off	The Frame Grabber is not recognized by the operating system.
	Flashing Green	Normal operation, the Frame Grabber is initialized and ready to capture.

11. About Epiphan frame grabbing technology

This chapter describes how the components required for capturing, displaying, recording, and broadcasting images from a VGA or DVI source with an Epiphan Frame Grabber work together. This chapter also contains a glossary of the terms used in this document.

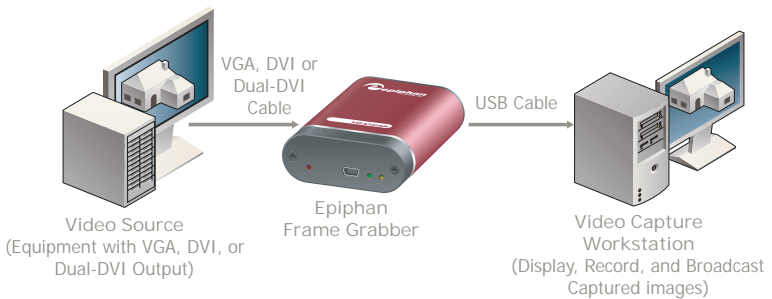
This chapter contains the following sections:

- [The VGA or DVI video source](#)
- [The Frame Grabber](#)
- [The video capture workstation](#)
- [Glossary of Terms](#)

Capturing, displaying, recording, and broadcasting VGA or DVI images requires the following components:

- A VGA or DVI video source to capture images from.
- An Epiphan Frame Grabber that captures images from the video source.
- A video capture workstation that displays, records, and broadcasts the images captured by the Frame Grabber.

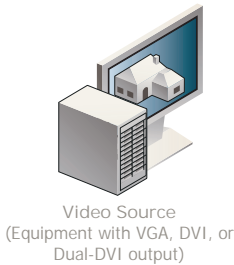
Figure 3: Capturing, displaying, and recording images



The VGA or DVI video source

Image capture begins with a VESA-compatible VGA, DVI, or dual-DVI video source. Virtually all personal computers as well as almost any device that displays images includes a VESA-compatible VGA or DVI video connection that you can connect an Epiphan Frame Grabber to. To capture the video images from a VGA or DVI source you connect the video source directly to a suitable Epiphan Frame Grabber using a suitable cable.

Figure 4: Video source (VGA, DVI, or dual-DVI output)



Epiphan Frame Grabbers can capture video in a wide range of video formats including analog and digital video formats, resolutions from 640 x 480 to 2048 x 2048, frame rates up to 12 fps at 2048 x 2048 resolution and up to 60 fps at 1024 x 768. For information about all of the video source features that Epiphan Frame Grabbers support, see the [Frame Grabbers Comparison Table](#) on the Epiphan Web Site.

The Frame Grabber

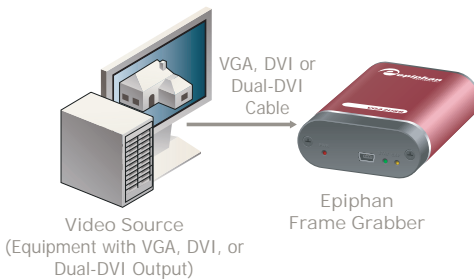
The Frame Grabber that you select depends on the video format produced by the video source. You can connect the basic VGA2USB Frame Grabber to most VGA video sources and successfully capture images.

For high resolution images or high frame rates, you should upgrade to the VGA2USB LR, HR, or Pro, depending on your detailed video format, frame rate, and resolution requirements and budget. See the [Frame Grabbers Comparison Table](#) on the

Epiphan Web Site for specifications of the all of the VGA2USB Frame Grabbers. You should select the Frame Grabber that matches or exceeds the output of your video source.

For most DVI video sources, you can connect the DVI2USB Frame Grabber. You can also use the DVI2USB Frame Grabber to capture VGA images. For higher resolution DVI sources you can upgrade to the DVI2USB Solo Frame Grabber. For dual-DVI sources you can use the DVI2USB Duo Frame Grabber. See the [DVI2USB Frame Grabbers Comparison Table](#) on the Epiphan Web Site for specifications of the different DVI2USB Frame Grabbers. You should select the DIV2USB Frame Grabber that matches or exceeds the output of your video source.

Figure 5: Video source and Frame Grabber



To get the signal from the video source to the Frame Grabber you connect the two devices with the appropriate cable. In most cases the cable you need comes in the package with your Frame Grabber.

For example, if your video source is VESA-compatible VGA source and if you want to capture images with a resolution of up to 1600 x 1200 at a frame rate of 30 frames a second then you could choose a VGA2USB HR or VGA2USB Pro. Both of these Frame Grabbers ship with the VGA video cable and adapters that you need to connect the video source directly to your Frame Grabber.

How Epiphan Frame Grabbers operate

The Frame Grabber is a hardware device that captures images (also called frames) from analog VGA signals or digital DVI streams. Capturing images means reading data from the VGA or DVI signal and converting this data into a digital image.

The Frame Grabber synchronizes itself with the video source to capture images at the resolution and color depth output by the video source or at the maximum color depth and resolution supported by the Frame Grabber. The Frame Grabber captures images at its own frame rate up to the maximum frame rate capacity of the Frame Grabber.

Epiphan Frame Grabbers perform the following functions to optimize and compress captured image data. The aim is to reduce the amount of data required for each captured image and optimize data transmission to the video capture workstation. These functions include:

- Pre-compression using technology developed by Epiphan to clean up and optimize the image. Pre-compression reduces the amount of data required for each image and improves the performance of the standard compression algorithms also built into most Epiphan Frame Grabbers. See [Pre-compression of computer-generated images](#) on the Epiphan Web Site for a description of pre-compression.
- Lossless image compression using industry standard image compression algorithms.
- Optional on-board cropping of the image.
- Color space conversion.
- USB transfer acceleration.

The result is the Frame Grabber captures a large amount of image data, converts the image data to RGB format at the maximum color depth that the Frame Grabber supports at the operating resolution, compresses and optimizes the data and then transmits the data to the video capture workstation.

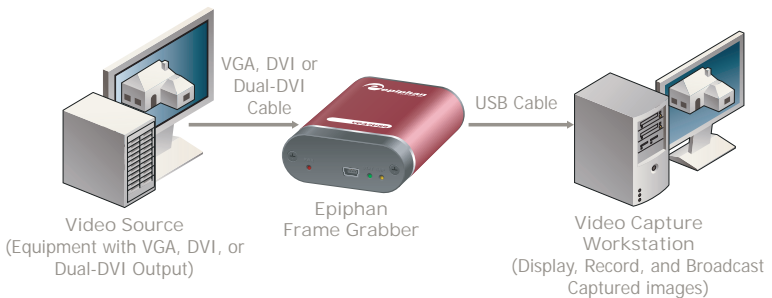
All Epiphan Frame Grabbers use USB 1.1 and USB 2.0 to transfer captured images to the video capture workstation. USB 2.0 is

recommended especially for high resolution and high frame rate applications because USB 2.0 supports much higher data transfer rates than USB 1.1. The USB version used depends on the video capture workstation.

The video capture workstation

The video capture workstation is a personal computer running a supported operating system such as Windows (2000, XP or Vista), Mac OS X Panther, or supported versions of Linux. For video capture workstation system requirements see [Chapter 2. “System Requirements”](#) on page 11.

Figure 6: Video source, Frame Grabber and video capture workstation



To be a video capture workstation the PC must include a USB device driver that can receive images from Epiphan Frame Grabbers. The video capture workstation must also include video capture application software for processing captured images according to your requirements. For example, you may want the video capture application software to display captured images or you may also want to record and print captured images, or you may want to share captured images by broadcasting them across the Internet to a remote location.

An Epiphan Frame Grabber is compatible with Windows, Mac OS X Panther or Linux PC platforms. The video capture workstation components are similar on each of these platforms. A

notable difference is that each platform includes different image processing application programming interfaces (APIs):

- On Windows 2000, XP, and Vista the Epiphan USB device driver and video capture application is compatible with the Microsoft DirectShow API.
- On Mac OS X the Epiphan USB device driver and video capture application is compatible with the Apple QuickTime API.
- On Linux the Epiphan USB device driver and video capture application is compatible with the Video4Linux V4L API.

The following sections describe the video capture workstation software components and APIs on each supported video capture application platform.

- [“Windows video capture application software”](#) on page 35
- [“Mac OS X video capture workstation software”](#) on page 40
- [“Linux video capture workstation software”](#) on page 42

About kernel mode and user mode

Some video capture workstation software components operate in **kernel mode** and some in **user mode**. Kernel mode programs are usually always running in the background and are usually not started and stopped by users. Kernel mode programs are usually configured from a central location such as the Windows control panel. Most software that communicates directly with hardware components operate in kernel mode. On all operating systems the Epiphan USB device driver is a kernel mode application.

User mode programs are programs that users run to perform a task such as word processing, drawing graphics, or recording captured images. Users start, stop, use and configure user mode programs. User mode programs do not usually communicate directly with hardware components. They communicate with kernel mode programs and it is the kernel mode programs that communicate with the hardware components. The Epiphan video capture application is a user mode program.

Windows video capture application software

The following software components operate on a video capture workstation running Windows 2000, XP, or Vista:

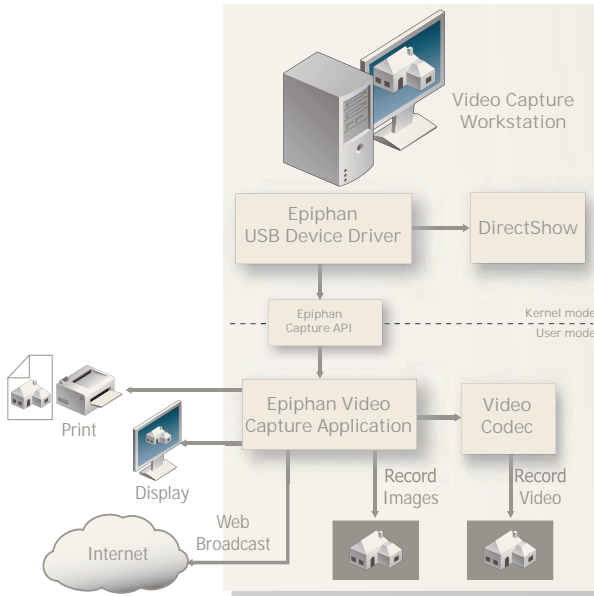
- [The Epiphan USB device driver](#)
- [DirectShow](#)
- [The Epiphan capture API](#)
- [The Epiphan video capture application](#)
- [Video codecs](#)

The Epiphan USB device driver

The Windows 2000, XP and Vista Epiphan USB device driver receives images from an Epiphan Frame Grabber and delivers the images to the Epiphan capture API and to DirectShow. 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. See [“Configuring image adjustments” on page 136](#) for more information about image adjustments.

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 Frame Grabber 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.

Figure 7: Windows video capture workstation software



Using the Epiphan software development kit (SDK) you can also create custom USB device drivers that incorporate the functions that you need.

On Windows video capture workstations the Epiphan USB device driver installs a control panel application (Figure 8).

From this control panel application you can view the status of the Frame Grabbers connected to the video capture workstation. You can also configure image adjustments for each Frame Grabber and configure how the Epiphan USB device driver communicates with DirectShow. See [“Configuring DirectShow options” on page 143](#).

If you have successfully installed the Epiphan USB device driver, when you connect a Frame Grabber, the name of the Frame Grabber appears in the Windows Device Driver under Imaging Devices. For example, if you installed a DVI2USB Solo Frame Grabber the name of the imaging device would be “DVI2USB Solo by Epiphan Systems Inc”.

Figure 8: Epiphan USB device driver

You can also find the Frame Grabber from the Windows Control Panel by opening the Scanners and Cameras control panel application.

DirectShow

DirectShow is the standard Microsoft DirectShow multimedia API. The Epiphan USB device driver can send captured images directly to DirectShow. This means that any DirectShow-compatible application can receive captured images. For example, you can use applications such as VirtualDUB to record avi files, Microsoft Media Encoder to record wmv files, and RealProducer to record rm files all consisting of a series of captured images sent to DirectShow by the Epiphan USB device driver. See [“Using a DirectShow application to record video files”](#) on page 107.

You can also create your own custom DirectShow-compatible video capture application to record captured images from DirectShow.

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 Frame Grabber captured images. The Epiphan capture API analyzes individual images,

performs on-device cropping, handles video mode changes and also supports KVM functions if you are using a KVM2USB frame grabber.

The Epiphan capture API is an alternative to using DirectShow to capture images. The Epiphan capture API delivers captured images to the Epiphan video capture application. 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.

The Epiphan video capture application

The Epiphan video capture application receives and processes captured images from the Epiphan capture API. Using the Epiphan video capture application you can:

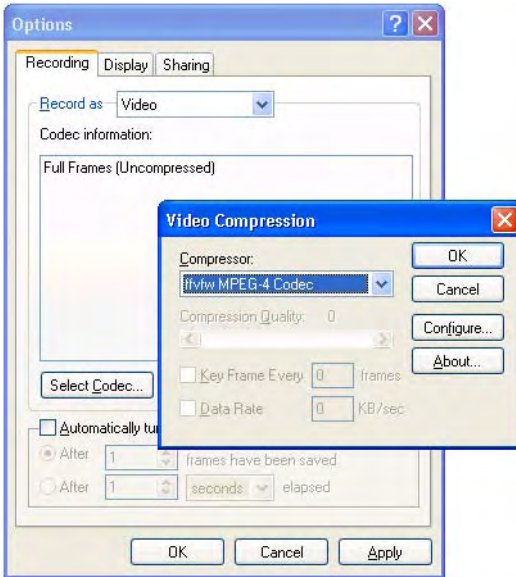
- Display, print, and copy captured images to the Windows clipboard to be pasted into another application.
- Record captured images as bmp, jpeg, or png image files.
- Record captured images by sending them to a video codec so that they can be saved as Windows AVI video files.
- Share captured images by broadcasting them over the Internet in real time.

Using the Epiphan SDK you can create your own custom video capture application for processing and recording captured images received from DirectShow or from the Epiphan capture API. By developing your own custom software application you can include the features that you need according to your requirements.

Video codecs

Many different video codecs are available for recording captured images as video files. The Epiphan video capture application is compatible with most Windows AVI video codecs. To use a video codec you must obtain and install the video codec software.

Figure 9: Selecting a video codec using the Epiphan video capture application



After you install the video codec on the video capture workstation you configure the Epiphan video capture application or your custom video capture application to send captured images to the video codec. From the Epiphan video capture application you can also configure settings for the video codec that you select. See [Chapter 15. “Recording videos” on page 97](#).

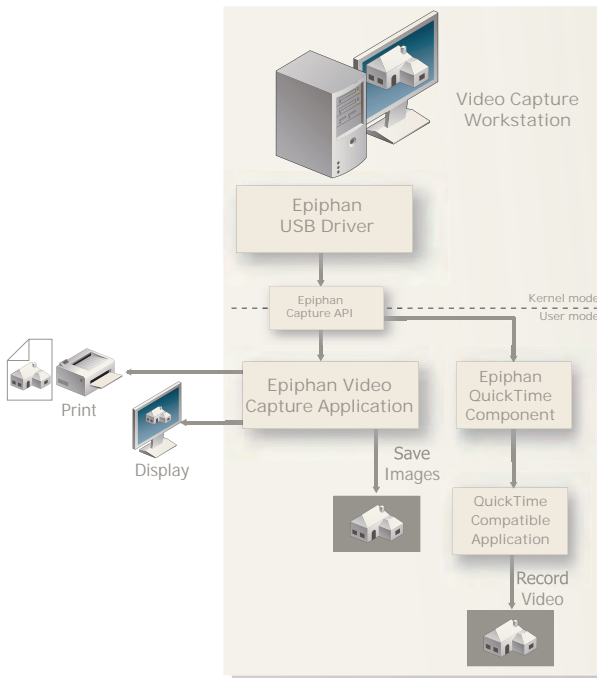
The video codec and codec settings to choose depend on your requirements. You may need to try several different codecs and change configuration settings to see which codec best fits your requirements. Epiphan recommends the [ffvfw video codec pack](#) for most Windows video capture applications. See [“Installing the ffvfw video codec pack” on page 100](#).

Mac OS X video capture workstation software

The following software components operate on a video capture workstation running Mac OS X Panther:

- The Epiphan USB device driver
- The Epiphan capture API
- Apple QuickTime and the Epiphan QuickTime component
- The Epiphan video capture application

Figure 10: Mac OS X video capture workstation software



The Epiphan USB device driver

The Mac OS X Epiphan USB device driver receives images from an Epiphan Frame Grabber and delivers the images to the Epiphan capture API. 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. See [“Configuring image adjustments” on page 136](#) for more information about image adjustments.

The USB device driver can also change the color depth of the captured image before sending the image to the video capture API. For example, if the Frame Grabber 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.

Using the Epiphan software development kit (SDK) you can also create custom USB device drivers that incorporate the functions that you need.

The Epiphan capture API

The Epiphan capture API receives captured images from the Epiphan USB device driver. The Epiphan capture API is optimized for processing Epiphan Frame Grabber captured images. The Epiphan capture API analyzes individual images, performs on-device cropping, handles video mode changes and also supports KVM functions if you are using a KVM2USB frame grabber.

The Epiphan capture API sends captured images to the Epiphan QuickTime component and to the Epiphan video capture application. 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.

Apple QuickTime and the Epiphan QuickTime component

Apple QuickTime is the standard Mac OS X QuickTime multimedia API. The Epiphan capture API sends captured images to the Epiphan QuickTime component. The Epiphan QuickTime component sends the captured images to QuickTime where they can be recorded or otherwise processed by any QuickTime-compatible video recording application. For example, you can use applications such as QuickTime Pro or HackTV Carbon to record QuickTime video files consisting of a series of

captured images sent to the QuickTime API by the Epiphan USB device driver. You can also create your own custom QuickTime-compatible video capture application to record captured images from QuickTime. See [“Recording videos for Mac OS X” on page 110](#).

The Epiphan video capture application

The Epiphan video capture application receives and processes captured images from the Epiphan capture API. Using the Epiphan video capture application you can:

- Display, print, and copy captured images to the Mac OS X clipboard to be pasted into another application.
- Save captured images as bmp, jpeg, png, or tiff image files.

For more information about the Mac OS X Epiphan video capture application, see [Chapter 13. “Mac OS X video capture application” on page 79](#).

Using the Epiphan SDK you can create your own custom video capture application for processing and recording captured images received from QuickTime or from the Epiphan capture API. By developing your own custom software application you can include the features that you need according to your requirements.

Linux video capture workstation software

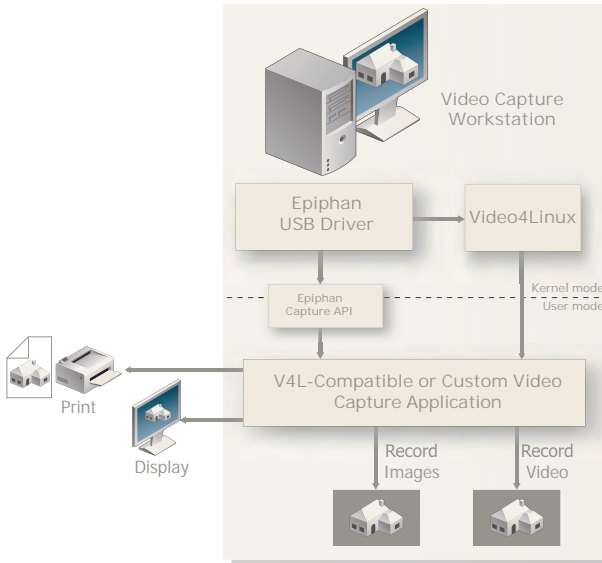
Epiphan provides the Epiphan USB device driver and the Epiphan capture API for Linux. Epiphan does not provide a video capture application for Linux. However, the USB device driver is compatible with Video4Linux so you can use Video4Linux-compatible applications to receive and process captured images.

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 Epiphany capture API
- V4L custom video capture applications

Figure 11:Linux video capture workstation software



The Epiphany USB device driver

The Linux Epiphany USB device driver receives images from an Epiphany Frame Grabber and delivers the images to the Epiphany capture API and to Video4Linux. Before delivering the images the Epiphany 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. See [“Configuring image adjustments” on page 136](#) for more information about image adjustments.

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 Frame Grabber 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.

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.

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 Frame Grabber captured images. The Epiphan capture API analyzes individual images, performs on-device cropping, handles video mode changes and also supports KVM functions if you are using a KVM2USB Frame Grabber.

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.

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 downloads page of the Epiphan Web Site. To download the latest version, browse to <http://www.epiphan.com/products/> and locate the downloads page for your product.

Glossary of Terms

This glossary describes many of the terms used in this *Epiphan Frame Grabber User Guide*.

Color depth, bits per pixel (bpp)

Color depth or bits per pixel (bpp) (also known as color resolution) is a computer graphics term describing the number of bits used to represent the color of a pixel in a bitmapped image or video frame. Epiphan Frame Grabbers support a number of color depths:

- RGB 24 bits per pixel, RGB 8:8:8 format: also known as true color and millions of colors, 24-bit color is the highest color depth normally used. 24bpp can display over 16.7 million colors. Most video codecs require a color depth of 24 bpp.
- RGB 16 bits per pixel, RGB 5:6:5 format: also known as high color and thousands of colors. 16 bpp may look as good as 24 bpp in many applications while using less data. However more complex images may not look as good with a 16 bpp color depth. 16 bpp can display over 65,536 colors.
- RGB 8 bits per pixel, RGB 3:3:2, 3:2:3, 2:3:3: uses much less data than 16 bpp but can only display 256 colors. 8 bpp is usually only useful for video streams with very low color depth.

- 8 bits per pixel, grayscale 256 levels: uses a similar amount of data as RGB 8 bpp but images are black, white, and shades of gray. Usually you would only use 8 bpp grayscale if your video source or codec used this color depth or to reduce file size.
- 5 bits per pixel, grayscale 32 levels: a grayscale format that has fewer levels of gray and uses less data than grayscale 256 levels. Usually you would only use 5 bpp grayscale if your video source or codec used this color depth or to reduce file size.
- Black and white: a very low quality and low data format that uses only black and white. Usually you would only use black and white if your video source is producing a black and white video signal.
- 16 bits per pixel, YUY2(422), UYVY: a color format used by many video sources. Similar to RGB 16 bpp but uses compression and other techniques to improve the video signal. Epiphan Frame Grabbers and the video capture application convert YUY2(422), UYVY video images to RGB, grayscale or black and white images.

All color depths are not supported by all video codecs or image file formats. Most video codecs and image file formats support RGB 24 bpp. It may be difficult to find a video codec that supports other color depths. Some image file formats do not support all color depths. Epiphan Frame Grabber web broadcasting operates at RGB 24 bpp.

Epiphan Frame Grabbers capture images at the color resolution of the video source up to the maximum resolution supported by the Frame Grabber. The maximum resolution supported by the VGA2USB Frame Grabber is 16 bits per pixel (bpp). The maximum supported by all other Epiphan Frame Grabbers is 24 bpp.

Capture, image capture, frame grabbing

Epiphan products can capture VGA, DVI, or dual DVI images. Capturing VGA data involves using a Frame Grabber to digitize analog VGA signals and transmit the digitized images as frames over a USB connection to the Epiphan video capture application.

Capturing DVI or dual DVI data involves using a Frame Grabber to convert DVI or dual DVI data into frames that can be transmitted over a USB connection to the Epiphan video capture application.

Capturing can also compress images before they are transmitted. Frames must be captured before they are displayed, printed, or recorded by the Epiphan video capture application.

Color resolution

See “Color depth, bits per pixel (bpp)” on page 45.

DVI

Digital Visual Interface (DVI) is a digital standard for transmitting visual data from a graphics source (such as a PC video card) to a display device (such as a computer monitor). Many devices that output digital visual images use the DVI standard for transmitting visual data. All Epiphan DVI2USB Frame Grabbers capture digital DVI frames and convert them to digital signals that are transmitted to the Epiphan video capture application using a USB connection. This USB data is then interpreted and displayed using the Epiphan video capture application.

Frame Grabber

A hardware device that captures frames from analog VGA signals or digital DVI streams. Epiphan Frame Grabbers may modify captured frames and compress them before sending them to a video capture workstation over a USB connection.

Frame

A frame is one of the many still images which can be combined to create a moving picture such as a video image. The term frame comes from the film industry. Film images are recorded on a strip of photographic film and each image looks like a framed picture.

Record

The process of saving (or recording) captured frames as video files or as sets of image files. Recording requires that frames are first captured before being recorded.

VGA

Video Graphics Array (VGA) is an analog standard for transmitting visual data from a graphics source (such as a PC video card) to a display device (such as a computer monitor). VGA originated in 1988. Most PCs and many other devices that output analog visual images use the VGA standard or extensions to the VGA standard for transmitting visual data. All Epiphan VGA2USB Frame Grabbers capture analog VGA frames and convert them to digital signals that are transmitted to the Epiphan video capture application using a USB connection. This USB data is then interpreted and displayed using the Epiphan video capture application.

VGA modes

A VGA mode describes the timing of the VGA signals sent by a VGA source to a VGA display device (or Frame Grabber). The VGA source and receiver (for example a monitor) must agree on the VGA mode so that the VGA display device can decode the timing of the VGA signal and display images.

A VGA signal consists of a series of frames. Each frame is a single image displayed by a VGA display device or captured by a Frame Grabber. A VGA frame is made up of horizontal lines. Each line is made up of pixels. The pixels in each line are transmitted from left to right. The lines in each frame are transmitted from top to bottom. If the VGA signal is interlaced each frame consists of every other line of the frame. An interlaced signal contains less data and so displays faster but also results in a lower quality image.

The timings in a VGA mode start with the *refresh rate*; which defines how often a new frame is sent. A VGA mode also indicates if the signal is interlaced.

Next a VGA mode describes the timing of the horizontal signals. These *horizontal timings* define how the data that makes up each line is transmitted. The line begins with the *active area*, which contains the RGB values for each pixel in the line. The active area is followed by a blanking region that contains black pixels. Inside the blanking interval, a horizontal sync pulse is transmitted to keep the signals synchronized. The blanking interval before the sync pulse is called the *front porch*, and the blanking interval after the sync pulse is called the *back porch*. The time between horizontal sync pulses is called the *sync time*. The *sync polarity* designates whether the sync pulse is positive or negative.

The *vertical timings* work the same way to define how the data that makes up each frame is transmitted. A frame begins with the active *video area* that contains all of the lines in the frame. The vertical signal also includes a vertical synch pulse that is timed according to the vertical *sync time*. The vertical blanking intervals are also called the *front porch* and *back porch*. Finally the vertical *synch polarity* designates whether the vertical sync pulse is positive or negative.

Video capture application

The Epiphan software that intercepts the frames (images) sent by the Frame Grabber over the USB connection. Using the video capture application you can display, print and record captured frames. You can also use the video capture application to transmit captured frames over the Internet.

Video capture workstation

A computer running Windows, Mac OS X or Linux that you can use to record captured frames. You connect your Frame Grabber to the video capture workstation with a USB connection. You must also install the Epiphan video capture application on the video capture workstation. If the video capture workstation can connect to the Internet you can use the video capture application to broadcast captured images over the Internet.

12. Windows video capture application

This chapter describes common functions and features of the Epiphan video capture application. Most of the information in this chapter describes the Windows 2000, XP, and Vista version of the Epiphan video capture application. However the information in this chapter also applies to the Linux version of the Epiphan video capture application software.

Note: For information about the Mac OS X version of the Epiphan video capture application, see [Chapter 13. “Mac OS X video capture application”](#) on page 79.

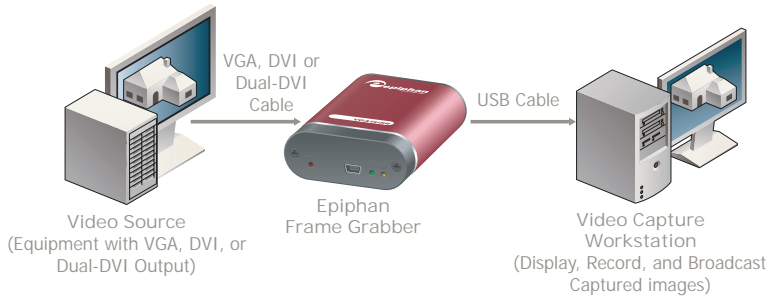
- For details about how to record images or video, see [Chapter 14. “Recording image files”](#) on page 91 and [Chapter 15. “Recording videos”](#) on page 97.
- For details about how to broadcast captured images over the Internet, see [Chapter 16. “Web Broadcasting”](#) on page 121.
- For details about how to set up KVM, see [Chapter 17. “Using the KVM2USB Frame Grabber”](#) on page 129.
- For special advanced topics, see [Chapter 18. “Advanced topics”](#) on page 133.
- For many useful How To procedures see the [How To](#) page of the Epiphan Web Site.

This chapter assumes that you have followed the instructions in the *Frame Grabber Installation Guide* shipped with your Frame Grabber and also available as chapters 2 to 10 of this *User Guide*. To start using this chapter you should have:

- Selected a video capture workstation that meets the system requirements described in your install guide and in [Chapter 2. “System Requirements”](#) on page 11.
- Successfully installed the Epiphan USB device drivers, and video capture application on the video capture workstation as described in [Chapter 3. “Installing the Windows VGA2USB/DVI2USB drivers and application”](#) on page 12.

- Connected your Frame Grabber to a VGA, DVI or dual-DVI source.
- Connected your Frame Grabber to a USB port on your video capture workstation.
- If required you should have also connected power to the Frame Grabber.

Figure 12:Connecting Epiphan Frame Grabbers



This chapter describes:

- [Upgrading to the latest software version](#)
- [Starting the video capture application](#)
- [Common procedures](#)
- [Menus](#)
- [Toolbar](#)
- [Status bar](#)
- [Shortcut keys](#)
- [Recording, display, KVM and sharing options](#)
- [Windows Epiphan USB device driver](#)

Upgrading to the latest 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.

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 or Linux 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>.

Finding software updates

To find the latest versions of all Epiphan software for Windows and Linux go to <http://www.epiphan.com/downloads>. You can also browse to the download page for your Frame Grabber product. For example, if you own an Epiphan VGA2USB Frame Grabber, you can browse to <http://www.epiphan.com> and select **Products > VGA Frame Grabbers > VGA2USB > Download**.

On these download pages you will find the most recent versions of:

- This *Epiphan Frame Grabber User Guide*.
- For Windows: the Epiphan USB device driver and video capture application for Windows 2000, Windows XP, and Windows Vista.

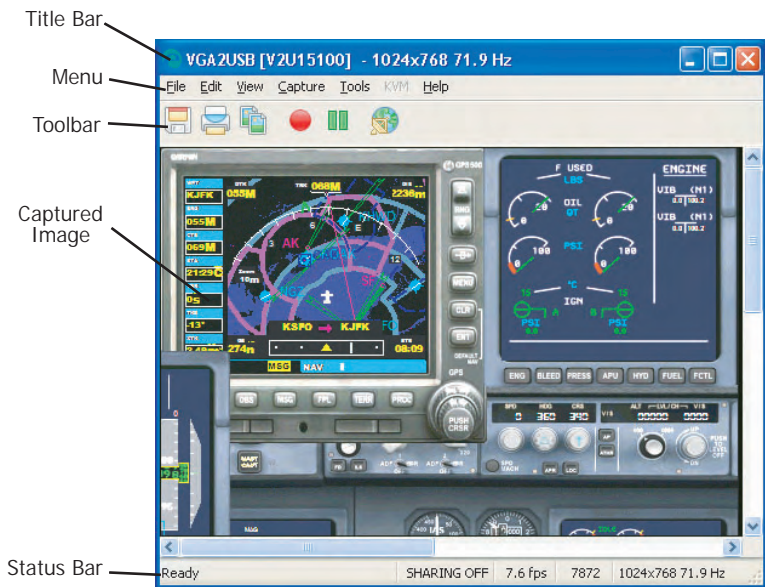
- For Linux (i386 and x86_64): pre-compiled drivers for many Linux distributions.
- For Macintosh: the latest release of the Epiphan device driver, QuickTime component and VGA2USB application compatible with MacOS X 10.4 and 10.5 (Intel and PowerPC) and 10.3.

Starting the video capture application

Before starting the video capture application the Frame Grabber must be connected to the video capture workstation USB port. If required the Frame Grabber should also be connected to power.

Start the video capture application as you would any other application installed on the video capture workstation.

Figure 13: Epiphan video capture application window (Windows XP, VGA2USB Frame Grabber)



As the application starts the following messages may appear on the video capture application 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 (see [“Configuring image adjustments”](#) on page 136 for more information).
- **No Signal Detected** if the video capture application cannot connect with the Frame Grabber or if the Frame Grabber is not connected to an active video source.

If the video capture application successfully connects to and synchronizes with the Frame Grabber, the video capture application window begins displaying captured images. [Figure 13](#) shows the parts of the video capture application window.

Note: You use command line options to control some settings when the video capture application starts. For example, you can start the video capture application without any window borders and so that it always appear on top of all application windows. See [“Windows command line options”](#) on page 149.

Title Bar	Displays the product name and serial number of the Frame Grabber that the video capture application is receiving captured images from. The title bar also displays the screen resolution and refresh rate of the video source. (The serial number is used for Web Broadcasting, see Chapter 16. “Web Broadcasting” on page 121.)
Menu	Select commands from video capture application menus. See “Menus” on page 61.
Toolbar	Save, print, and copy a snapshot of the current captured image. Start, stop, pause and resume recording images. Start and stop a web broadcasting session. See “Toolbar” on page 67.

Captured Image	The image currently being captured by the Frame Grabber. The captured image is the same as the image that you can save, print, copy, and record.
Status Bar	The status bar displays information about the current operation of the video capture application. The information displayed includes the file name of the video or image file last saved if the video capture application is recording video or image files. Other information includes whether sharing (web broadcasting) is on or off, the current frame rate, the number of frames captured, and the screen resolution and refresh rate of the video source. See “Status bar” on page 68.

Common procedures

This section describes many of the most common video capture workstation procedures.

- Pausing, copying, saving, and printing images
- Recording captured images
- Starting web broadcasting

Pausing, copying, saving, and printing images


Once the video capture application is displaying images captured by the Frame Grabber, you can pause, copy, save, and print the current image.

To pause and resume the captured image

- 1 Select Pause from the Capture menu or from the toolbar select




While the captured image is paused the video capture application stops receiving new images from the Frame Grabber. Pause also pauses video recording, image recording and web broadcasting. While paused you can save, print, and copy the captured image.

- 2 To resume capturing images select Pause from the Capture menu or from the toolbar select  .


To copy a snapshot of the current image

You can use the following procedure to copy the image currently displayed by the video capture application to the video capture workstation clipboard. You can optionally pause image capture before copying an image.

- 1 Select Copy from the Edit menu or from the toolbar select  .
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.


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 image capture before saving an image.

- 1 Select Save from the File menu or from the toolbar select  .
The status bar shows the location and name of the saved file.
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.
When you select Save again, the video capture 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, and location.
You can open the saved image file with most bitmap image editing applications.

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 image capture before printing an image.

- 1 Select Print from the File menu or from the toolbar select  .

The current image is sent to the default printer. You can select Print Setup from the file menu to select a different printer and set printer options.


Note: You can also configure the video capture application to invert colors for printing. From the Tools menu select Options then select the Display tab and select Invert colors for printing.

Recording captured images


You can record captured images as a video file or as a series of saved image files. In both cases the recording steps are the same.


To record captured images as a series of image files

Before recording captured images as a series of image files, you must configure recording options by selecting Options from the Tools menu, selecting the Recording tab, and selecting Record as Images. You should also select the image file format and other image file settings. See [Chapter 14. "Recording image files" on page 91](#) for the details.

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

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. The Status bar shows the name and location of the last saved file.


You can pause recording by selecting Pause 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 images, the status bar displays the number of image files saved. For example, the message **Wrote 31 files.** indicates the video capture application saved 31 image files.

To record captured images as a video file


Before recording captured images as a video file you must configure recording options by selecting Options from the Tools menu, selecting the Recording tab, and selecting Record as Video. See [Chapter 15. "Recording videos" on page 97](#) for all the details.


- 1 Select Start Recording from the Capture menu or from the toolbar select .
- 2 Enter the file name, select the location for saving the video file, and select 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) recorded.

When the size of the video file reaches the AVI file size limit (see ["AVI file size limit" on page 103](#)) the video capture application does one of the following:

- stops recording
- starts a new video file and continues recording (["Configuring video file recording options" on page 102](#) describes how to specify the file name)
- overwrites the original video file and continues recording.

You can pause recording by selecting Pause 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) recorded. For example: **Wrote c:\temp\example.avi (85 sec, 464 frames).**

Starting web broadcasting

Before broadcasting captured images over the Internet you need to set the display format to 24 bits per pixel. See [Chapter 16. "Web Broadcasting" on page 121](#) for more information about setting up web broadcasting.

To broadcast captured images over the Internet

- 1 Select Web Broadcasting from the Tools menu or from the toolbar select .

The Start web broadcasting dialog appears.




- 2 Record the Internet address from which users can view the web broadcast.


The address is always [http://www.vga2usb/](http://www.vga2usb.com/) followed by the serial number of the Frame Grabber capturing the broadcasted images. In the example above the Internet address is <http://www.vga2usb.com/V2U15100>.

3 Select Start Web Broadcasting.

As images are captured by the Frame Grabber they are broadcast over the Internet. The Status bar displays **SHARING ON**.

Users can use any web browser to connect to the Internet address to view the broadcast. See [Chapter 16. “Web Broadcasting” on page 121](#) for more information about the system requirements for viewing web broadcasts.

You can pause web broadcasting new images by selecting Pause from the Capture menu or  from the toolbar.

You can stop web broadcasting by selecting Stop Web Broadcasting from the Tools menu or  from the toolbar. When you stop web broadcasting the status bar displays **SHARING OFF**.

Menus

This section describes the commands available from the following Windows video capture application menus:

- [File menu](#)
- [Edit menu](#)
- [View menu](#)
- [Capture menu](#)
- [Tools menu](#)
- [KVM menu](#)
- [Help menu](#)

File menu

Use the File menu commands to save and print the current image displayed by the video capture application and to exit the video capture application.

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 video capture application 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	<p>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.</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 video capture application to invert colors for printing. From the Tools menu select Options then select the Display tab and select Invert colors for printing. See “Configuring display options” on page 71.</p>
Print	<p>Print a snapshot of the current image to the configured printer.</p>
Exit	<p>Close and exit the video capture application.</p>

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. You can paste this image into a document or other application as a bitmap image.
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View menu

Use the commands on the view menu to control the parts of the video capture application 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.
Image Only (Esc to exit)	<p>Change the video capture application to operate in image only mode. In image only mode the video capture application 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>Image only mode can be useful for applications such as integrating the video capture application into a custom system. You can still use all of the video capture application shortcut keys to save and print images, start and stop recordings, and to exit from image only mode. See “Shortcut keys” on page 69. You can always press Alt+F4 to exit from the video capture application.</p> <p>You can also use the <code>--borderless</code> command line option to start the video capture application in image only mode. See “Windows command line options” on page 149 for information about this and other command line options.</p>

Capture menu

Use the commands on the capture menu to start, stop or pause capturing and recording images. From the capture menu you can also select the Frame Grabber that the video capture application receives captured images from if you have more than one Epiphan Frame Grabber connected to the video capture workstation. You can also override image adjustments, DirectShow settings, and the VGA mode settings for the selected Frame Grabber.

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 video capture application records. See [“Recording, display, KVM and sharing options”](#) on page 69.

Start Recording	Start recording the current image to a video file or a series of image files.
Stop Recording	Stop recording the current image.
Pause	Pause or resume image capturing. If you select pause the video capture application stops displaying new captured images and the image captured when you selected Pause is displayed. Pause also pauses recording a video, pauses saving image files, and pauses web broadcasting. Select pause again to resume displaying captured images and resume recording or web broadcasting.
Select Device	If you have more than one Frame Grabber connected to the video capture workstation you can select Select Device to choose the Frame Grabber that the video capture application receives captured images from. You can also use this command to select the Frame Grabber to configure with the Configure Device command.

Configure Device	<p>Override image adjustments, DirectShow options, and select VGA modes for the current Frame Grabber. See the following sections for more information:</p> <ul style="list-style-type: none"> • “Configuring image adjustments” on page 136 • “Configuring DirectShow options” on page 143 • “Configuring VGA modes” on page 145
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Tools menu

Use the Tools menu to customize basic video capture application operating settings. The Tools menu also contains commands for special functions such as broadcasting captured images over the Internet.

Web Broadcasting	Broadcast the images being captured by the video capture application over the Internet. See Chapter 16. “Web Broadcasting” on page 121.
Upload EDID	Use this command to upload an extended display identification data (EDID) file to your DVI2USB Frame Grabber. See “About EDID” on page 133.
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 recording, display, KVM, and sharing (Internet Broadcasting) settings. See “Recording, display, KVM and sharing options” on page 69.

KVM menu

Use the KVM menu if you are using the Epiphan KVM2USB Frame Grabber. See [“Using the KVM2USB Frame Grabber” on page 129](#) for more information.

Enter KVM Mode	Start operating the video capture application in KVM mode.
Reconnect KVM	Re-connect KVM mode if KVM stops functioning.
Send Ctrl-Alt-Del	Simulate pressing Ctrl-Alt-Del on the Windows PC being managed by KVM.

Help menu

Use the Help menu to Check for Updates and to display information about the version of the video capture application that you are running.







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.

Figure 14: Displaying the video capture application version



Toolbar

Use the toolbar to save, print, or copy the current captured image, to start, pause, and stop recording the current captured image, and to start and stop web broadcasting. You can use the Toolbar command on the View menu to change the size of the toolbar icons or 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 video capture application 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 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 video capture application as a series of image files or a video file. When you start recording the status bar displays RECORDING and also displays information about the image files 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 video capture application stops displaying new captured images and the image captured when you selected Pause is displayed. Pause also pauses recording a video, pauses saving image files, and pauses web broadcasting. Select pause again to resume displaying captured images and resume recording or web broadcasting.
	Start or stop broadcasting or sharing captured images over the Internet. See Chapter 16. "Web Broadcasting" on page 121.

Status bar

The status bar displays information about the current status of the video capture application. The status bar contains the following number of sections:

- Four if the video capture application is just capturing images.
- Five if you are recording images.
- Six if you are recording images and you have selected Options from the Tools menu, selected the Display tab and selected Show frame count on the status bar. See [“Configuring display options” on page 71](#).

These sections display the following information:

- The location and file name of image and video files saved while recording images.
- The web broadcasting status. SHARING OFF means web broadcasting is turned off. SHARING ON indicates that web broadcasting is turned on.
- Recording status. RECORDING means that the video capture application is recording captured images.
- The frame rate that the Frame Grabber is operating at in frames per second (fps). For information about how the frame rate is determined, see [“About the frame rate” on page 151](#).
- The number of frames that the Frame Grabber has captured since the video capture application was last started. The number of frames is only visible if you select Show frame count on the status bar from the Display tab of the Options dialog. See [“Configuring display options” on page 71](#). The number of frames stops incrementing and starts flashing if you have paused the video capture application.
- The color depth and refresh rate of the captured images.

Shortcut keys

You can use the following shortcut keys from the video capture application window.

Ctrl+S	Save a snapshot of the current image to the video capture workstation.
Ctrl+Shift+S	Save As.
Ctrl+P	Print a snapshot of the current image to the configured printer.
Ctrl+Shift+P	Print Setup.
Ctrl+C	Copy a snapshot of the current image to the clipboard.
Ctrl+R	Start or stop recording images or video.
Ctrl+U	Pause or resume image capturing.
Ctrl+W	Start or stop web broadcasting.
Esc	Exit Image Only mode.

Recording, display, KVM and sharing options

This section introduces the options available from the Tools menu when you select the Options command. These options control how the Frame Grabber and video capture application records images, displays images, triggers KVM, and shares or broadcasts images over the Internet.

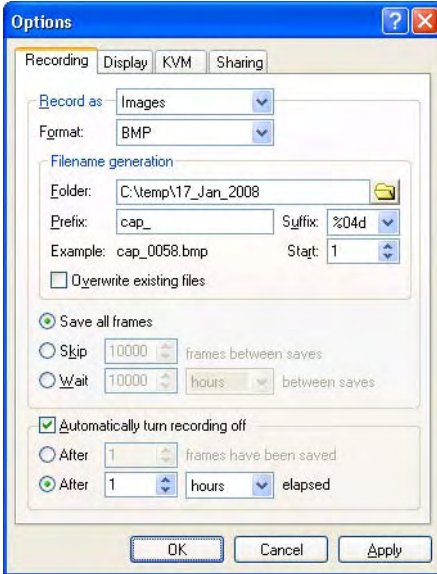
Recording	Configure how the video capture application saves captured frames when you start recording. You can record captured images as a series of image files or as an AVI video file. See “Configuring recording options” on page 70 .
Display	Configure the display format used by the video capture application for displaying and saving captured images. See “Configuring display options” on page 71 .

KVM	Configure the combination of keyboard and mouse events that switch KVM mode on and off. See “To set the KVM triggering event” on page 130.
Sharing	Override default compression settings for web broadcasts. See “Changing web broadcasting compression and performance” on page 125.

Configuring recording options

Select Options from the Tools menu and then select the Recording tab to control how the video capture application records captured images. You can record captured images as a series of consecutively saved graphic files or as a video file. How the video capture application records frames when you start recording from the Toolbar or the capture menu depends on how you set the recording options. You can select the following options.

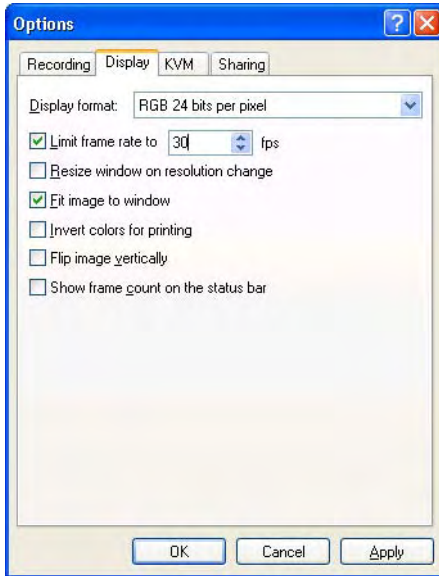
Record as Images	Set the video capture application to record captured images as a series of image files saved on the video capture workstation. For information about how to record images and image recording settings, see Chapter 14. “Recording image files” on page 91.
Record as Video	Set the video capture application to record images as an AVI video file saved on the video capture workstation. For information about how to record videos and video recording settings, see Chapter 15. “Recording videos” on page 97.
Automatically turn recording off	Select automatically turn recording off to configure the video capture application to automatically stop recording captured images as image files or as a video file. <ul style="list-style-type: none"> You can stop recording after a specified number of images (frames) have been recorded. Set the number of frames in the range of 1 to 30,000. You can stop recording after a specified time has elapsed. Set the time in seconds, minutes, or hours.

Figure 15:Record as images options

Configuring display options

Select Options from the Tools menu and select the Display tab to select the display format that the video capture application uses to display and record captured images. As well you can use the display options to limit the frame rate that the video capture application uses. You can also enable or disable options that control how the video capture application displays and prints images.

Figure 16: Display options



Display Format

Select the color depth that the video capture application uses to display, record, and print captured images. You can set display format to:

- RGB 24 bits per pixel
- RGB 16 bits per pixel
- RGB 8 bits per pixel
- Grayscale 256 levels
- Grayscale 32 levels
- Black and white

In most cases you should set the display format to RGB 24 bits per pixel. This setting is required for most video codecs, is supported by all image formats, and is required for web broadcasting.

For descriptions of display formats and color depths, see [“Color depth, bits per pixel \(bpp\)” on page 45](#). For more information about setting the display format, see [“About setting the display format” on page 74](#).

Limit frame rate to	<p>Select Limit frame rate to set a frame rate that is lower than the frame rate at which your Frame Grabber can capture images. You can reduce the frame rate to reduce the number of images captured by the Frame Grabber. You may want to reduce the frame rate to reduce the load on the video capture workstation, to reduce the size of recorded video files, or the number of saved image files.</p> <p>For example, a VGA2USB LR or PRO can capture up to 60 frames a second (fps). This frame rate may approach 100% CPU usage, even on a dual CPU video capture workstation. To reduce load on the video capture workstation you can reduce the frame rate to 30 fps without losing very much useful data.</p> <p>The valid frame rate range is from 0.01 to 60 fps. The default frame rate is 30 fps.</p>
Resize window on resolution change	<p>Select this option so that the video capture application resizes the application window when the resolution of the VGA or DVI source changes. This option does not affect recorded, printed, or saved images.</p>
Fit image to window	<p>Scale the displayed captured image up or down to fit in the video capture application window. This option does not change the size of recorded, printed, or saved images.</p>
Invert colors for printing	<p>This option is useful if you are printing images that contain light colored images, white text on a black background, or if for some other reason the printed image will be more useful if the colors are inverted. This option changes printed images only. It does not change the display and does not affect recorded or saved images.</p>

Flip image vertically	Select this option to turn the captured image displayed on the video capture application upside down. If you select this option, the image in recorded videos, the image that is copied when you select Copy from the Edit menu, printed images, and broadcasted images are also upside down. Images saved by selecting Save from the File menu and recorded image files are not affected by this option.
Show frame count on the status bar	Select this option to display on the status bar the total number of frames (or images) captured since the video capture application was last started.

About setting the display format

For best results you would usually set the display format color depth to match the video source color depth. If the display format and video source color depth do not match, the device driver or video capture application converts the color resolution of images as they are captured. This conversion can put extra demands on the video capture workstation CPU.

Note: For a definition of color depth, see “[Color depth, bits per pixel \(bpp\)](#)” on page 45.

In some cases; however, you may want to set the display format to a different color depth than the video source. There are a number of possible reasons for doing this. For example:

- You are recording captured images to video and your video codec is not compatible with the color depth of the video source. In this case you could set the display format to match the requirements of your video codec.
- You want to save disk space. Setting display format to a lower color depth reduces the size of recorded image files or videos. Using a lower display format color depth means that the video and image files saved by the video capture application are smaller and use less disk space.

- You have special requirements for a color depth that is different from the color depth produced by the video source. Set the display format to the color depth that you require.

Epiphan Frame Grabbers capture images at the color depth of the video source up to the maximum color depth supported by the Frame Grabber. The maximum color depth supported by the VGA2USB Frame Grabber is 16 bits per pixel (bpp). The maximum color depth supported by all other Epiphan Frame Grabbers is 24 bpp.

Increasing the color depth of captured images

The VGA2USB Frame Grabber captures images at 16 bpp. If 16 bpp is supported by the codec or image file format that you are using, you should also set the display format to RGB 16 bits per pixel. Setting the display format to RGB 24 bits per pixel requires the Frame Grabber device driver to convert the image format from RGB 16 to RGB 24. This results in extra CPU and memory usage and larger image or video files but the image quality (or amount of information) is still the same as in the original RGB 16 images that came from the Frame Grabber.

However, in most cases even with a VGA2USB Frame Grabber you would usually operate at 24 bpp because this color depth is required by most video codecs and also for web broadcasting. In most cases image capture and recording performance should be acceptable if the video capture workstation meets or exceeds the hardware requirements described in [“Hardware Requirements” on page 11](#) and if there are not a lot of concurrent demands on this PC.

Reducing the color depth of captured images

All DVI2USB Frame Grabbers and the VGA2USB LR/HR/PRO Frame Grabbers can capture images at RGB 24 bpp. If your video source is operating at RGB 24 bpp and you set the display format lower than RGB 24 bpp, you are reducing the quality of the captured image. You are also causing the Epiphan USB device driver to consume extra CPU and memory resources to convert the images to the reduced color depth.

However, in some cases you may choose to reduce the quality of the captured image for a number of reasons such as reducing file size, or a custom application that uses a different color depth. In most cases image capture and recording performance should be acceptable if the video capture workstation meets or exceeds the hardware requirements described in [“Hardware Requirements” on page 11](#) and if there are not a lot of concurrent demands on this PC.

Converting color images to grayscale or black and white

If the Frame Grabber is capturing color RGB images and you set the display format to a grayscale or black and white format, the video capture application converts the color images to the requested grayscale or black and white format. Conversion from color to grayscale or black and white causes the greatest demand on the video capture workstation CPU because the conversion is performed by the video capture application. If you are capturing color images, you should only set the display format to grayscale or black and white if you have a specific need for this color depth. If you have concerns about performance, you can make some trial recordings to ensure the video capture workstation has sufficient CPU and memory resources.

Windows Epiphan USB device driver

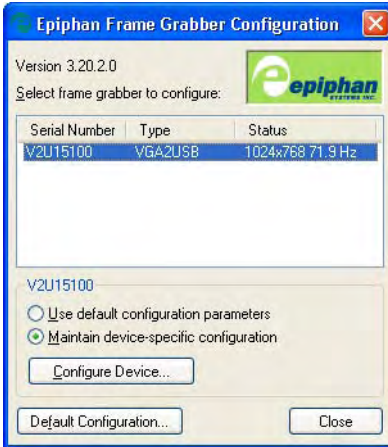
On Windows video capture workstations the Epiphan USB device driver installs a VGA2USB control panel application ([Figure 17](#)).

You can use this control panel application to view the status of the Frame Grabber or Frame Grabbers connected to the video capture workstation. You can also select Configure Device to configure the following settings for each Frame Grabber that you have connected to the video capture workstation:

- Image adjustments, see [“Configuring image adjustments” on page 136](#)
- How the Epiphan USB device driver communicates with DirectShow, see [“Configuring DirectShow options” on page 143](#)

- Customize or limit the VGA modes that the Frame Grabber can use, see “Configuring VGA modes” on page 145.

Figure 17:Epiphan USB device driver



Note: Changing these settings from this control panel has the same effect as selecting Configure Device from the Capture menu and changing the settings there.

Note: You can change and save configuration settings for any Frame Grabber that you have connected to the video capture workstation even if the Frame Grabber is not operating or connected at the time. If you change the configuration of a Frame Grabber that is not connected, the configuration is stored on the video capture workstation and applied to the Frame Grabber when the Frame Grabber is connected and operating.

You can also select Default Configuration to reset a Frame Grabber to its default configuration. Editing image adjustments and DirectShow options from the control panel application or from the video capture application has the same results.

13. Mac OS X video capture application

This chapter describes common functions and features of the Epiphan video capture application for Mac OS X. You can use the Mac OS X version of the Epiphan video capture application to configure the Frame Grabber attached to your computer and to view, save, copy, and print the images captured by the Frame Grabber.

Note: For information about the Windows version of the Epiphan video capture application, see [Chapter 12. “Windows video capture application”](#) on page 51.

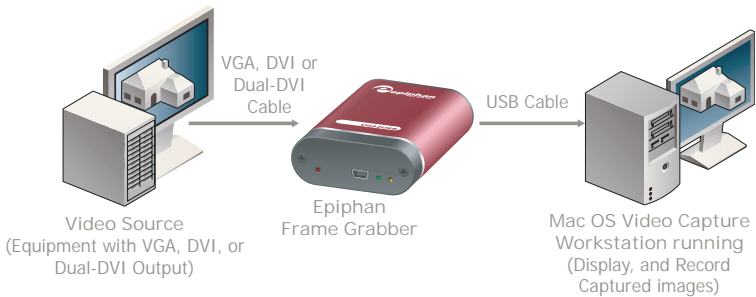
- For details about how to record video using the Mac OS X application HackTV Carbon, see [“Recording videos for Mac OS X”](#) on page 110.
- For details about how to set up KVM, see [Chapter 17. “Using the KVM2USB Frame Grabber”](#) on page 129.
- For many useful How To procedures see the [How To](#) page of the Epiphan Web Site.

This chapter assumes that you have followed the instructions in the [Frame Grabber Installation Guide](#) shipped with your Frame Grabber and also available as chapters 2 to 9 of this *User Guide*. To start using this chapter you should have:

- Selected a video capture workstation running Mac OS X that meets the system requirements described in your install guide and in [Chapter 2. “System Requirements”](#) on page 11.
- Successfully installed the Epiphan USB device drivers, and video capture application on the video capture workstation as described in [Chapter 4. “Installing the Mac OS X VGA2USB/DVI2USB drivers and application”](#) on page 14.
- Connected your Frame Grabber to a VGA, DVI or dual-DVI source.
- Connected your Frame Grabber to a USB port on your video capture workstation.

- If required you should have also connected power to the Frame Grabber.

Figure 18: Connecting Epiphan Frame Grabbers



This chapter describes:

- [Upgrading to the latest Mac OS X software version](#)
- [Starting the Mac OS X video capture application](#)
- [Copying, saving, and printing images](#)
- [Menus](#)
- [Toolbar](#)
- [Changing system preferences](#)

Upgrading to the latest Mac OS X software version

From time to time Epiphan makes 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 Mac OS X Epiphan video capture application do not install a shortcut on the 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 video capture application. You may also need to delete older versions of the Epiphan icon.

Finding software updates

To find the latest versions of all Epiphan software for Mac OS X, go to <http://www.epiphan.com/downloads>. You can also browse to the download page for your Frame Grabber product. For example, if you own an Epiphan VGA2USB Frame Grabber, you can browse to <http://www.epiphan.com> and select **Products > VGA Frame Grabbers > VGA2USB > Download**.

On these download pages you will find the most recent version of this *Epiphan Frame Grabber User Guide* and the most recent release of the Epiphan device driver, QuickTime component and VGA2USB application compatible with MacOS X 10.4 and 10.5 (Intel and PowerPC) and 10.3.

Starting the Mac OS X video capture application

Before starting the video capture application the Frame Grabber must be connected to the video capture workstation USB port. If required the Frame Grabber should also be connected to power.

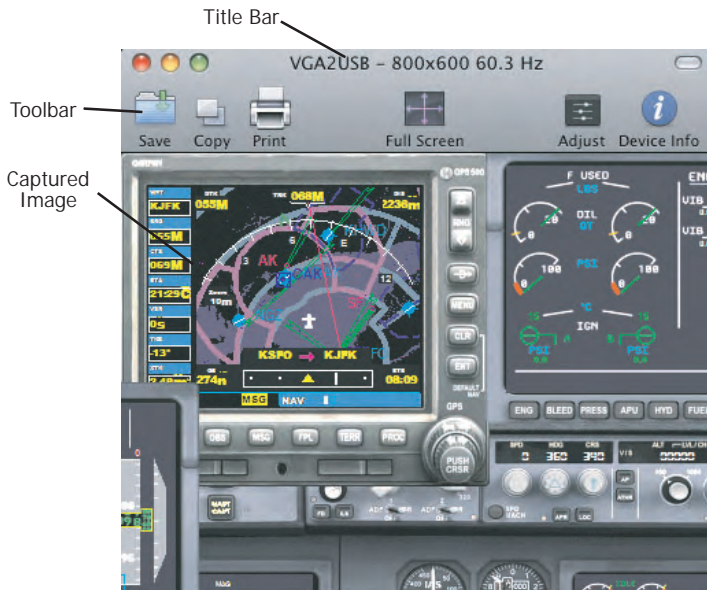
Start the video capture application as you would any other application installed on the video capture workstation.

As the application starts the following messages may appear on the video capture application 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 (see “[Configuring image adjustments](#)” on page 136 for more information).

- **No Signal Detected** if the video capture application cannot connect with the Frame Grabber or if the Frame Grabber is not connected to an active video source.

Figure 19: Epiphan video capture application window (Mac OS X, VGA2USB Frame Grabber)



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

Figure 19 shows the parts of the video capture application window.

Title Bar	Displays the product name of the Frame Grabber that the video capture application is receiving captured images from. The title bar also displays the screen resolution and refresh rate of the video source.
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Toolbar	Save, copy, and print a snapshot of the current captured image. Switch to full screen mode, override image adjustments, and display information about the Frame Grabber. See “Toolbar” on page 89.
Captured Image	The image currently being captured by the Frame Grabber. The captured image is the same as the image that you can save, print, copy, and record.

Copying, saving, and printing images

Once the video capture application is displaying images captured by the Frame Grabber, you can copy, save, and print the current image.

To copy a snapshot of the current image

You can use the following procedure to copy the image currently displayed by the video capture application to the video capture workstation clipboard.


- 1 Select Copy from the Edit menu or from the toolbar select .

The current image is copied to the clipboard.

- 2 Paste the image into a document or other application as a bitmap image.

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, jpg, or tiff file on the video capture workstation.

- 1 Select Save from the File menu or from the toolbar select .

You can open the saved image file with most bitmap image editing applications.

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.

- 1 Select Print from the File menu or from the toolbar select



The current image is sent to the default printer. You can select Print Setup from the file menu to select a different printer and to set printer options.

Menus

This section describes the commands available from the following Mac OS X video capture application menus:

- [VGA2USB menu](#)
- [File menu](#)
- [Edit menu](#)
- [View menu](#)
- [Tools menu](#)

VGA2USB menu

Use the commands on the VGA2USB menu to view the current version of the video capture application, configure preferences for the video capture application, configure KVM preferences, and exit the video capture application.

About VGA2USB	Display the information about the version of the video capture application that you are running. See Figure 20 .
Preferences	Configure general preferences and KVM preferences for the video capture application.
Quit VGA2USB	Exit the video capture application.

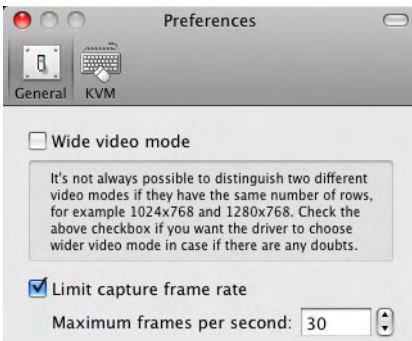
Figure 20: Displaying the video capture application version



Video capture application general preferences

Configure video capture application preferences to set the video capture application to wide video mode or to limit the frame capture rate. To set preferences, select Preferences from the VGA2USB menu.

Figure 21: General preferences



Wide video mode	This checkbox, when selected, allows Wide Aspect Ratio VGA modes to be displayed by the video capture application window. The Epiphany 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 Epiphany USB device driver selects a wide video mode. You can also set this option using Mac OS X System Preferences. See “Setting QuickTime options for recording videos (Mac OS X)” on page 111.
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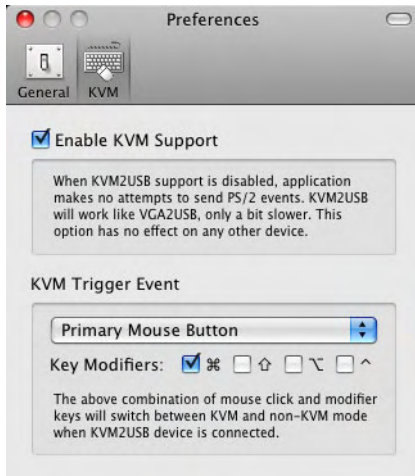
Limit capture frame rate	<p>Limit the capture frame rate to use the video capture application to control the capture frame rate. Specify a maximum number of frames per second. Usually you would only limit the frame rate in this way if the video capture workstation is having performance problems.</p> <p>If you limit the capture frame rate, the video capture application records videos at the same rate as the limited frame rate. If the limited frame rate is higher than the frame rate of the Frame Grabber, the video capture application records videos at the frame rate of the Frame Grabber.</p>
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KVM preferences

Configure KVM preferences to enable KVM support and specify the event that starts KVM operation.

To set KVM preferences, select Preferences from the VGA2USB menu and the select KVM from the Preferences toolbar.

Figure 22:KVM Preferences



Enable KVM Support	Enable or disable KVM support. This option only takes effect when a KVM2USB Frame Grabber is connected to the video capture application. When KVM support is enabled the video capture application sends PS/2 events and with a KVM2USB Frame Grabber can be used to control a headless machine.
KVM Trigger Event	Select the key and mouse button combination that triggers switching between KVM mode and non-KVM mode.

File menu

Use the File menu commands to save and print the current image displayed by the video capture application.

Save Image	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), 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.

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. You can paste this image into a document or other application as a bitmap image.
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View menu

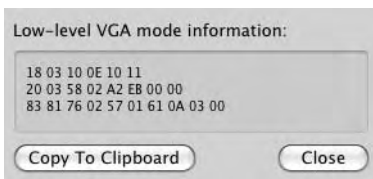
Use the commands on the view menu to control the parts of the video capture application window that are displayed.

Show Device Information	Enable or disable displaying information about the current Frame Grabber at the top of the video capture application window.
Show adjustment Controls	Override image adjustments. When the video capture application first starts, the application and the Frame Grabber adjust the captured image for optimal appearance. However, you may need to override these image adjustment settings to improve the image quality. See “Configuring image adjustments” on page 136.
Enter Full Screen	Scale the video capture application window to fill the screen.
Hide/Show Toolbar	Enable or disable displaying the toolbar at the top of the video capture application.

Tools menu







Use the Tools menu to select Show VGA Information to display low level information about the VGA mode that you are capturing with your Frame Grabber. When requested by Epiphany Support you can use this command and copy this information into an email to send it to Epiphany Support.

Figure 23: Viewing VGA information



Toolbar

Use the toolbar to save, copy or print the current captured image and to start, pause, or stop recording and to pause image capturing. You can use the Hide/Show Toolbar command on the View menu to show or hide the toolbar.

	Save a snapshot of the current image captured by the video capture application 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), JPEG (*.jpg) file, or tiff (*.tiff) file.
	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.
	Print a snapshot of the current image to the configured printer.
	Full Screen mode. Scale the video capture application window to fill the screen.
	Override Image Adjustments. When the video capture application first starts, the application and the Frame Grabber adjust the captured image for optimal appearance. However, you may need to override these image adjustment settings to improve the image quality. See “Configuring image adjustments” on page 136 .
	Device Info. Enable or disable displaying information about the current Frame Grabber at the top of the video capture application window.

Changing system preferences

Before starting to record videos or to save or print images, you should configure Epiphany QuickTime integration options by opening System Preferences and selecting VGA2USB under Other and configuring QuickTime settings. See “Setting QuickTime options for recording videos (Mac OS X)” on page 111.

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

Figure 24: System preferences about



14. Recording image files

You can use the information in this chapter if you are planning on using your Epiphan Frame Grabber and Epiphan video capture application to record the images captured by your Frame Grabber as a series of individual image files.

This chapter describes:

- [Configuring image file recording options](#)
- [Setting display options to change how image files are recorded](#)
- [Recording image files](#)
- [Viewing saved image files](#)

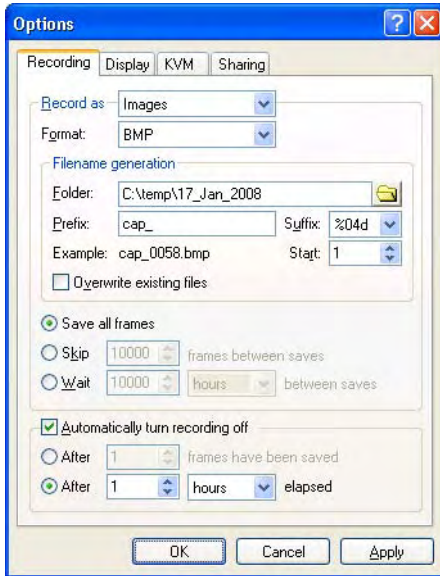
Configuring image file recording options

You should review and modify image file recording options before recording captured images as image files. Using image file recording options you can control the format of the image files, control the file naming system used for saving the image files, and determine whether to save all captured images or to be selective in the images that you capture.

To configure image file recording options

- 1 Start the video capture application.
- 2 On the Tools menu select Options.
- 3 On the Recording tab select Record Images.
- 4 Configure the following options and select OK or Apply to save your changes.

Figure 25: Image file recording options



Format	Select the file format for saving image files. You can choose BMP (Windows bitmap *.bmp), PNG (portable network graphics (*.png), or JPEG (*.jpg).
Filename generation	Use the filename generation options to control the names of the saved image files and the location on the video capture workstation to which to save the files.
Folder	Type in the path to the folder or select the folder button to select the folder into which to save image files. All of the image files will be saved into this folder.
Prefix	Enter a prefix to be added to the start of each saved image file name. All saved files will have the same prefix.

Suffix	<p>Select a suffix for the end of each saved image file name. Use the suffix to automatically change the name of each saved file. You can select a number of different suffixes. Each one changes how the automatic file naming works. Each suffix starts with a % and can include the following characters:</p> <ul style="list-style-type: none"> • 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 use decimal numbers in the suffix. • X means use hexadecimal numbers in the suffix. <p>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...</p>
Start	<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>
Example	<p>Displays an example file name constructed by the prefix and suffix that you have configured.</p>
Overwrite existing files	<p>If you select overwrite existing files, the video capture application saves files according to the image file recording options, overwriting existing files if any are present.</p> <p>If you do not select overwrite existing files, every time the video capture application encounters a file with the same name as it would have used to save the file it selects the next file name in the sequence until it can save a file without overwriting an already saved file.</p>

Save All Frames	Save all captured images during a recording session.
Skip	Reduce the number of image files saved during a recording session. Save the first captured image at the start of a recording session but skip the specified number of captured images before saving the next image. Continue skipping the specified number of captured images between saving images. You can skip between 1 and 10,000 images.
Wait	Save the first captured image at the start of a recording session but wait until the specified number of seconds, minutes, or hours has passed before saving the next image. Continue waiting the specified time period between saving captured images. Use this option to reduce the number of images saved during a recording session. You can set wait for up to 10,000 hours.
Automatically turn recording off	Automatically stop recording images after a number of images have been recorded or a set amount of time has elapsed. You can turn recording off after between 1 and 30000 frames (or images) have been recorded. You can also turn recording off after a period of time that you set in seconds, minutes, or hours.

Setting display options to change how image files are recorded

To change display options from the Tools menu, select Options and then select the Display tab. The following display options change how image files are recorded.


Display Format	The video capture application saves image files with the same color depth as the display format.
Limit frame rate to	If you limit the frame rate, the video capture application saves image files at the same rate as the limited frame rate. If the limited frame rate is higher than the frame rate of the Frame Grabber, the video capture application saves image files at the frame rate of the Frame Grabber.

For more information about display options, see “[Configuring display options](#)” on page 71.


Recording image files


Before recording captured images as a series of image files, you should configure image recording options (see “[Configuring image file recording options](#)” on page 91) and optionally configure display format settings (see “[Setting display options to change how image files are recorded](#)” on page 95).

To record image files

- 1 Start capturing the images to be recorded.
- 2 Select Start Recording from the Capture menu or from the toolbar select  .

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. The Status bar shows the names and location of image files as the video capture application saves them.

You can pause recording by selecting Pause 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 images the status bar displays the number of image files saved. For example, the message **Wrote 31 files.** indicates the video capture application saved 31 image files.

Viewing saved image files

The video capture application saves image files in the popular file formats that you can view using most bitmap graphics viewer or editor software programs. [Figure 26](#) shows a saved image file named 640x480.png displayed using the GIMP bitmap graphics editor. You cannot use the Epiphany video capture application to view saved image files.

Figure 26: Viewing a saved image file using GIMP



15. Recording videos

You can use the information in this chapter if you are planning on using your Epiphan Frame Grabber and Epiphan video capture application to record the frames captured by your Frame Grabber as video files.

This chapter describes:

- [Recording videos for Windows 2000, XP, or Vista](#)
- [Using a DirectShow application to record video files](#)
- [Recording videos for Mac OS X](#)
- [Recording videos for Linux](#)

Recording videos for Windows 2000, XP, or Vista

This section describes how to use the Epiphan video capture application to record video files on a video capture workstation running Windows 2000, XP or Vista.

Under Windows 2000, XP, or Vista, the Epiphan video capture application records videos as windows *.avi files. The *.avi files are created and saved by an external codec that must be installed on the video capture workstation. The Epiphan video capture application passes captured images to the video codec and the codec does the recording. Setting up video recording involves installing an external third-party video codec and adding that codec to your video capture application configuration. This section describes:

- [Setting display options for recording videos](#)
- [Selecting a Windows video codec](#)
- [Installing the ffvfw video codec pack](#)
- [Configuring video file recording options](#)
- [Recording a video](#)
- [Playing back a video file](#)
- [Using a DirectShow application to record video files](#)

Setting display options for recording videos

Before starting to record videos, you should configure Epiphan video capture application display settings.

Note: Most video codecs require setting the display format to RGB 24 bits per pixel.

The following display options change how the video capture application records video files.

Display Format	The video capture application records video files with the same color depth as the display format. Usually you need to set the display format to RGB 24 bits per pixel before recording videos.
Limit frame rate to	If you limit the frame rate, the video capture application records videos at the same rate as the limited frame rate. If the limited frame rate is higher than the frame rate of the Frame Grabber, the video capture application records videos at the frame rate of the Frame Grabber.
Flip image vertically	Select this option to turn the captured image displayed on the video capture application upside down. If you select this option, the image in recorded videos is also upside down.

For more information about display options, see [“Configuring display options”](#) on page 71.

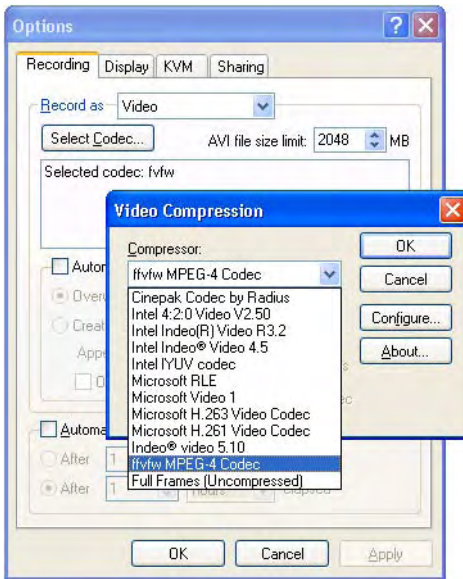
Selecting a Windows video codec

The video capture application automatically finds all of the video codecs installed on the video capture workstation. Unless you have already installed a high-speed codec, most of the codecs that the video capture application finds may be too slow or have poor compression. If a codec is too slow, the video recording frame rate may be too low to produce a good quality video without compromising the performance of the video capture workstation. If a video codec has poor compression, the recorded *.avi files could become very large.

To view the codecs installed on the video capture workstation

- 1 Start the Epiphan video capture application.
- 2 Select Options from the Tools menu.
- 3 Select the Recording tab.
- 4 Set Record as to Video.
- 5 Select the Select Codec button.
- 6 Select the Compressor list to view the list of video codecs available on the video capture workstation.

Figure 27: Example list of installed Windows video codecs



Although a number of codecs may be available, Epiphan recommends that you select a third-party codec to purchase or download that will meet your requirements. Select a video codec that can record videos at a high frame rate and that also supports high quality compression.

Epiphan recommends the MS MPEG 4 V2 video codec for most applications. You can use this codec to produce *.avi files that are compatible with most *.avi players. This codec operates at high refresh rates without reducing the performance of the video capture workstation and also includes high quality compression.

Installing the ffvfw video codec pack

The MS MPEG 4 V2 video codec is available from the free ffvfw codecs pack. You can download the ffvfw codecs pack from <http://www.free-codecs.com/download/ffvfw.htm>.

To download and install the ffvfw video codec pack

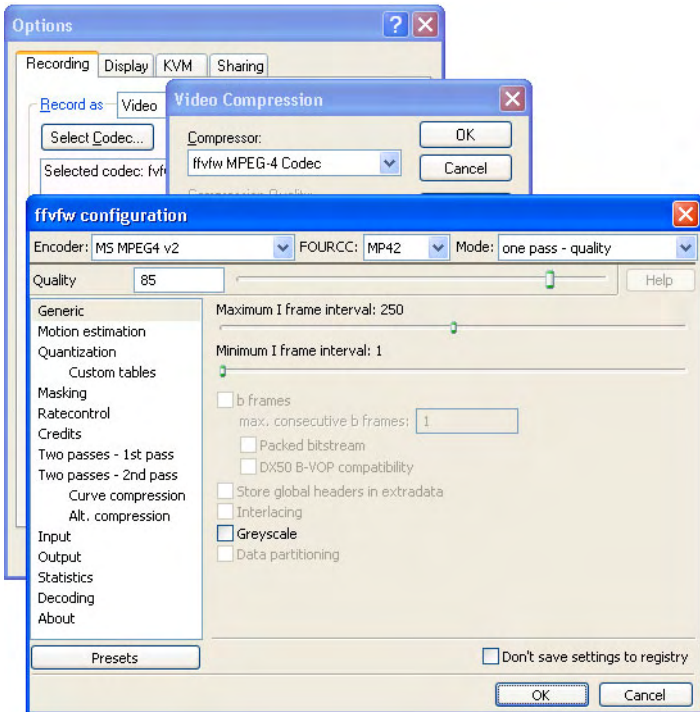
- 1 Make sure the Display Format is set to RGB 24 bits per pixel.
Check by selecting Options from the Tools menu and selecting Display. See “Setting display options for recording videos” on page 98.
- 2 Select the following link to download the ffvfw codec pack:
http://www.free-codecs.com/Video_Codecs.htm
This link starts a download of the file **ffvfw-20031028.exe**, which is the installer for the ffvfw codec pack. Download this file and then run the executable (for example, double-click on the file) to install the ffvfw codec pack.
- 3 From the video capture application, select Options from the Tools menu.
- 4 Select the Recording tab.
- 5 Select Record as Video.
- 6 Select the Select Codec button.
- 7 In the Compressor list select ffvfw MPEG-4 Codec.
- 8 Select Configure.
- 9 Select the following settings for the ffvfw codec pack:

Encoder	MS MPEG4 v2
FOURCC	MP42
Mode	one pass - quality
Quality	Between 1 and 100. (Selecting a higher quality may reduce the frame rate and increase the size of the video files produced by the codec. You may want to experiment with the quality setting to achieve optimum results.)

10 You may not need to change other settings unless you have special requirements.

11 Select OK three times to save your changes.

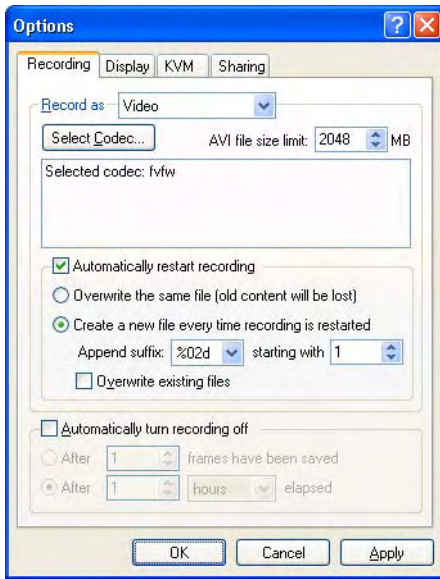
Figure 28:Configuring the ffvfw codec pack



Configuring video file recording options

You should review and modify video recording options before recording captured images as video files. Using video file recording options, you can control the maximum size of the video files (between 1 and 4095 Mbytes), and control the file naming system used for saving the video files.

Figure 29: Options for restarting recording



To configure video file recording options

- 1 Start the video capture application.
- 2 On the Tools menu select Options.
- 3 On the Recording tab select Record As Video.
- 4 Configure the following options and select OK or apply to save your changes.

AVI file size limit	Select the maximum size of the video file that the video capture application can save. You can set the size to from 1 to 4095 Mbytes. During video recording, when the video file reaches this size limit a new file will be saved and recording will continue if you have selected Automatically restart recording. If you have not selected Automatically restart recording, video recording stops when the size limit is reached.
Automatically restart recording	If you select this option, a new file is created and recording continues each time the video file size limit is reached.
Overwrite the same file	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 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 video capture application starts another file named with the original file name appended with a sequential numeric suffix. Use the append suffix options to specify format of this suffix.</p> <p>Each suffix starts with a % and can include the following characters:</p> <ul style="list-style-type: none">• 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 use decimal numbers in the suffix.• X means use hexadecimal numbers in the suffix. <p>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...</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 and so on.</p>


<p>Overwrite existing files</p>	<p>If you select overwrite existing files the video capture application saves files according to the video file recording options, overwriting existing files if any are present.</p> <p>If you do not select overwrite existing files, every time the video capture application encounters a file with the same name as it would have used to save the file it selects the next file name in the sequence until it can save a file without overwriting an already saved file.</p>
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Recording a video

Before recording captured images as a video you should:

- Set the display format to RGB 24 bits per pixel (see “[Setting display options for recording videos](#)” on page 98)
- Install and configure a video codec (see “[Selecting a Windows video codec](#)” on page 98 and “[Installing the ffwfw video codec pack](#)” on page 100)
- Configure video file recording options (see “[Configuring video file recording options](#)” on page 102)
- Review video recording options (see “[Configuring video file recording options](#)” on page 102).

To record captured images as a video file


- 1 Connect the Epiphan Frame Grabber to the video source that you want to record from and to the video capture workstation.
- 2 On the video capture workstation, start the video capture application.
- 3 Make sure the video capture application is displaying the captured images that you want to record.
- 4 Select Start Recording from the Capture menu or from the toolbar select  .


- 5 Enter the file name, select the location for saving the video file, and select 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) recorded.

When the size of the video file reaches the AVI file size limit, (see [“AVI file size limit” on page 103](#)) the video capture application does one of the following:

- stops recording.
- starts a new video file and continues recording. ([“Configuring video file recording options” on page 102](#) describes how to specify the file name.)
- overwrites the original video file and continues recording.

You can pause recording by selecting Pause 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) recorded. For example: **Wrote c:\temp\example.avi (85 sec, 464 frames).**

Playing back a video file

Depending on the video codec that you used, you should be able to play back most recorded videos using Windows Media Player. If you are playing back the video file on a computer other than the video capture workstation, you may need to install a video codec on that computer.

You cannot use the Epiphan video capture application to play back video files.

To play back a video file

- 1 Open the video file with a media player such as Windows Media Player.
- 2 Start, stop, pause, and view the video as required.

Using a DirectShow application to record video files

This section describes how to use the VirtualDub freeware application to capture images from an Epiphan Frame Grabber and record the captured images as *.avi video files. You can download and install VirtualDub from <http://www.virtualdub.org/>.

This is not a detailed description of how to use VirtualDub. This section provides a basic example of how to use a DirectShow-compatible application to capture images using an Epiphan Frame Grabber. Even though these instructions are specific to Virtual Dub, you can apply them to any third-party video capture application that can get images from DirectShow. For more information about DirectShow, see *“DirectShow” on page 37*.

Epiphan Frame Grabbers communicate with VirtualDub using the DirectShow API. Any DirectShow-compatible image capture application installed on a video capture workstation that is connected to an Epiphan Frame Grabber can also receive captured images from the Frame Grabber.

The key to capturing images from an Epiphan Frame Grabber using a DirectShow-compatible capture application is to find the Frame Grabber from the capture application. To be able to find the Frame Grabber, you must install the Epiphan USB device driver on the video capture workstation and connect the Frame Grabber to the video capture workstation.

If you have successfully installed the Epiphan USB device driver, when you connect an Epiphan Frame Grabber, the Frame Grabber's name appears in the Windows Device Driver under Imaging Devices. For example, if you installed a DVI2USB Solo Frame Grabber, the name of the imaging device would be "DVI2USB Solo by Epiphan Systems Inc".

You can also find the Frame Grabber from the Windows Control Panel by opening the Scanners and Cameras control panel application. The Frame Grabber has the same name in the Scanners and Cameras control panel application as in the Windows Device Driver.

From the Scanners and Cameras control panel application, you can right-click on the Epiphan Frame Grabber icon and select Get Pictures to save images captured by the Frame Grabber.

Before you start recording images with VirtualDub

You must have the following components before starting to record images using VirtualDub:

- An Epiphan Frame Grabber.
- A VGA, DVI, or Dual-DVI video source.
- A video capture workstation running Windows 2000, XP, or Vista. See [Chapter 2. "System Requirements" on page 11](#) for video capture workstation system requirements.

Use the following steps to download and install the required software and make the required connections before starting to record captured images using VirtualDub.

- 1 Follow the steps in [Chapter 3. "Installing the Windows VGA2USB/DVI2USB drivers and application" on page 12](#) to download and install the Epiphan USB device driver.

Unless you have developed your own USB device driver for Epiphan Frame Grabbers, you must install the Epiphan USB device driver, which is part of the VGA2USB/DVI2USB drivers and application. Windows and DirectShow can then get images from the Epiphan Frame Grabber.

- 2 Go to <http://www.virtualdub.org/> and follow the instructions to download and install VirtualDub.
- 3 Optionally download and install a video codec such as the free `ffvfw` codec pack. You can download and install this codec pack from <http://www.free-codecs.com/download/ffvfw.htm>. Step 3 in the following procedure describes how to configure VirtualDub to use this video codec when recording captured images as a video file.
- 4 Connect your Epiphan Frame Grabber as described in the install chapters of this guide.

For example, if you have a VGA2USB Pro Frame Grabber, see [Chapter 5. “Connecting a VGA2USB Device” on page 16](#).

To record captured images as video files using VirtualDub

Now that you have downloaded and installed all the required software, the video source is producing images, and the Epiphan Frame Grabber is connected to the video source and the video capture workstation, you can use the following steps to record captured images as video files with VirtualDub.

- 1 Start the VirtualDub application.
- 2 From the File menu select Capture AVI.
VirtualDub changes to Capture mode.
- 3 From the VirtualDub Video menu select Compression.
- 4 Select the video codec to use for recording captured images.
For example, if you have installed the `ffvfw` codec pack you can select `ffvfw MPEG-4 Codec`. You can also configure the video codec from this dialog.
- 5 From the VirtualDub Device menu select your Frame Grabber.
For example, to record images from a VGA2USB Frame Grabber, select `VGA2USB by Epiphan Systems Inc. (DirectShow)`.

After a short pause, the images being captured by the Frame Grabber appear in the VirtualDub window.

- 6 From the VirtualDub File menu select Set Capture File and specify the name and location of the video file to be created when you start capturing images.
- 7 From the Capture menu select Capture Video to start recording captured images as an *.avi video file.
- 8 To stop recording, from the Capture menu select Stop Capture.
- 9 To exit capture mode, from the Capture menu select Exit Capture Mode.

Other configuration options

You can configure other VirtualDub options to control how VirtualDub records images. You can play back recorded videos from VirtualDub.

You can also use the VGA2USB Windows control panel application to configure image adjustments and DirectShow options for images captured and recorded by VirtualDub or any other DirectShow application. See [“Configuring image adjustments” on page 136](#) and [“Configuring DirectShow options” on page 143](#).

Recording videos for Mac OS X

This section describes how to use an application called HackTV Carbon to record video files on a video capture workstation running Mac OS X. To use HackTV Carbon you must first install the Epiphan USB device driver and Epiphan QuickTime component on the video capture workstation.

Apple QuickTime is the standard Mac OS X QuickTime multimedia API. The Epiphan capture API sends captured images to the Epiphan QuickTime component. The Epiphan QuickTime component sends the captured images to QuickTime where they can be recorded or otherwise processed by any QuickTime-compatible video recording application such as HackTV Carbon or QuickTime Pro.

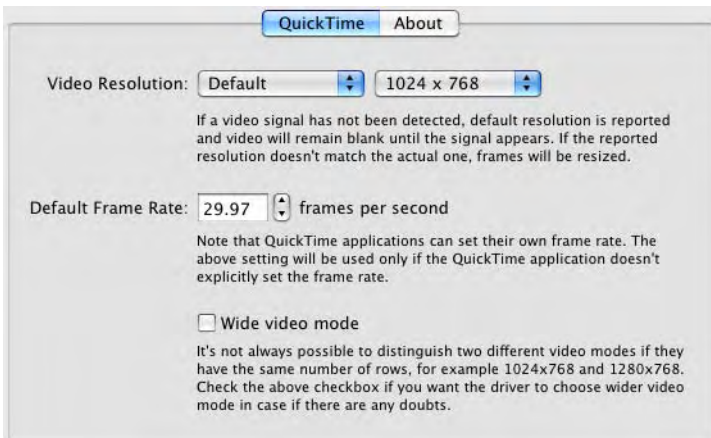
This section describes:

- Setting QuickTime options for recording videos (Mac OS X)
- Recording video files (Mac OS X)
- Playing back a video file (Mac OS X)

Setting QuickTime options for recording videos (Mac OS X)

Before starting to record videos you should configure Epiphany QuickTime integration options by opening System Preferences and selecting VGA2USB under Other and configuring QuickTime settings.

Figure 30: Mac OS X VGA2USB system preferences



<p>Video Resolution</p>	<p>Select a video resolution option:</p> <p>Actual: The actual resolution of the video source is reported to QuickTime. 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 has not been detected, the default resolution is reported and the video remains blank until the signal appears. If the default resolution 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>Default Frame Rate</p>	<p>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 USB device driver sends to QuickTime. This default frame rate is only used if the QuickTime video recording application does not explicitly set the frame rate.</p>
<p>Wide video mode</p>	<p>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.</p>

Recording video files (Mac OS X)

Use the following procedure to record captured images as a video file using HackTV Carbon. This procedure assumes that you have installed the Epiphan USB device driver and the Epiphan QuickTime component on your Mac OS X video capture workstation as described in [“Installing the Mac OS X VGA2USB/DVI2USB drivers and application”](#) on page 14 and connected your Epiphan Frame Grabber as described in the install chapters of this guide. This procedure also assumes that you have downloaded and installed HackTV Carbon.

To record captured images as a video file

Note: Make sure you select Full Size from the HackTV Carbon Monitor menu to record full size video files.

- 1 Connect the Epiphan Frame Grabber to the video source that you want to record from and to the Mac OS X video capture workstation.
- 2 On the Mac OS X video capture workstation, start HackTV Carbon.
- 3 From the HackTV Carbon Monitor menu, select Video Settings and then Source.
- 4 Select the serial number of your Frame Grabber.
- 5 Select Compression and select a video codec such as MPEG-4 Video.
- 6 Optionally adjust settings for the codec.
- 7 Select adjustments and configure adjustments as required.
- 8 From the Monitor menu select Full Size to record a full size image.
You could also select other sizes if required.
- 9 From the Monitor menu select a recording option. Either Record without hogging machine or Record until mouseclick.
- 10 Specify the name and location of the video file to be created.

Playing back a video file (Mac OS X)

You can play a QuickTime video using QuickTime or any QuickTime-compatible video player.

Recording videos for Linux

This section describes how to use the Epiphan USB device driver and Video4Linux to record video files on a video capture workstation running Linux.

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 application.

This section describes:

- [Recording video files \(Linux\)](#)
- [Playing back a video file \(Linux\)](#)

Recording video files (Linux)

Use the following procedure to record captured images as a video file on a video capture workstation running Linux. This procedure assumes that you have installed the Epiphan USB device driver and Video4Linux and a video capture or recording application that is compatible with Video4Linux on your Linux video capture workstation.

To download and install the latest version of the Epiphan USB device driver for your Linux distribution, browse to <http://www.epiphan.com/products/> and locate the downloads page for your product. Scroll down to the Linux section of the downloads page.

This procedure also assumes that you have connected your Epiphan Frame Grabber as described in the install chapters of this guide.

To record captured images as a video file

- 1 Connect the Epiphan Frame Grabber to the video source that you want to record from and to the Linux video capture workstation.
- 2 On the video capture workstation, start the Video4Linux-compatible video capture or recording application.
- 3 Select your Frame Grabber as the video input.

For example, to record images from a DVI2USB Solo Frame Grabber, from the Video4Linux-compatible video capture or recording application you would select a video source with a name similar to DVI2USB Solo by Epiphan Systems Inc.

After a short pause the images being captured by the Frame Grabber appear in the Video4Linux-compatible video capture or recording application window.

- 4 Specify the name and location of the video file to be created when you start capturing images.
- 5 Start recording captured images as a video file using the format supported by the Video4Linux-compatible video capture or recording application.

Playing back a video file (Linux)

You can playback a saved video using a video player that can play videos in format of the video file created by the video capture or recording application.

16. Web Broadcasting

You can use the information in this chapter to share or broadcast the images captured by your Epiphan Frame Grabber over the Internet. 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 Epiphan Frame Grabber that is capturing the images. The Frame Grabber serial number appears on the video capture application title bar.

Web broadcasting sends the currently captured image only. You cannot broadcast saved recordings and Epiphan Frame Grabber web broadcasting 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 5-minute time limit. You can contact Epiphan at info@epiphan.com to permanently enable the web broadcasting account for your Frame Grabber. This change is made on the Epiphan web broadcasting server and the change is not visible to the user.

Caution: The images broadcast over the Internet are not secure. Potentially anyone can view the web broadcast if they know the correct Internet address. The web broadcasting supported by the video capture application is a relatively limited feature. The [Epiphan broadcasting products](#) (such as VGA2WEB, VGA Broadcaster and VGA Bridge) provide a richer web broadcasting feature set.

This chapter describes:

- [Setting the Display format for web broadcasting](#)
- [Starting a web broadcasting session](#)
- [Viewing a web broadcasting session](#)
- [Changing web broadcasting compression and performance](#)

Setting the Display format for web broadcasting

Before starting web broadcasting you must set the video capture application display format to RGB 24 bits per pixel.

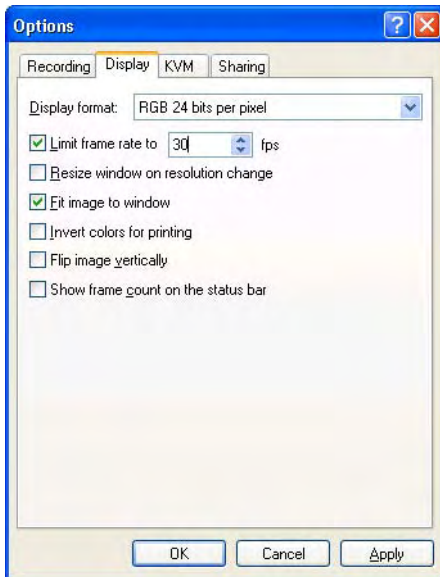
To set the Display format for web broadcasting

- 1 Open the video capture application.
- 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. See “[Configuring display options](#)” on page 71.

- 6 Select OK to save your changes.

Figure 31:Configuring the display format




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.

The following procedure is the same whether or not Epiphan has permanently enabled web broadcasting for your Frame Grabber.

To start a web broadcasting session

Before broadcasting captured images over the Internet you need to set the display format to 24 bits per pixel.

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

The Start web broadcasting dialog appears.



- 4 Record the Internet address from which users can view the web broadcast.


The Internet address is always `http://www.vga2usb/` followed by the serial number of the Frame Grabber capturing the broadcasted images. The serial number is visible in the video capture application title bar. In the example the Internet address is `http://www.vga2usb.com/V2U15100`.

The web broadcast internet address is not displayed by the video capture application during the broadcast.

- 5 Select Start Web Broadcasting.

As images are captured by the Frame Grabber they are broadcast over the Internet. The Status bar displays SHARING ON.

Users can use any web browser and connect to the Internet address to view the broadcast. See “[Viewing a web broadcasting session](#)” on page 124 for more information about the system requirements for viewing web broadcasts.

You can pause web broadcasting by selecting Pause from the Capture menu or  from the toolbar.

You can stop web broadcasting by selecting Stop Web

Broadcasting from the Tools menu or  from the toolbar.

When you stop web broadcasting the status bar displays SHARING OFF.

Viewing a web broadcasting session

You can view a web broadcasting session from any web browser on any computer (Windows PC, Mac OS X, or Linux and so on) that can connect to the Internet. The PC and web browser should be running the most recent version of Java. You can download the latest version of Java from <http://www.java.com>.

To view a web broadcast

- 1 Open a web browser and browse to the required Internet address, for example: <http://www.vga2usb.com/V2U15100>.

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

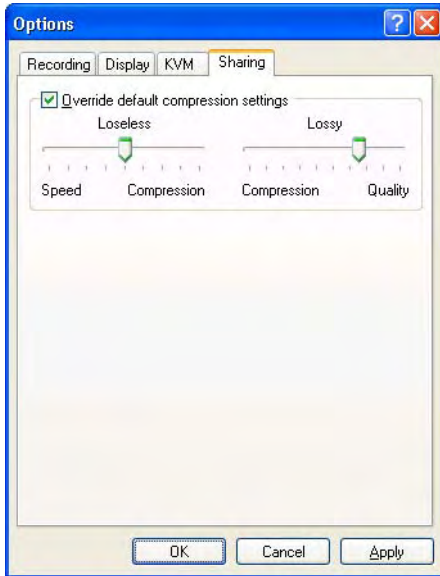
The first web browser window (in which the web broadcast address was entered) displays a message indicating that the web presentation has been opened in a new window. You can also use the first window to refresh the broadcast or re-open the broadcast window if it is accidentally closed.

Changing web broadcasting compression and performance

Normally you would 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 broadcast.

To change web broadcasting compression, from the Tools menu select Options and then select Sharing ([Figure 32 on page 126](#)). Select Override default compression settings and adjust the Lossless and Lossy settings.

Figure 32: Web broadcasting compression options



<p>Lossless compression</p>	<p>Lossless compression compresses the images being broadcast without reducing image quality. Increasing lossless compression can use a considerable amount of the video capture workstation CPU resources.</p> <p>The default lossless setting is 5. The range is 1 (Speed, the lowest lossless compression) to 9 (Compression, the highest lossless compression).</p>
<p>Lossy compression</p>	<p>Lossy compression compresses the images being broadcast by reducing image quality. Lossy compression is not as CPU intensive as lossless compression.</p> <p>The default lossy setting is 75. The range is 10 (Compression, the highest lossy compression and lowest quality) to 100 (Quality, the lowest lossy compression and the highest quality).</p>

Troubleshooting web broadcasting performance

Here are three typical reasons for adjusting web broadcasting compression:

- If you have a slow Internet connection or if receivers of the web broadcasts notice delays you can increase lossless or lossy compression to reduce Internet bandwidth usage.
- If receivers 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 receivers 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.

Some examples

Here are some examples of adjusting lossless and lossy compression for different Internet bandwidth and video capture workstation conditions.

- If the video capture workstation has a quad-core 3GHz CPU but connects to the Internet with a dial-up modem, you could move the lossless slider closer to Compression to increase the lossless compression to reduce Internet bandwidth usage.

- If you have a high-bandwidth connection to the Internet but the video capture workstation has an older or relatively slow CPU (for example, a Pentium III CPU), you could move the lossless slider closer to Speed to reduce the lossless compression.
- If the video capture workstation has a relatively slow CPU and your Internet connection is relatively slow you can move the lossy slider closer to Compression to increase the lossy compression.
- If increasing the lossy compression reduces image quality you can move the lossy slider closer to Quality to reduce the lossy compression and improve the quality of the image.

Improving performance by lowering the frame rate

You can also improve the performance of web broadcasting by lowering the frame rate. Lowering the frame rate reduces the amount of Internet bandwidth usage by reducing the number of frames broadcast. Lowering the frame rate also reduces the demand on the video capture workstation CPU resources (because fewer frames means the video capture workstation uses fewer CPU resources to capture and compress the frames).

To lower the frame rate, from the Tools menu select Options and then select Display. Select Limit frame rate to and set the frame rate to a lower value.

17. Using the KVM2USB Frame Grabber

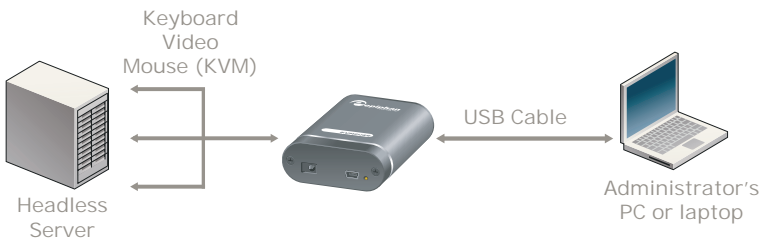
Using the KVM2USB Frame Grabber you can use any administrator's PC to connect to and operate a server that does not have a keyboard, monitor, and mouse. The KVM2USB operates like any keyboard, video, and mouse (KVM) system but the KVM2USB device is small and portable and requires simple connection and configuration settings.

You can use the KVM2USB for any operation on the headless server including interrupting boot up, selecting a different operating system, running the server in different operation modes (if supported by the server) and configuring the headless server BIOS settings.

You use a custom Epiphany cable to connect the KVM2USB device to the server. The custom cable connects to the mouse and keyboard ports using USB or PS/2 connections and to the VGA or DVI port of the server. The other end of the cable connects to the KVM2USB KVM input port.

The KVM2USB USB connector connects to a USB port on the administrator's PC. You also must install the Epiphany video capture application software on the administrator's PC. The administrator's PC can be running Windows or Mac OS X and must support USB 2.0.

Figure 33: Connecting the KVM2USB



To set up KVM mode

On the administrator's PC, use the following steps to start KVM mode after connecting the components.

- 1 Start the video capture application.
- 2 Optionally configure a KVM triggering event so that whenever you press a key sequence the video capture application starts KVM mode. See ["To set the KVM triggering event"](#).
- 3 Start KVM mode:
 - For Windows, from the KVM menu, select Enter KVM Mode.
 - For Mac OS X, from the VGA2USB menu, select Preferences then select KVM and select Enable KVM Support.
 - Use the KVM trigger event mouse and keyboard combination to start KVM mode.

The server's display appears in the video capture application window.

To set KVM preferences for Windows, see ["KVM menu" on page 65](#).

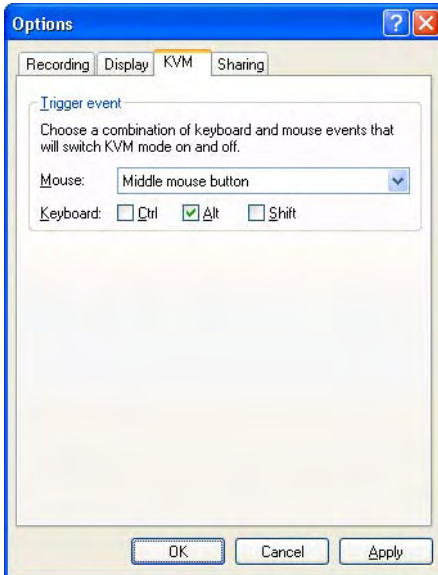
To set KVM preferences for Mac OS X, see ["KVM preferences" on page 86](#).

- 4 Use the keyboard and mouse of the administrator's PC to operate the server. The mouse and keyboard interaction with the server displays inside the video capture application window.

To set the KVM triggering event

- 1 Start the video capture application.
- 2 From the Tools menu select Options and select the KVM tab.

Figure 34:Configuring the KVM triggering event



- 3 Select a keyboard key and mouse combination that you would like to use to start KVM operation.

Choose a combination that is not used by another application on the management PC or on the server. Setting a good KVM triggering event makes it easier and more efficient to enter and exit KVM mode.

You can select the right, middle or left mouse button and any combination of the Ctrl, Alt, and Shift keys.

- 4 Select OK to save your changes.

To stop KVM mode

On the administrator's PC video capture application from the KVM menu, select Exit KVM Mode or use the KVM triggering event.

18. Advanced topics

This chapter contains the following sections:

- [About EDID](#)
- [Configuring image adjustments](#)
- [Configuring DirectShow options](#)
- [Configuring VGA modes](#)
- [Windows command line options](#)
- [About the frame rate](#)
- [Troubleshooting](#)

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 an Epiphany Frame Grabber to a video source, the video source sees the Frame Grabber as a monitor. Just like a monitor, the Frame Grabber contains EDID that is used by the video source to determine the video signal to send to the Frame Grabber.

Figure 35: Frame Grabber EDID and video source



Usually you would operate an Epiphan Frame Grabber using the factory installed default EDID. However, in some cases when you connect an Epiphan Frame Grabber 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 Frame Grabber. The EDID information in the file restricts the video signal that can be accepted by the Frame Grabber. For example, you can upload a custom EDID file to your Frame Grabber that reports that the Frame Grabber only operates at 1040x768. When the video source reads the EDID from the Frame Grabber, 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 frame grabbers from the [DVI2USB, DVI2USB Solo, DVI2USB Duo EDIDs](#) 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 Frame Grabber. This page also contains default EDIDs for each DVI2USB Frame Grabber. You can use the custom EDIDs to restrict the video resolution of the video source connected to the DVI2USB Frame Grabber. You can use the default EDIDs to return your DVI2USB Frame Grabber to normal operation.

Changing the EDID on your Frame Grabber

Use the following steps to upload a new EDID to your Frame Grabber. The uploaded EDID is permanently installed in the Frame Grabber and the Frame Grabber 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 Frame Grabber.
Keep the Frame Grabber 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 Frame Grabber.
- 6 Set the required resolution on the video source.

You may need to disable/re-enable or reset the DVI port. How you do this depends on your DVI source but could involve restarting the device, entering a reset command, or pressing a reset button.

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 an Epiphan Frame Grabber, 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 Frame Grabber supported 720x400 so the system changed to this resolution when the Frame Grabber was connected to it.

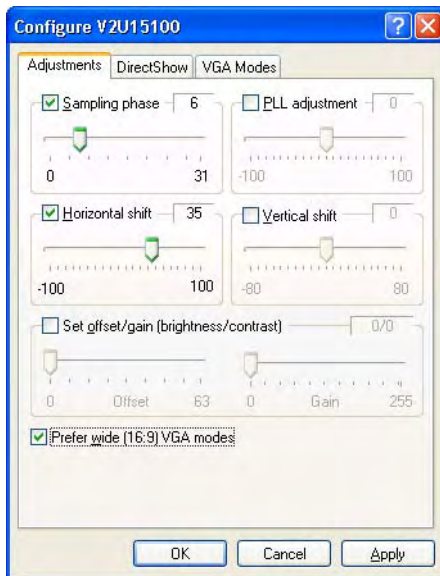
The user wanted to return the video source to operating at 640x480 but could not manually adjust the screen resolution. To solve the problem, Epiphan created a custom EDID for the Frame Grabber that excluded support for 720x400. When the user uploaded the custom EDID to the Frame Grabber, the video source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

Configuring image adjustments

On Windows, from the Capture menu you can select Configure Device and then select the adjustments tab to configure image capture adjustments.

You can also configure image adjustments from the VGA2USB control panel application. See [“Windows Epiphan USB device driver”](#) on page 76.

Figure 36: Windows image capture adjustment options



You can also use command line options to override automatic image adjustments. See [“Windows command line options”](#) on page 149.

On Mac OS X, from the View menu you can select Show Adjustment controls or from the Toolbar you can select the Adjust icon to configure basic and advanced capture adjustments.

Figure 37:Mac OS X basic image capture adjustment options

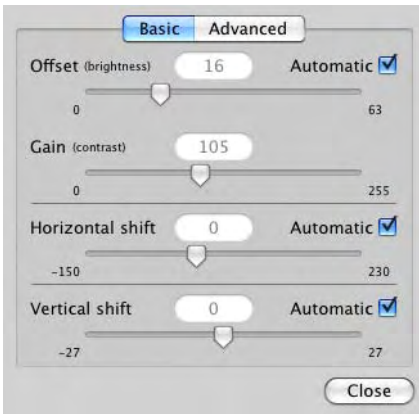
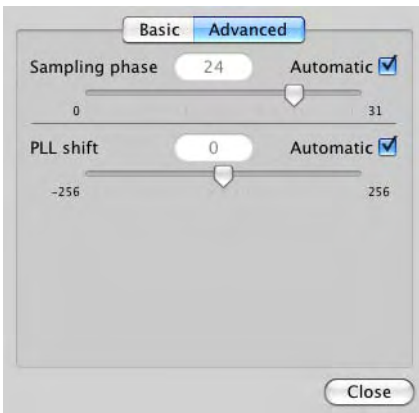


Figure 38:Mac OS X advanced image capture adjustment options



The video capture application automatically adjusts image capture settings every time it starts up. This image adjustment is also repeated every 60 seconds during operation. So normally you would not have to configure image capture adjustments. However, you may have special requirements or for other reasons have image quality problems that can only be fixed by making image adjustments.

If image adjustments are required, you should make them in small increments to avoid loss of image synchronization. If image synchronization is lost, the video capture application will stop capturing images. To start capturing images again you need to exit from and restart the video capture application.

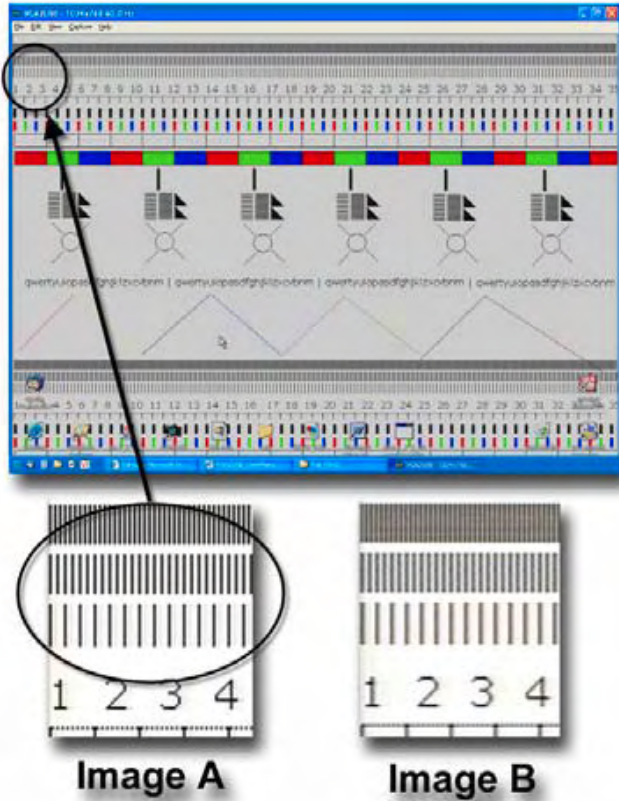
Note: Because image adjustments are made automatically there are no default image adjustment settings. Also, changing image adjustments means making relative adjustments from the settings auto configured by the system.

Sampling Phase

Adjust the sampling phase to change the horizontal resolution of the image. In [Figure 39](#), the sampling phase is properly adjusted for Image A and the sampling phase for Image B is incorrectly adjusted. As a result Image B is not as clear as Image A.

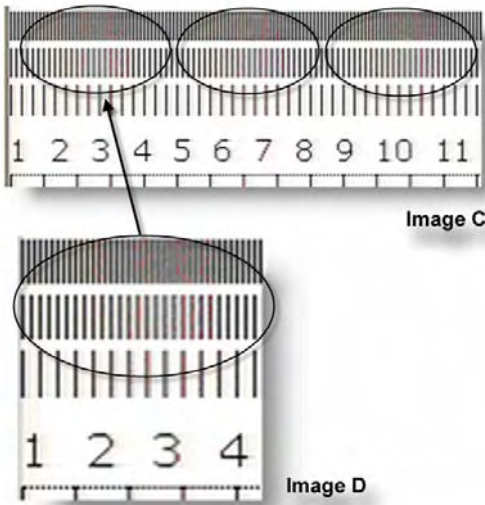
If the image in the video capture application window displays a similar quality of image as shown in Image B, then select and adjust the sampling phase in small steps until a sharper image is displayed in the video capture application window.

Figure 39: Adjusting the Sampling Phase



PLL adjustment

The PLL adjustment adjusts the vertical synchronization properties of the image. In [Figure 40](#), if the image in the video capture application window displays a similar quality of image as shown in Image D, then select and adjust the sampling phase in small steps until a sharper image is displayed in the video capture application window.

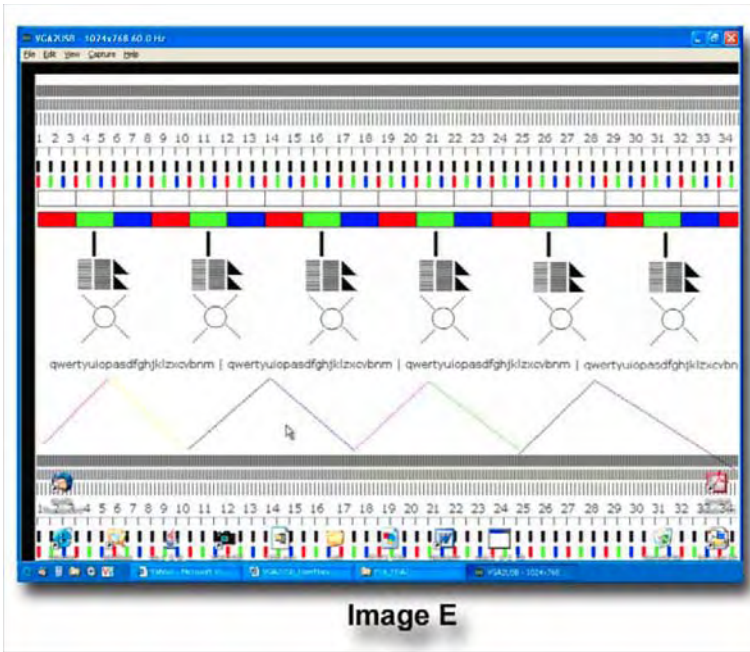
Figure 40:PLL adjustment

A good indication that the PLL setting needs to be adjusted is when there is a repetitive distortion or blurriness on the horizontal axis of the image as shown in Image C and Image D above.

Horizontal and Vertical Shift

Using the horizontal and vertical shift adjustments you can offset the image position on the screen. For example, Image E in [Figure 41](#) shows a captured image shifted slightly to the right (horizontally) and slightly downward (vertically). To correct the image position, minor adjustments to these settings are necessary.

Figure 41:Horizontal and Vertical Shift



Increasing or decreasing the Horizontal setting will cause the image to be shifted to the left or right respectively. Increasing or decreasing the Vertical setting will cause the image to be shifted upward or downward respectively.

Offset and Gain Controls (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.

Prefer wide (16:9) VGA modes

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.

Resetting image adjustments

Use the following procedure to turn off image adjustments settings so that image adjustments can return to being set automatically.

To reset image adjustments

- 1 Start the video capture application.
- 2 From the Capture menu select Configure Device.
- 3 Select the Adjustments tab.
- 4 Disable all types of image adjustments by clearing all checkboxes.
- 5 Select OK.
- 6 Close the video capture application.
- 7 Disconnect the USB cable from the video capture workstation or from the Frame Grabber and wait at least 10 seconds.
- 8 Reconnect the USB cable.
- 9 Start the video capture application.
Image adjustments are now set automatically again.

Configuring DirectShow options

From the Capture menu you can select Configure Device and then select the DirectShow tab to configure DirectShow options.

You can also configure DirectShow options from the VGA2USB control panel application.

Figure 42: Configuring DirectShow options



Fix Resolution

Control the image resolution reported to DirectShow and so used by DirectShow-compatible applications. You can use this option to cause DirectShow to expand or shrink the image recorded by DirectShow-compatible video capture applications. The available resolutions range from 640 x 480 to 2560 x 1600.

Default Image	Select an image to be sent to DirectShow if the Frame Grabber is not sending images to the video capture workstation. This option replaces what would otherwise be a blank screen with a static image that would be captured by DirectShow-compatible image capture applications.
Scaling	<p>If Fix Resolution is set to a resolution that does not match the actual resolution of the video signal you can select Pixel Resize to have the Epiphan USB device driver resize the image (either shrink or expand it) to match the fixed resolution. Pixel Resize is a simple resizing method that adds or removes pixels as required to resize an image.</p> <p>If you set scaling to No Resizing the Epiphan USB device driver does not resize the image sent to DirectShow. If the actual resolution of the video signal is smaller than the fixed resolution, the image appears in DirectShow compatible video capture applications with a border around it. If the actual resolution is larger than the fixed resolution, the image appears cropped in DirectShow compatible video capture applications.</p>
Flip image vertically	Select this option to turn the captured image displayed on the video capture application upside down. If you select this option, the image in recorded videos, the image that is copied when you select Copy from the Edit menu, printed images, and broadcasted images are also upside down. Images saved by selecting Save from the File menu and recorded image files are not affected by this option.

<p>Limit frame rate to</p>	<p>Select Limit frame rate to and set a frame rate that is lower than the frame rate at which your Frame Grabber can capture images. You can reduce the frame rate to reduce the number of images captured by the Frame Grabber. You may want to reduce the frame rate to reduce the load on the video capture workstation or to reduce the size of recorded video files.</p> <p>For example, if the Frame Grabber can capture up to 60 frames a second (fps), this frame rate may use close to 100% CPU usage on some video capture workstations. To reduce load on the video capture workstation you can limit the frame rate to 30 fps without losing very much useful data.</p> <p>The valid frame rate range is from 0.01 to 60 fps. The default frame rate is 30 fps.</p>
<p>Fix frame rate</p>	<p>Select fix frame rate to force the frame rate to always be the same as the limited frame rate. If the limited frame rate is less than the actual frame rate some frames will be missed. If the limited frame rate is higher than the actual frame rate some frames will be duplicated.</p>

Configuring VGA modes

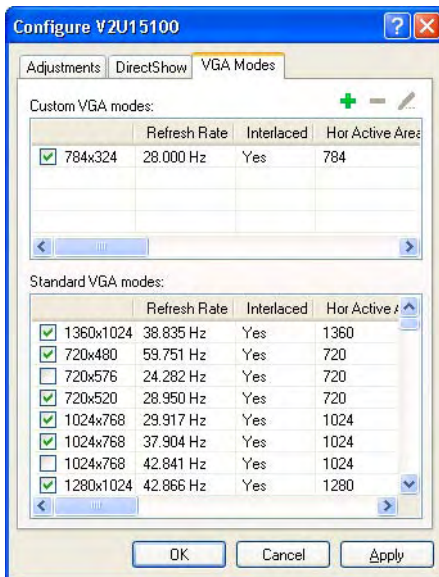
For a description of VGA modes that also describes many of the terms used in this section, see [“VGA modes” on page 48](#).

If you are capturing images from a VGA stream, from the Capture menu of the video capture application you can select Configure Device and then select the VGA modes tab to configure the VGA modes that the Frame Grabber can operate in. You can also configure VGA modes from the VGA2USB control panel application.

In most cases you should not have to configure VGA modes. Usually the Frame Grabber and VGA source can automatically select a VGA mode.

However, configuring VGA modes can be useful if you have special requirements or if the VGA source and Frame Grabber do not automatically select the VGA mode that you want. To resolve problems like this you can configure VGA modes to either limit the standard VGA modes that the Frame Grabber can operate in or you can add one or more custom VGA modes and configure the Frame Grabber to operate in a custom VGA mode.

Figure 43:Configuring VGA Modes



The Frame Grabber acts like a display device. Many VGA sources set the VGA mode that they use by checking the VGA modes the display device can use and then setting their VGA output mode to match. So if you can control the VGA mode that the Frame Grabber uses you may be able to control the VGA mode that the VGA source uses.

If the Frame Grabber and the VGA source cannot automatically select the VGA mode that you want them to use, you may be able to resolve this by only allowing the Frame Grabber to operate in one or some standard VGA modes.

If the VGA source operates in a non-standard VGA mode, you can use the custom VGA mode settings to add that non-standard mode to your Frame Grabber. The Frame Grabber can then operate in that mode.

Adding custom VGA modes

Add custom VGA modes if you want your Frame Grabber to operate in a non-standard (custom) VGA mode. You may want to do this if your video source operates in a non-standard VGA mode.

You can add as many custom VGA modes as you want for each Frame Grabber. If you want the Frame Grabber to operate with a single custom VGA mode, then just add one. You can add more if you need to operate your Frame Grabber in different custom VGA modes later.

In most cases the Frame Grabber will automatically select the custom video mode that most closely matches the VGA output. If you want to make sure that the Frame Grabber selects a specific custom video mode you can unselect all standard VGA modes and all custom VGA modes except for the one that you want the Frame Grabber to use.

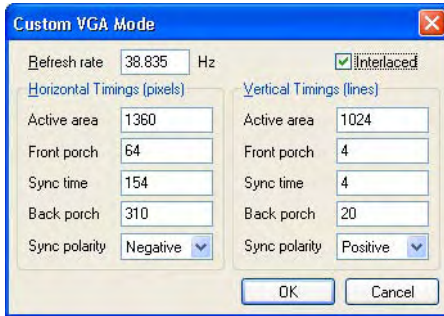
Usually you would configure a custom VGA mode to match the custom VGA mode of your VGA source. (So you do not need to understand the details of custom VGA modes to add them to your Frame Grabber.) The video capture application does not provide any guidance in configuring custom VGA modes. You can enter almost any value in any of the fields. So you need to know the details about the VGA mode settings of your VGA source then add that information to the custom VGA mode configuration.

You can add, edit, and delete custom VGA modes. If you add multiple custom VGA modes you can select one or more for the Frame Grabber to use.

To add a custom VGA mode to a Frame Grabber

- 1 Start the video capture application.
- 2 From the Capture menu, select Select Device.
- 3 Select the Frame Grabber to add a custom VGA mode to and select OK.
- 4 From the Capture menu, select Configure Device.
- 5 Select the VGA Modes tab.
- 6 Select **+** to add a custom VGA mode.

Figure 44: Adding a custom VGA mode



- 7 Configure the custom VGA mode with the following information:
 - Refresh rate
 - Select Interlaced if required

The following horizontal timings in pixels:

- Active area
- Front porch
- Sync time
- Back Porch
- Sync polarity (positive or negative)

The following vertical timings in pixels:

- Active area
- Front porch
- Sync time
- Back Porch
- Sync polarity (positive or negative)

- 8 Select OK.
- 9 Make sure that the required custom VGA mode or modes are selected in the Custom VGA modes list.

Selecting standard VGA modes

A Frame Grabber can operate in over 80 different standard VGA modes. This list is designed to support as many popular standard VGA modes as possible. All of these VGA modes are listed in the Standard VGA Modes list on the VGA modes tab. You can use this list to control the standard VGA modes that the Frame Grabber can operate in by selecting or deselecting standard VGA modes in the list.

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. See [“Creating a Windows shortcut that uses command line options”](#) on page 150 for some examples.

--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.
*See “Configuring image adjustments” on page 136.	

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\VGA2USB DVI2USB KVM2USB\.

- 1 Open Windows Explorer and navigate the following path:
C:\Program Files\VGA2USB DVI2USB KVM2USB
- 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\VGA2USB DVI2USB KVM2USB\v2tgui2.exe" --topmost
```

For example, to add `--topmost` and `--borderless`, set the horizontal shift to `-67`, and the vertical shift to `10`:

```
"C:\Program Files\VGA2USB DVI2USB KVM2USB\v2tgui2.exe" --topmost  
--borderless --hs -67 --vs 10
```

- 5 Select OK to save your changes to the shortcut.

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

About the frame rate

The Frame rate at which your Frame Grabber and the video capture application operates depends on the resolution of the VGA or DVI source on the Frame Grabber that you are using, and on the video capture workstation hardware.

For Frame Grabbers that do not support hardware compression, performance and frame rate is limited mostly by USB throughput. The theoretical limit for USB 2.0 is 60 MB/sec and the practical limit for bulk transfers is between 20 and 40 MB/sec.

The theoretical maximum frame rate can be determined using the following calculation:

theoretical maximum frame rate = $(20000000 / (n * w * h))$

Where:

- w and h are the number of columns and rows in the video mode (for example, 800x600 or 1024x768).
- n is number of bytes per pixel (from 1 to 3, see below)

The real maximum frame rate is usually lower than the theoretical maximum frame rate because the real maximum frame rate is limited by the video capture workstation CPU and memory or by extra load on the USB bus (for example, if you have other USB devices on the same USB bus).

For the VGA2USB Frame Grabber, n is always 2 (because the VGA2USB Frame Grabber maximum color depth is RGB16 which is 2 bytes per pixel).

For the DVI2USB Frame Grabber n can be from 1 to 3 depending on the capture mode. The DVI2USB Frame Grabber maximum color depth is RGB24 (3 bytes per pixel) as well as RGB16 (2 bytes per pixel) and RGB8/Grayscale (1 byte per pixel).

For Frame Grabbers that support hardware compression (the VGA2USB LR/HR/Pro, DVI2USB Solo/Duo) the maximum real frame rate very much depends on the entropy (statistical properties) of the input VGA or DVI signal. In other words, the frame rate depends on how well the signal can be compressed, or how much the next frame is different from the previous one. The frame rate can range, from less than non-compressing VGA2USB in the worst-case scenario (because the format for compressed data adds extra overhead) to 60 frames per second (hardwired limit) if almost nothing changes on the image.

Troubleshooting

Some basic Frame Grabber troubleshooting tips:

Problem	Possible cause	Action to take
Nothing is displayed on local monitor	The VGA/DVI cables are not properly connected to either the Frame Grabber or to the VGA source equipment.	Check that the VGA/DVI cables are properly connected. See the connection instructions for your Frame Grabber. For example: “To connect a VGA2USB (including LR, HR, and Pro)” on page 17.
Autosave is enabled, but there are no image files saved	Filename settings are not properly setup.	See the File Name Generation Settings described in “Configuring image file recording options” on page 91.
When Web Broadcasting is enabled, the following message appears: Sharing has been stopped	The Internet connection on the host computer is not functioning properly, or the time limit for the broadcasting session has been reached.	Verify that the network cable is properly connected to the host computer and then open a web browser window to verify that the internet connection is working.

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