

VIDEOLOGY

IMAGING SOLUTIONS INC.

Original Equipment Manufacturer

USB Photo ID Cameras

Instruction Manual for Videology Viewers
SFT-07019 and SFT-07019-WHQL
TWAIN Data Source SFT-10011



20/21K13XUSB-C
20/21K14XUSB-C
20/21K15XUSB-C



60C002USB.C
60C002USB.C-3.3



20K758USB-C-1



20/21B14XUSB



20/21C11XUSB
20/21C21XWUSB



24C7.3XUSB



20/21K35XUSB
20/21K45XUSB



24B1.3XUSB-C
24C1.3XUSB



24C7.3XUSB-F-L8



20K758USB-SYS-1

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For technical assistance with this product, please contact the supplier from whom the product was purchased.

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1. Document History

Rev	Date	Reason	CN#
Rev F	09-14-15	-C models have been updated, now C-1	16-0058
Rev E	06-08-15	Updated flash section 8.3.9	15-0065
Rev D	04-16-14	20/21C11XWUSB, 20/21C21XWUSB cameras added	14-0082
Rev C	08-31-12	Section 8.2 updated, added V pulse and frame rate (24B1.3XUSB-V)	12-0138
Rev B	03-15-12	Added camera 24C7.38USB-F, flash camera instructions section 8.3.9	12-0038
Rev A	07-22-11	Manual updated for all camera models. For software SFT-07019 rev 1.0.110, SFT-07019-WHQL rev 1.0.105. Added TWAIN Instructions - SFT 10011 rev 2.1.11	11-0075

2. Overview

2.1. The Videology USB Camera Family

Videology USB Cameras provide a quick and easy means of displaying and capturing high quality video and images on any USB 2.0 equipped desktop or laptop computer running a supported Microsoft® OS.

Designed with flexibility in mind, each camera model has its own distinct advantage, whether speed, resolution, image quality, sensitivity or price. Because they are USB based, there is no need for a frame grabber. Instead, a single USB cable provides power, video frames, control and data transfer.

- All cameras share the same simple, powerful API allowing easy migration from one camera to another.
- SDKs are available for OEMs (for an additional fee).
- Housings: Mechanical design options can be quoted for OEMs

This fixed lens camera family can utilize any CS mount lens. The lens may be changed out for a more optimal focal length. Varifocal lenses allow a wider range of focal lengths within one lens.

Note: Use a Megapixel lens with the Megapixel 24C7.38USB camera in order to maintain the full resolution.

2.2. Contents

This camera package has two software executables.

1. SFT-07019 (Videology Viewer software and USB drivers)
or SFT-07019-WHQL (WDM device drivers are Microsoft® digitally certified)
2. SFT-10011 (TWAIN data source)

To check for updated software, please go to www.videologyinc.com/download.htm

The Videology viewer (SFT-07019-WHQL) can operate this camera family without a need for any third party software. It will auto recognize which camera is plugged in and show the corresponding controls and features for that camera.

Note: All cameras stream video and have a still capture mode.

Many users wish to utilize a Photo ID card software management platform. In this case a separate TWAIN driver is needed (SFT-10011). ALL third party software packages allow a camera to be recognized thru their TWAIN (or Scanner) drop down camera source choices. This TWAIN interface is recommended as the primary method to integrate with the Videology camera.

If the software photo ID management program has a *standards* based DirectShow *compliant* interface, the camera will work with that interface. However, we have found many third party software platforms do not conform to DirectShow on all operating systems.

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3. Camera Features

20/21B14XUSB

USB 2.0 1/4" CMOS Color Board Camera

- 22mm x 26mm mini-board is compatible with previous 20/21K14XUSB-C family products
- All-digital design uses camera board's digital (D1) output for input to USB board
- USB 2.0 bus provides power to camera

20/21C11XWUSB

1/3" CMOS Color Board Camera with USB 2.0

- 1/3" CMOS sensor (690TVL)
- Miniature rugged 22mm x 26mm double board
- Low 0.1 lux sensitivity
- Metal CS, M-12 and pinhole lens mounts
- Optional mini metal housings suitable for ATMs and Kiosks

20/21C21XWUSB

1/3" CMOS WDR Color Board Camera with USB 2.0 and CVBS Video Output

- Provides analog (CVBS) and USB (2.0) video output simultaneously
- 1/3" CMOS sensor (690TVL)
- Dynamic range to 120dB provides brilliant color detail within both shadows and brightest light scenes
- Miniature rugged 22mm x 26mm double board
- Low 0.1 lux sensitivity
- Metal CS, M-12 and pinhole lens mounts
- Optional mini metal housings suitable for ATMs and Kiosks

20/21K35XUSB

1/4" CCD High Resolution B&W Board Camera with USB 2.0 Video Output

- 22mm x 26mm mini-board is compatible with previous 20/21K13XUSB-C family products
- USB 2.0 bus provides power to camera
- I²C control
- Lens mounts: metal CS, M12 board or pinhole

20/21K45XUSB

1/4" CCD High Resolution Color Board Camera with USB 2.0 Video Output

- 22mm x 26mm mini-board is compatible with previous 20/21K15XUSB-C family products
- USB 2.0 bus provides power to camera
- I²C control
- Lens mounts: metal CS, M12 board or pinhole

20/21K758USB-C-1

USB 2.0, High Resolution Color Box Camera

- CCD sensor provides high sensitivity & image quality
- Still image capture with streaming video
- USB 2.0 bus provides power and camera control

20/21K758USB-SYS-1

USB, High Resolution Color Camera for Photo Identity Systems

- CCD sensor provides high sensitivity and quality
- Still image capture with streaming video
- Flexible gooseneck arm allows for easy camera control
- Small footprint saves table space
- USB 2.0 bus provides power and camera control

24B1.3XUSB-C

High Definition 1.3 Megapixel B&W Single Board Camera with USB Video Output

- Progressive scan, 1.3 megapixel CMOS sensor (square pixels)
- Sensor is optically centered within lens mount holes
- Streaming video or single frame capture via hardware/software
- Triggerable instantaneous snap shots (model 24B1.3XUSB-V)
- 24fps at full 1280 x 1024 resolution uncompressed video
- Simplified cabling - video, power and full camera control over a single USB cable
- Extended integration time (>0.5 sec.)

24C1.3XUSB

CMOS USB 2.0 1.3 Megapixel Sensor Color Board Camera

- Progressive scan, 1.3 megapixel CMOS sensor
- >12.5fps at 720p high definition uncompressed resolution
- USB 2.0 bus provides power and camera control

24C7.38USB

USB, Megapixel Color Box Camera

- 1.3 megapixel progressive scan sensor
- >12.5fps at 720p high definition uncompressed resolution
- Still image capture with streaming video
- USB 2.0 bus provides power and camera control

24C7.38USB-F-L8

USB Megapixel Color Box Camera with Flash

- Synchronized USB powered LED flash for consistent high quality images in any environment
- 1.3 megapixel progressive scan sensor
- >12.5fps at 720p high definition uncompressed resolution
- Still image capture with streaming video
- USB 2.0 bus provides power, camera and flash control
- Convenient manual dial allows customized flash intensity

60V002USB-C

USB Digitizer Board (5VDC Power Supply)

- Video Inputs (multiplexed):
 - 1x composite video, 1x S-video
 - Video formats: NTSC/EIA, PAL/CCIR
- Video Output:
 - USB 2.0, uncompressed image data streams
 - Max resolution (NTSC/ EIA): 704 x 480 at 30Hz
 - Max resolution (PAL/CCIR): 768 x 576 at 25Hz
- Power input USB 2.0, 5VDC
- Power throughput 5VDC up to 200mA for powering camera boards such as 20B14XDIG series

60V002USB-C-3V3

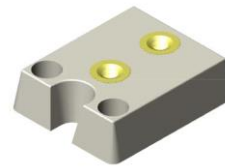
USB Digitizer Board (3.3VDC Power Supply)

- Video Inputs (multiplexed):
 - 1x composite video, 1x S-video
 - Video formats: NTSC/EIA, PAL/CCIR
- Video Output:
 - USB 2.0, uncompressed image data streams
 - Max resolution (NTSC/ EIA): 704 x 480 at 30Hz
 - Max resolution (PAL/ CCIR): 768 x 576 at 25Hz
- Power input USB 2.0, 5VDC
- Power throughput 3.3VDC up to 200mA for powering camera boards such as 20B45 series

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4. Mounting Methods

The cameras (**20K758USB-C-1** and **24C7.38USB**) are fitted with a ¼-twenty screw thread so that any common tripod can be used.

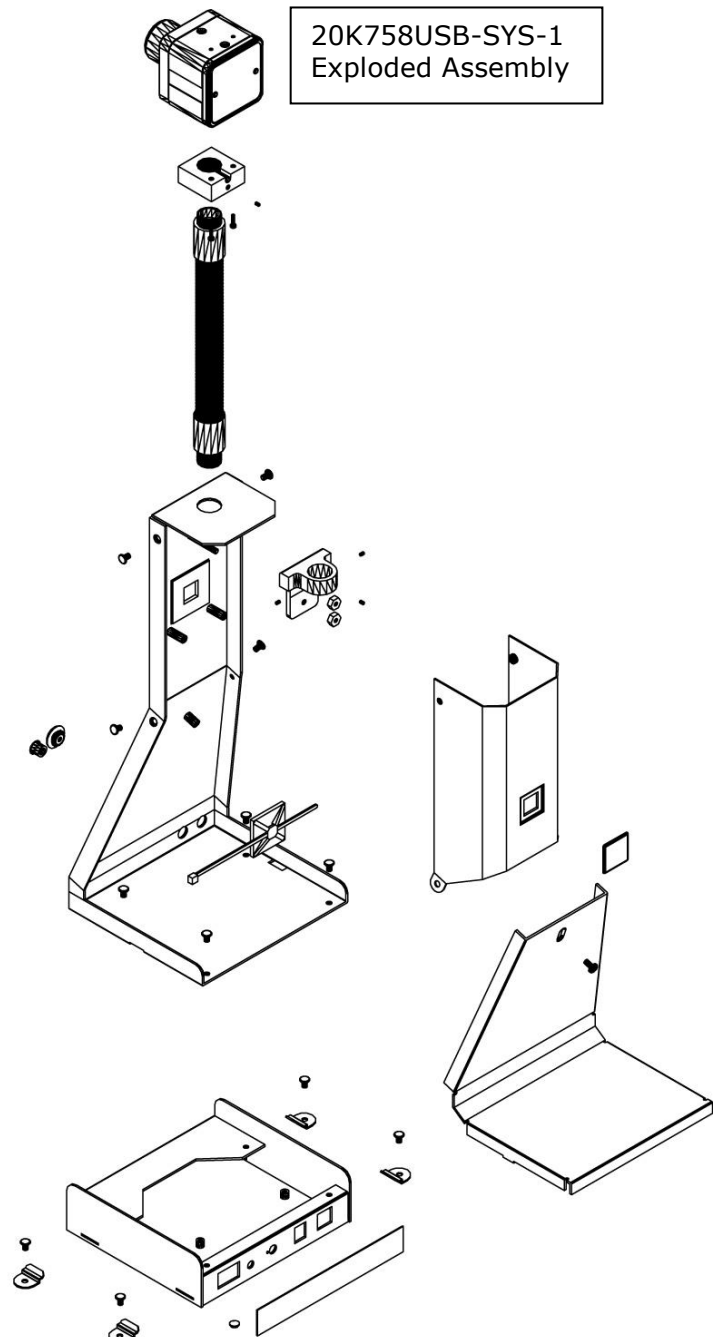


¼-twenty mount

The **20K758USB-SYS-1** has a unique stand that integrates the camera with a stand that can withstand a 40 degree tilt and still stabilize upright. The camera cannot disassemble from the stand, as it is totally integrated with cabling that threads within the assembly.

The cable neatly emerges from the base of the stand (eliminating the potential to entwine around a tripod's legs or to pull the camera down if accidentally twisted).

Tabs are provided to attach the base of the stand to a table, thereby fully immobilizing the stand.



5. Minimum System Requirements

A PC with USB 2.0 compatible port.

MAC is not supported.

USB 1.1 is not supported.

Preview only

- PIII- 1.1GHz or above
- 128MB of RAM (256MB preferred)
- Windows XP/2000 for USB2.0
- DirectX/DirectShow 9.0c or later
- Windows XP Service Pack 1 (Service Pack 2 Preferred) Windows 2000 Service Pack 4

Preview and capture at the same time

- Full D1 MPEG 2 - P4 – 2.4GHz or above
- 640 x 480 MPEG 2 - P4 – 2.0GHz or above
- 352 x 288 MPEG1 - P4 – 1.5GHz or above
- Hard Disk - 5400RPM or above (**7200RPM preferred**)
- 128MB of RAM (**256MB preferred**)
- Windows XP/2000 for USB2.0
- DirectX/DirectShow 9.0c or later
- Windows XP Service Pack 1 (Service Pack 2 Preferred) Windows 2000 Service Pack 4

Verify system has the latest USB 2.0 host driver from Microsoft® only.

Verify that USB host controller chipset is Microsoft certified.

This product is not guaranteed to operate with a USB 2.0 host driver or application from OWC (Other World Computing).

6. Viewer and USB Driver Installation

Note: SFT-07019-WHQL WDM device drivers are Microsoft® digitally certified

Please install the software first.
Do not connect the camera to the computer before installing the software.

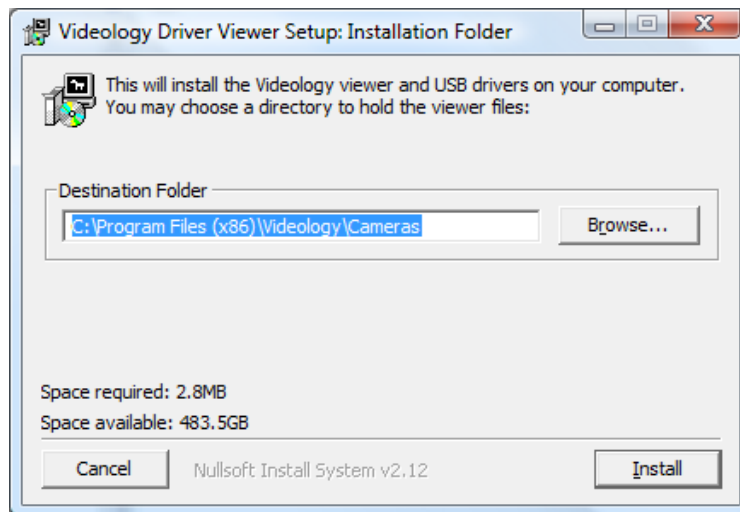
Note: If you have a previous version of the Videology USB camera software installed on your computer, you should first remove this. To remove an older version, go to Start and select all programs, Find the Videology Cameras folder and select the Uninstall Viewer option.

6.1. Viewer Installation (All Models)

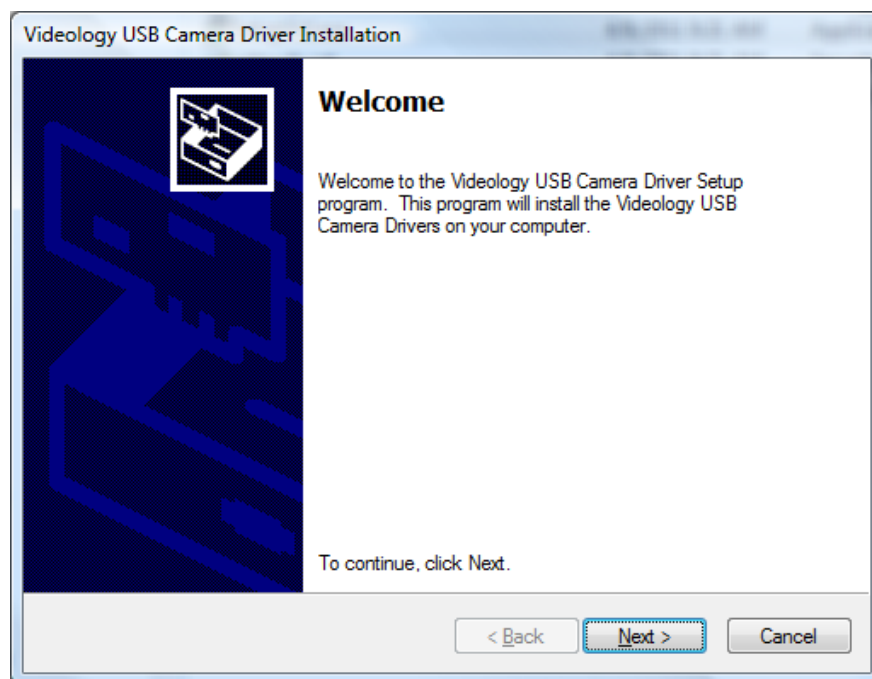
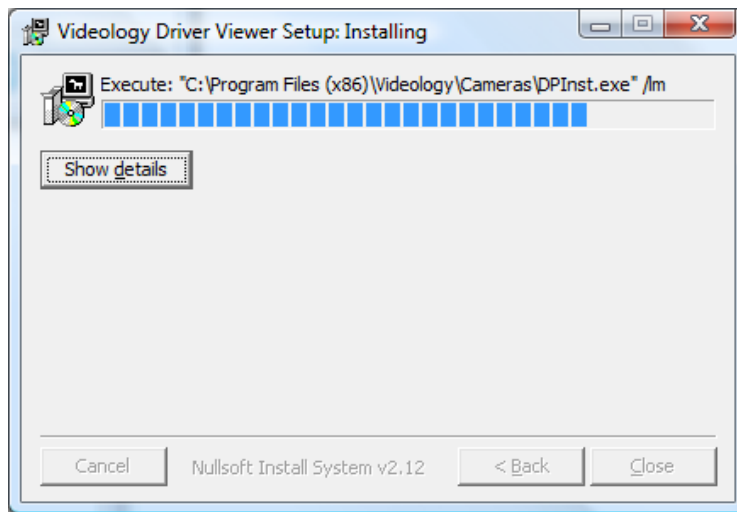
Insert the CD labeled **USB Viewer Software** (SFT-07019 or SFT-07019-WHQL). Click the executable file named **SetupVid.exe**.

Videology's viewer software automatically checks which operating system is running and loads the appropriate drivers (32bit or 64bit).

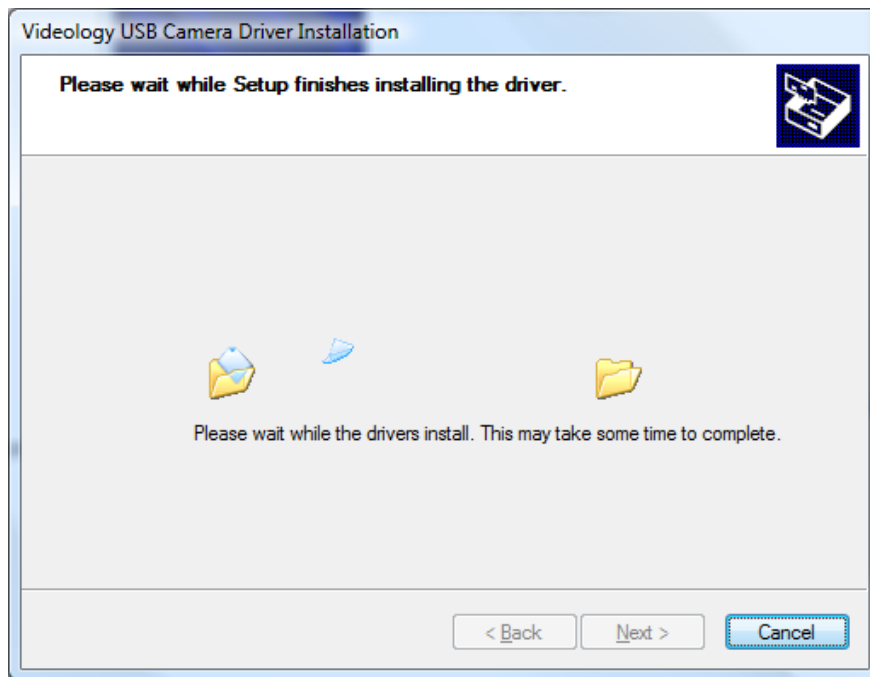
The following screen will appear:



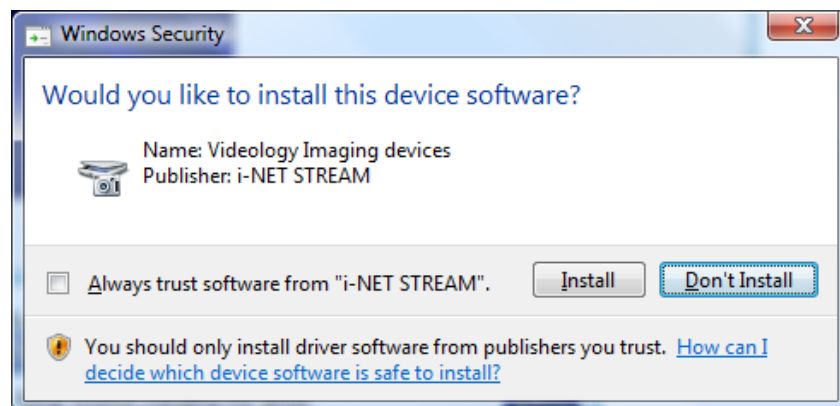
If you wish to install the viewer in a location other than the default directories, click on the **Browse** button and specify the desired location, otherwise click on the **Install** Button and the following screens will appear:



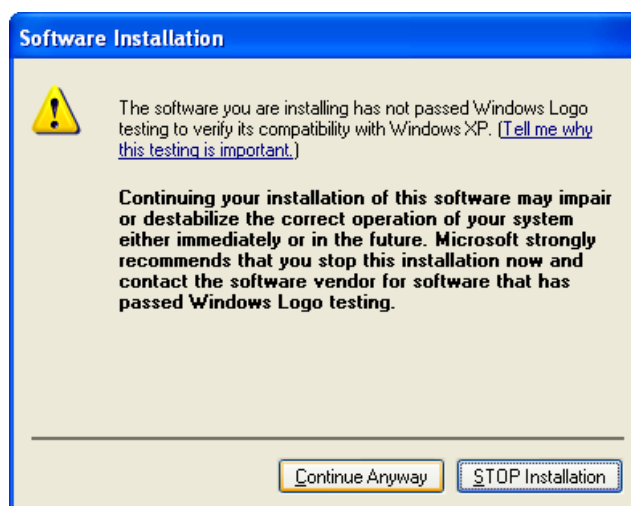
Click **Next** to continue.



Next, the Windows Security window opens informing that the WDM device drivers are Microsoft® digitally certified. Depending on the software version one of these windows will open:

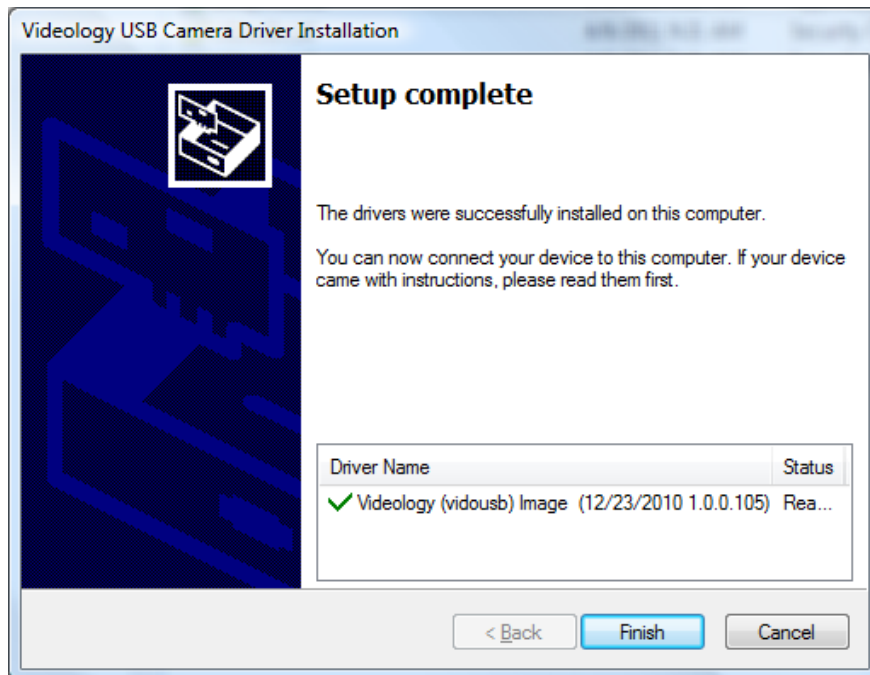
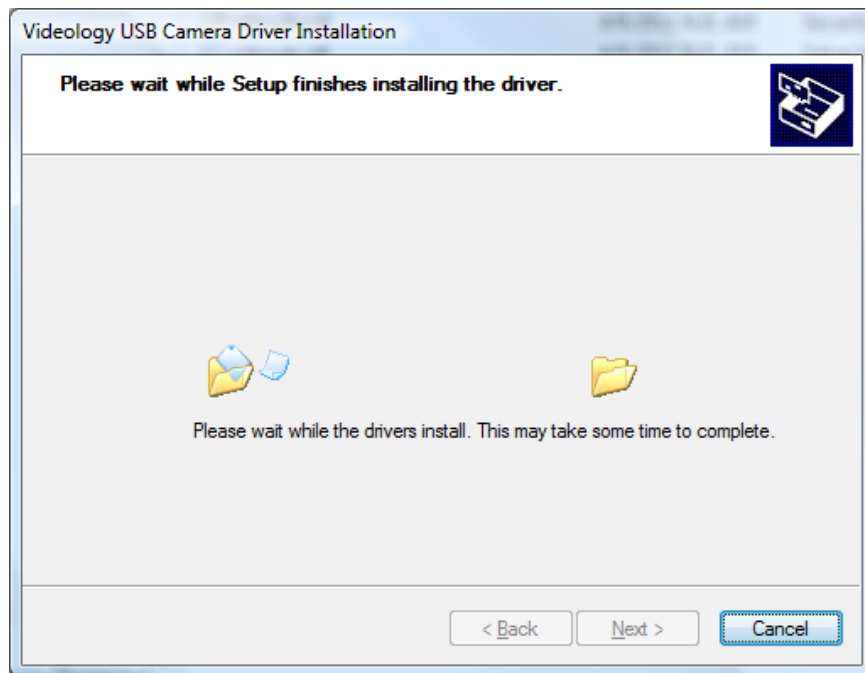


SFT-07019-WHQL

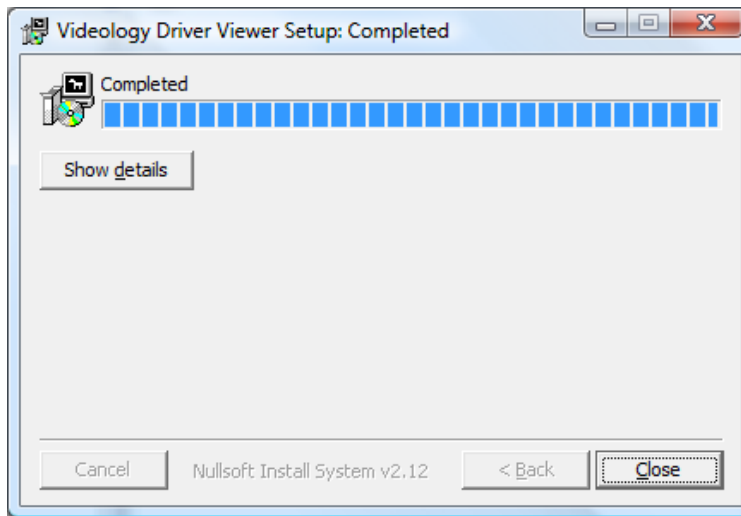


SFT-07019

Click **Install** or **Continue Anyway**.



The driver and viewer installation is now complete. Click **Finish**.



Click **Close** to exit the hardware wizard.

You can now connect the Videology camera to your PC using any available USB port. When the camera is connected, your computer will report that a new USB device has been detected, and will proceed to install the driver. Each time the camera is connected to a different USB port, the driver will be installed, this will be done only once for each port.

Please refer to section 8 for launching the Videology viewer.

Note:

24C7.38USB-F Ensure that the cable connecting the camera to the flash module is connected at both ends, push the plugs in firmly to ensure a good connection.

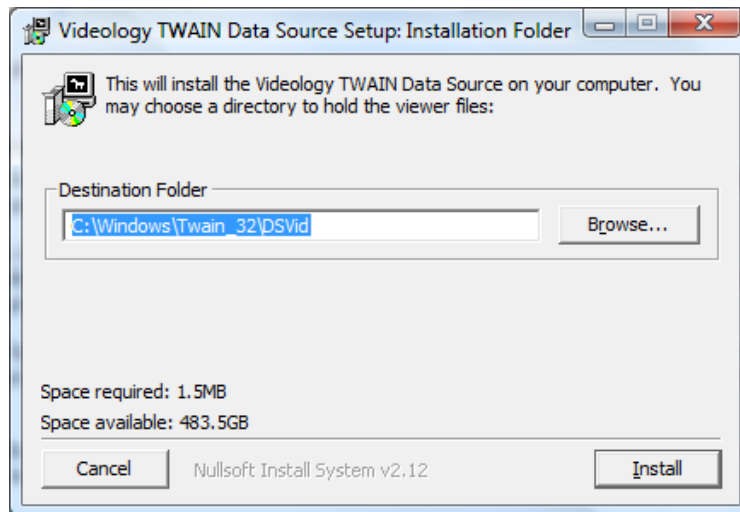
The camera is now ready for use.

7. TWAIN Installation

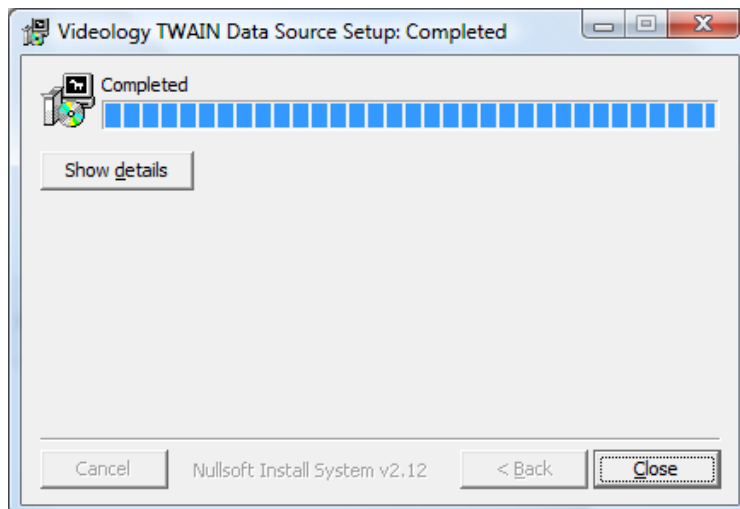
To install the TWAIN data source, insert the CD labeled **Twain Data Source** and double click the executable file named **SFT-10011 - TDS -Rev 2-1-18.exe**.

Note: the file name might be slightly different depending on the revision level of the software.

The following window will appear:



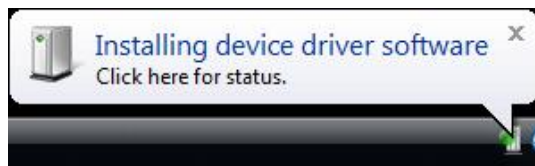
If the viewer is to be installed in a location other than the default directories, click on the **Browse** button and specify the desired location, otherwise click on the **Install** Button and the following screens will appear:



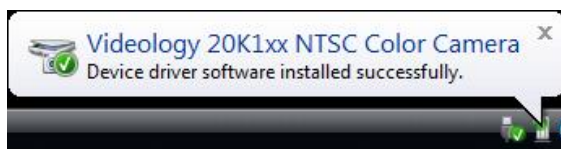
The TWAIN driver installation is now complete. Click **Close** to exit the hardware wizard.

8. Using the Videology Viewer

After software installation, plug in the USB cable from the camera. A window will pop up stating that Windows is installing the device drivers:



Upon completion a second window will state the driver software installed successfully:



NOTE: There is no auto focus feature in these cameras. Once camera is focused, the user can modify the settings.

For **20K1XXUSB-C-1 series** (USB board and box cameras)
see section 8.1

For **24B1.3XUSB-C** (monochrome 1.3 megapixel)
see section 8.2

For **24C1.3XUSB-C, 24C7.38USB-F** (color 1.3 megapixel)
see section 8.3

For **2XC21XW-USB**
see section 8.4

For **24C7.38USB-F**, ensure that the cable connecting the camera to the flash module is connected at both ends; push the plugs in firmly to ensure a good connection.

The camera is now ready for use.

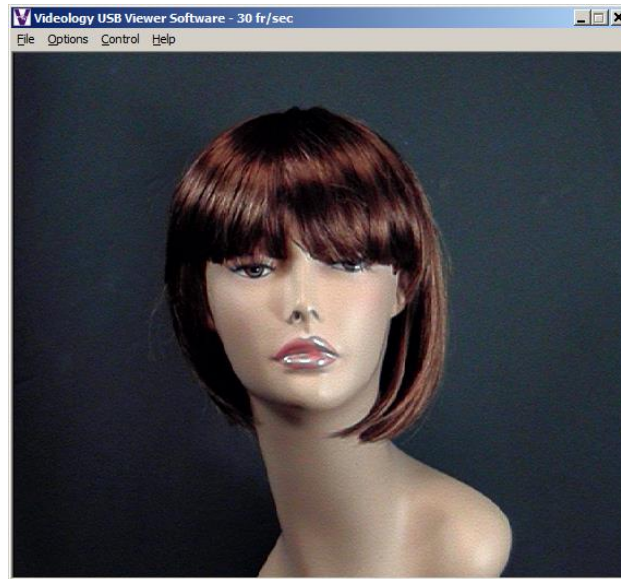
NOTE: 60V002USB-C

USB Digitizer Board will incorporate whichever viewer software is supplied with the camera. Please refer to the corresponding sections for that particular camera.

8.1. Using the Videology viewer with models 2XK1XXUSB-C-1

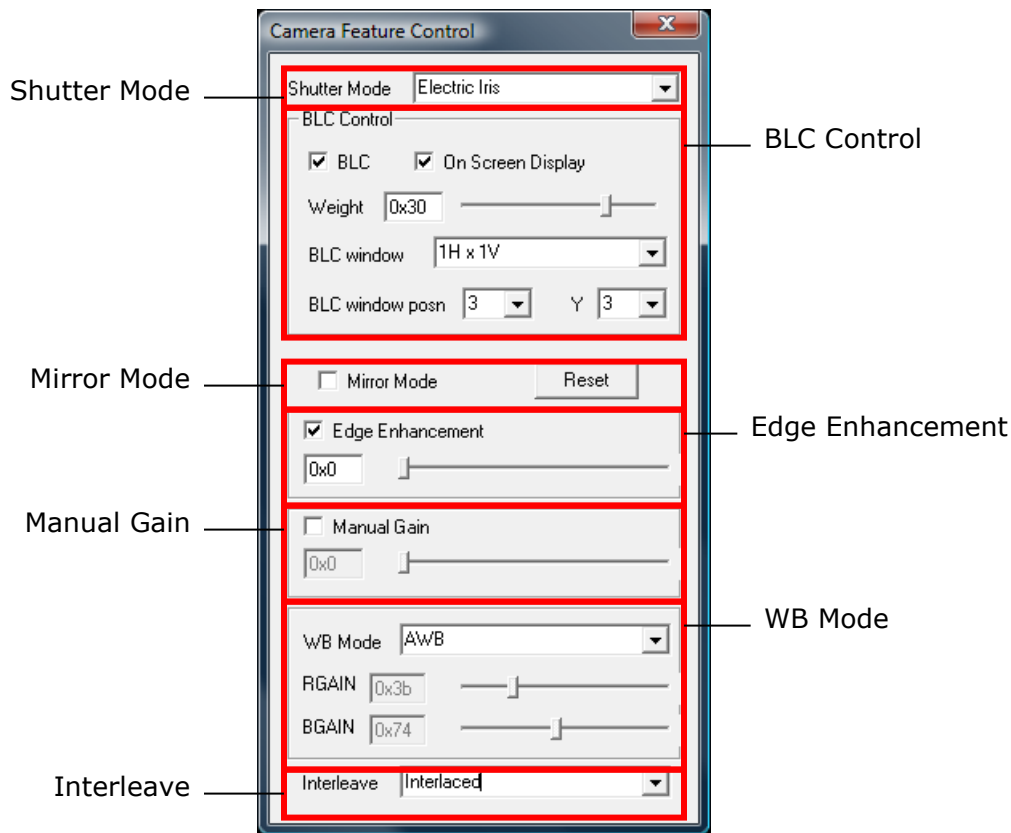
Please refer to section 6 **Viewer and USB Driver Installation** for viewer installation instructions.

To launch the viewer software, simply click on the Videology Icon on the Desktop. A window will appear displaying the camera image.



8.1.1. Using the Control Panel

Clicking on the **Control** option on the menu bar will display the control panel. The control panel can be used to make changes to the camera settings. The various control features are discussed in more detail in the following pages.



8.1.2. Shutter Mode

For this type of camera, the shutter speed refers to an electronic shutter, which determines the length of time over which charge is accumulated on the image sensor. There is no physical shutter.

In low-light conditions, a slow shutter speed (long integration time) is required in order to get a quality image. However, if there is significant motion in the scene, a slow shutter speed will result in significant blurring of the image, and a faster shutter speed will be needed to get a clear sharp image.

The shutter speed of Videology USB cameras can be varied from 1/50 second to 1/10000 second.

There is an automatic setting (Electric Iris), in which the shutter speed is adjusted automatically according to the overall light level.

There is also "flickerless" shutter speed, which is used to prevent fluctuations in image brightness when operating under fluorescent lighting.

8.1.3. Back Light Compensation (BLC Control)

Under normal lighting conditions, with the Electronic Iris control activated, the camera will automatically adjust the image brightness so that all parts of the image are visible.

However when the background illumination is very bright – for example, when someone is standing in front of a window – the shutter speed will automatically reduce which will cause the foreground image to appear darkened. Faces may appear as if in silhouette making it difficult to see any detail.

In this situation, Back Light Compensation (BLC) can be used to increase the brightness of certain parts of the image.

Back Light Compensation effectively limits the area of the screen in which the AGC operates, thus ensuring that details within the area will not be lost. As a consequence, regions of the image outside of the BLC area may become very bright and washed out.

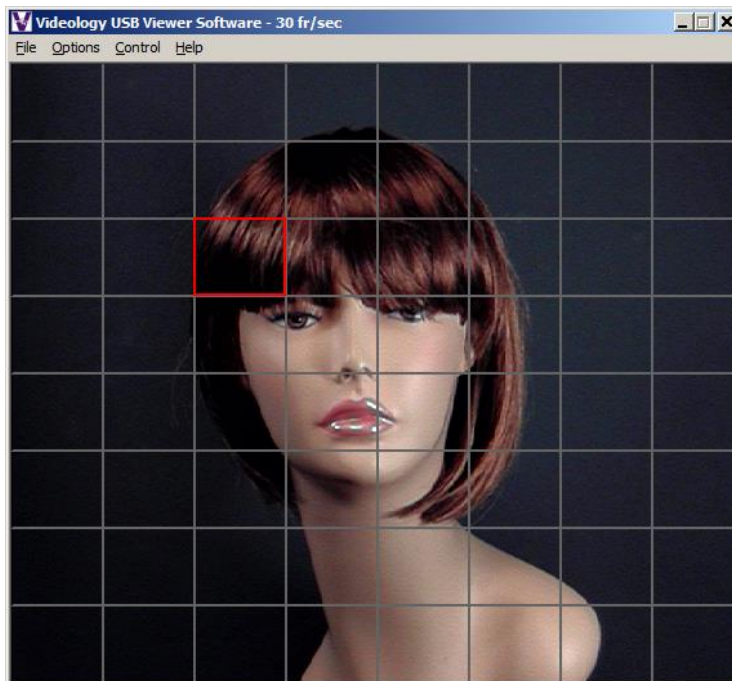
To enable BLC simply click on the **BLC** Check box.

To display and/or change the BLC area, click on the **On Screen Display** box.

An 8 x 8 grid will appear over the image with a red box drawn around the active BLC window. To move the BLC window, you can either drag it with the mouse, or enter the X and Y co-ordinates in the control panel.

The size of the BLC window can vary in both size and shape. The **BLC window** controls the size and the **BLC window posn** controls where the BLC area is within the grid.

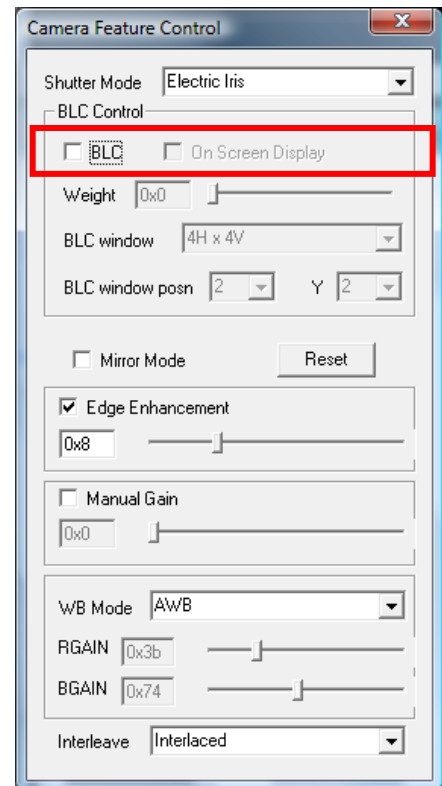
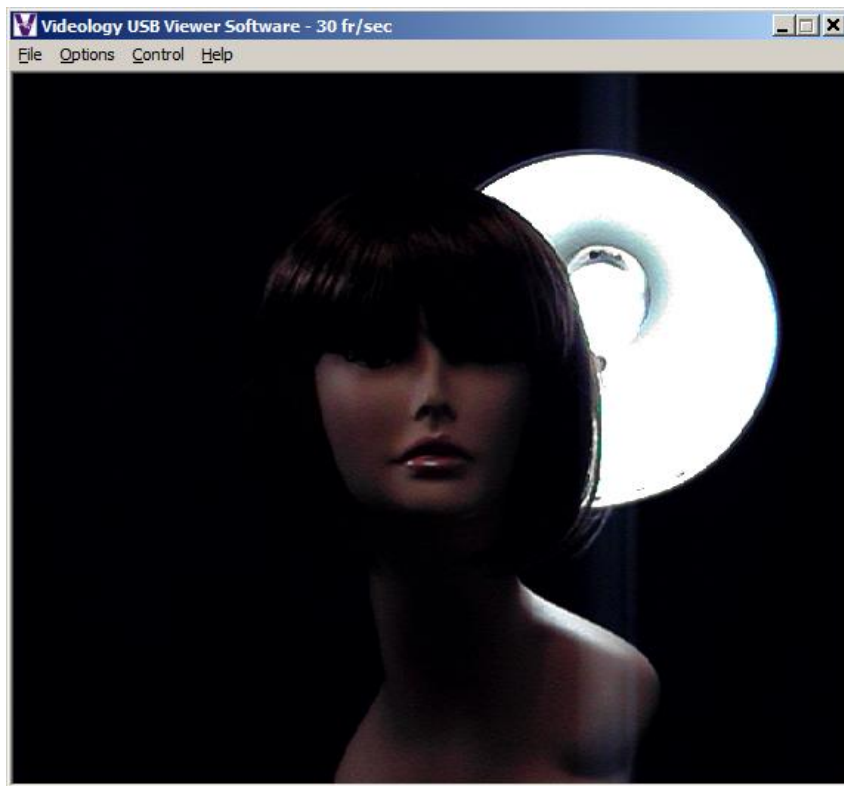
The level of BLC can be adjusted using the **WEIGHT** function on the BLC control panel.



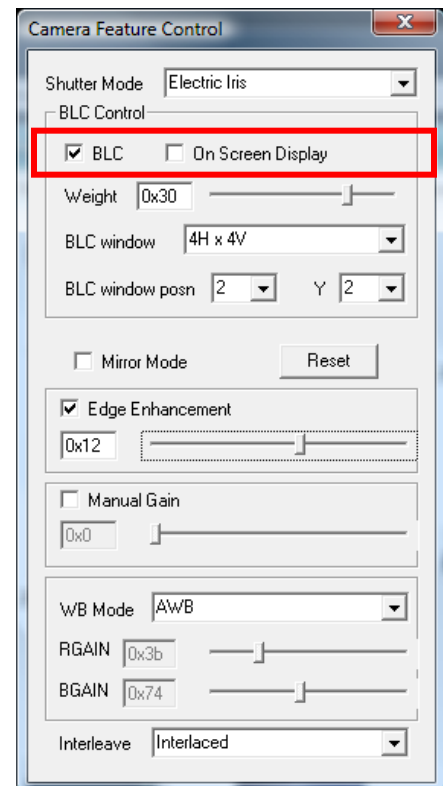
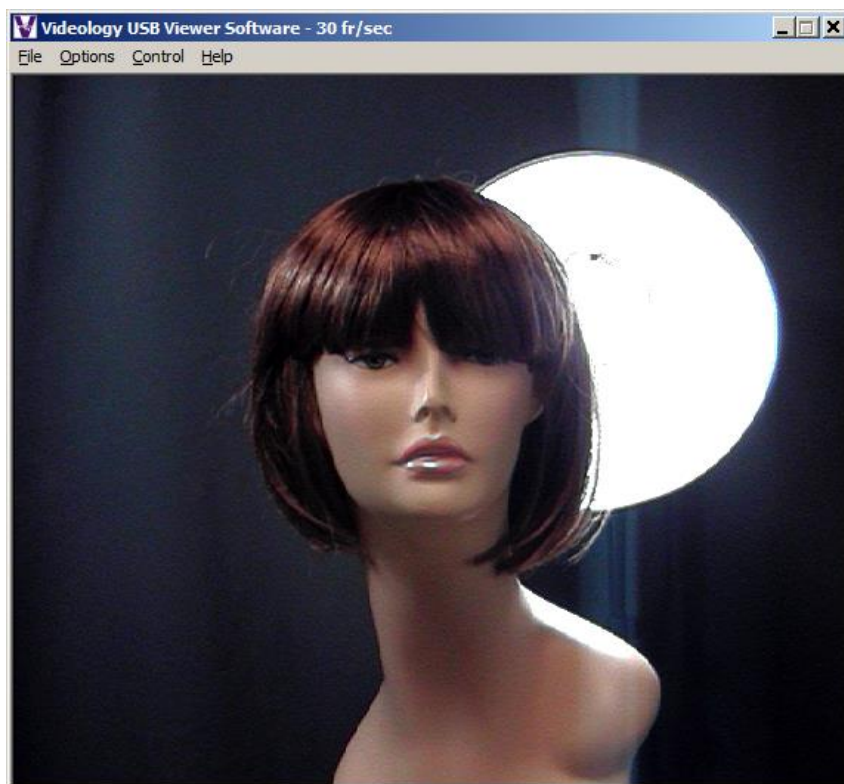
NOTE: Videology supplies the camera's default option in BLC with a center weighting.

BLC will only function when the shutter speed is set to "Electric Iris."

The effect of Back Light Compensation is shown in the following images.

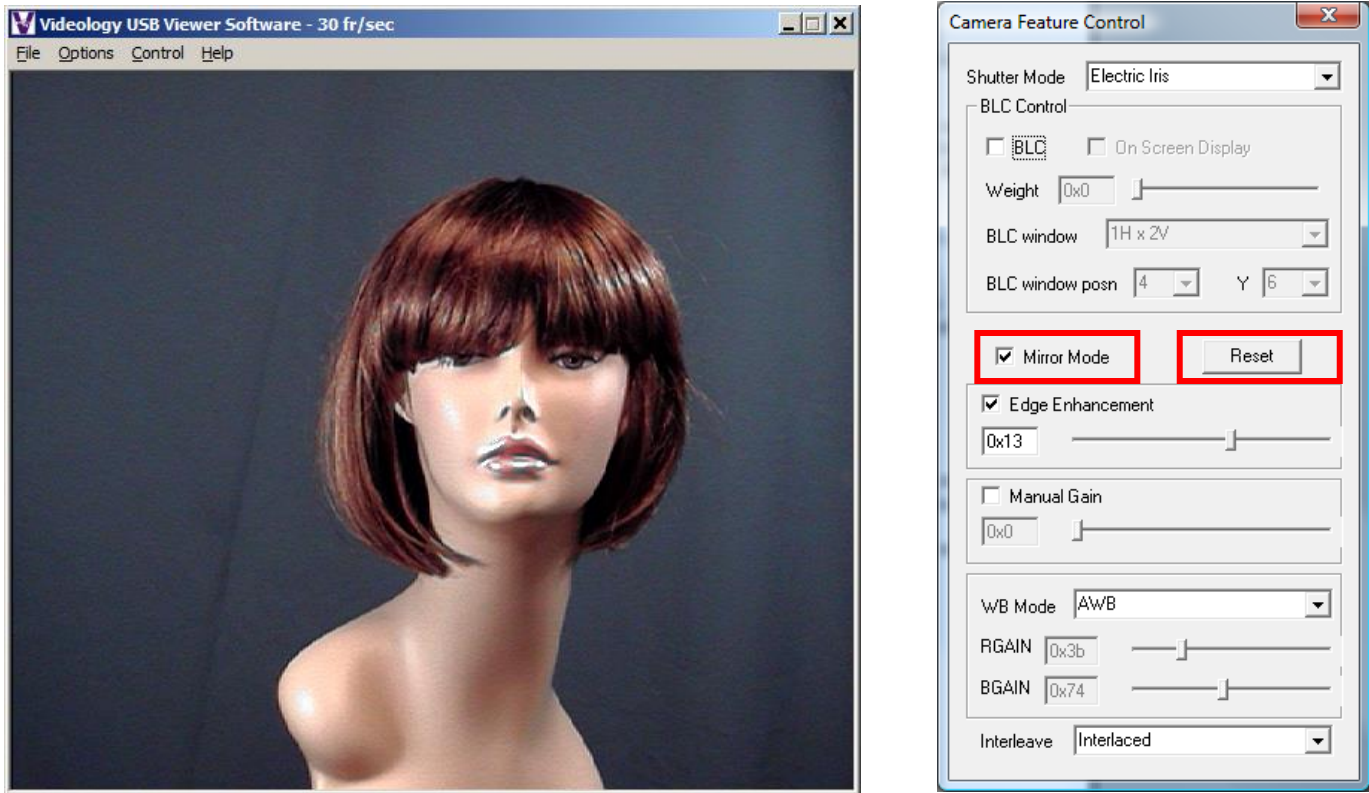


Back Light Compensation OFF (top image) and Back Light Compensation ON (Bottom Image).



8.1.4. Mirror Mode

The **mirror mode** option is simply used to provide a mirror inversion of the image. This feature is used when the camera is viewing the subject through a mirror.



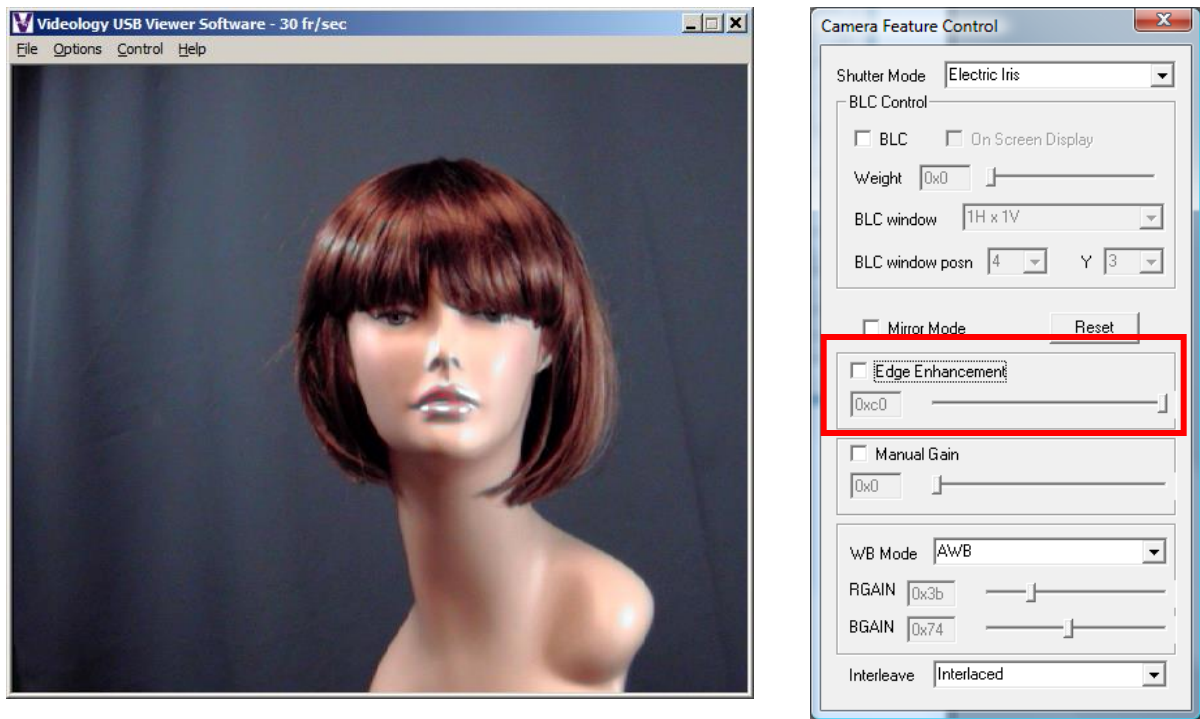
8.1.5. Reset

The **Reset** feature is used to restore all the settings to the factory default values.

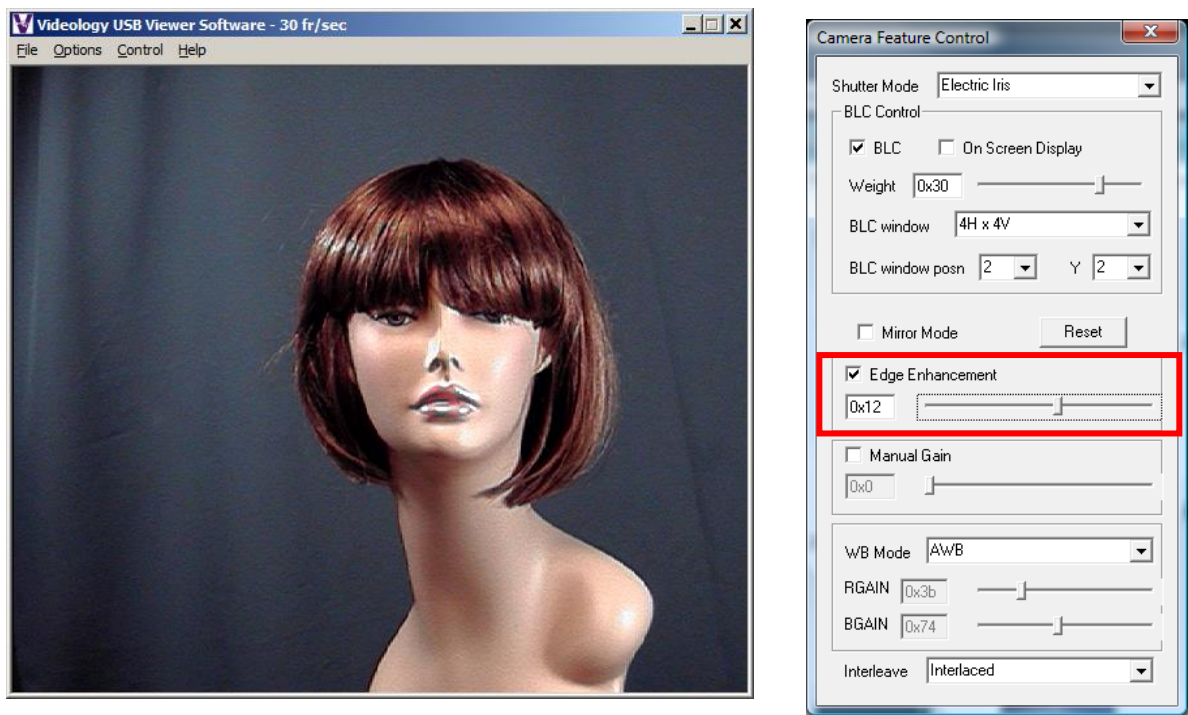
8.1.6. Edge Enhancement

Edge enhancement is used to make the edges of lines appear sharper and more distinct. It gives the appearance of increased resolution, but in reality the resolution is determined purely by the number of pixels, and is fixed.

The effect of edge enhancement is illustrated below.



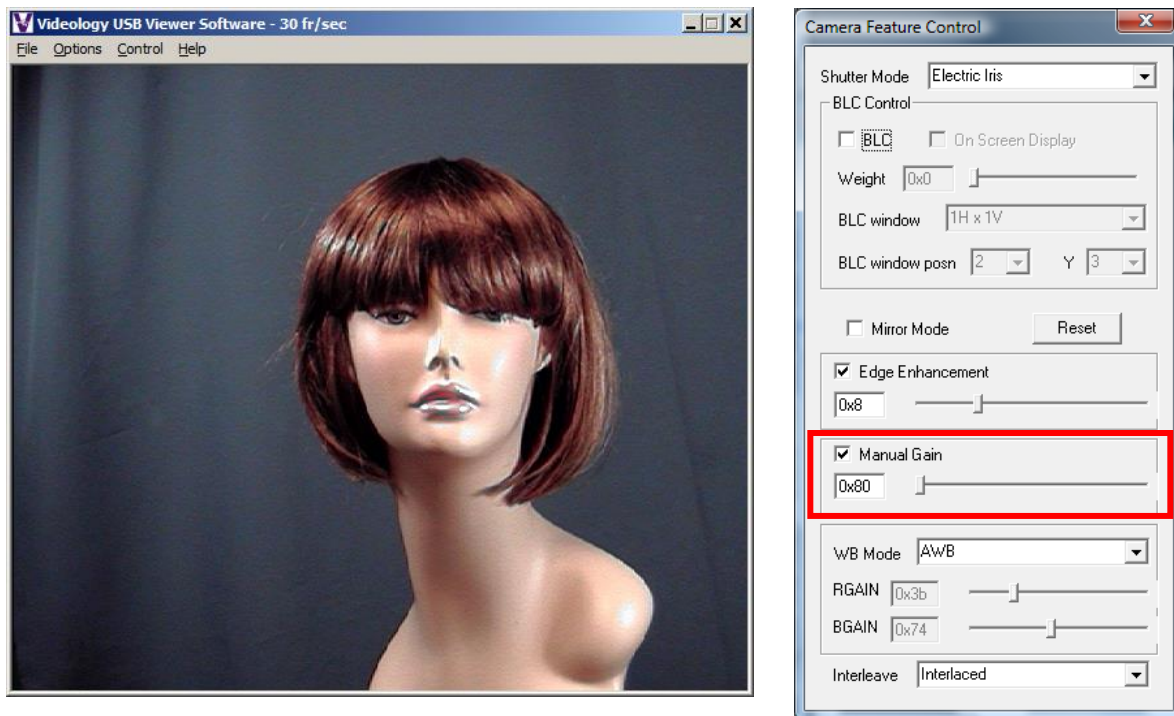
Edge Enhancement OFF (top image) and ON (bottom image)



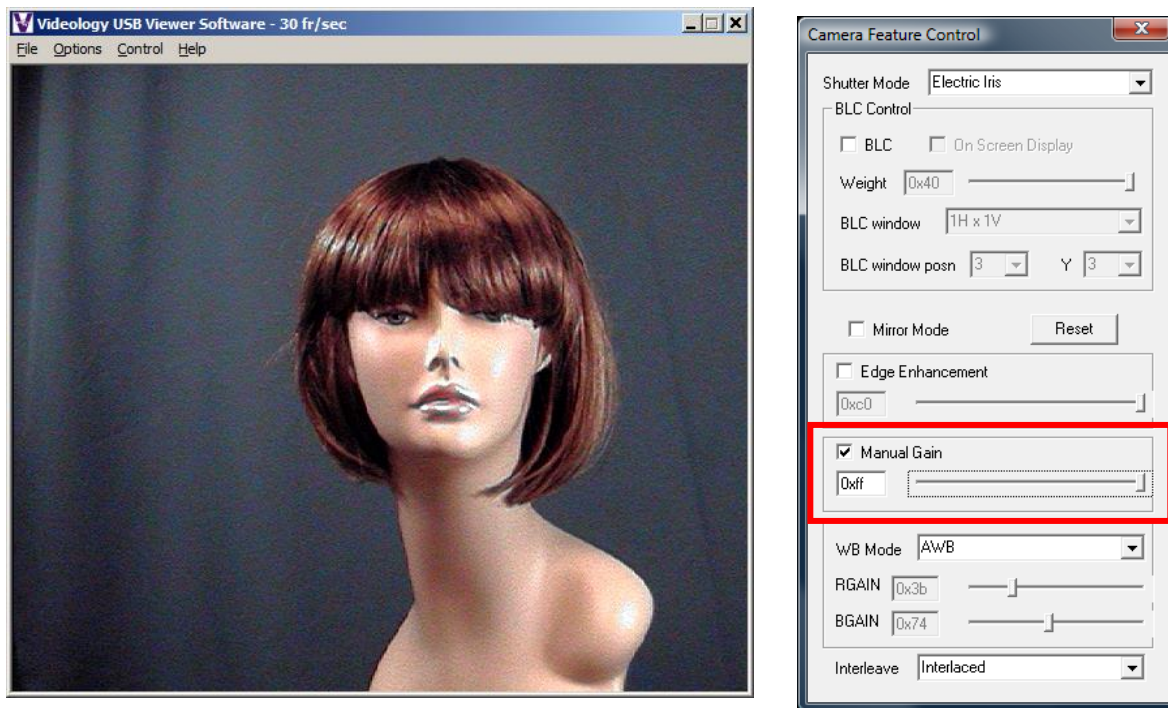
8.1.7. Manual Gain

Manual Gain provides a means of controlling the overall image brightness.

Gain can be set to automatic (unchecked), in which case the camera will automatically adjust to variation in illumination and subject matter or manual (checked) in which the user controls the variation in illumination and subject matter.



Gain Control low (top image) Gain Control high (bottom image)



8.1.8. White Balance (WB) Mode

Under varying lighting conditions, (sunlight, fluorescent lighting etc) the perceived color of objects will change. This is true for the human eye and also for the video camera.

The color spectrum of a light source varies according to its' temperature. A tungsten lamp for example operates at a relatively low temperature of about 2800K (~3000°C) whereas the sun has an equivalent color temperature of about 5500K (~5800°C).

We typically classify light sources by their "color temperature" which is a measure of the temperature of a perfect black body that would radiate light with the same spectral (color) content.

As the color temperature of a light source increases, the spectrum of the emitted light moves from red to blue. Thus a piece of white paper viewed under a tungsten lamp would have a slightly reddish hue, whereas when viewed under sunlight it would appear to be slightly blue by comparison.

Fluorescent lamps operate very differently from incandescent lamps, and can have color temperatures ranging from 3000K to 5000K.

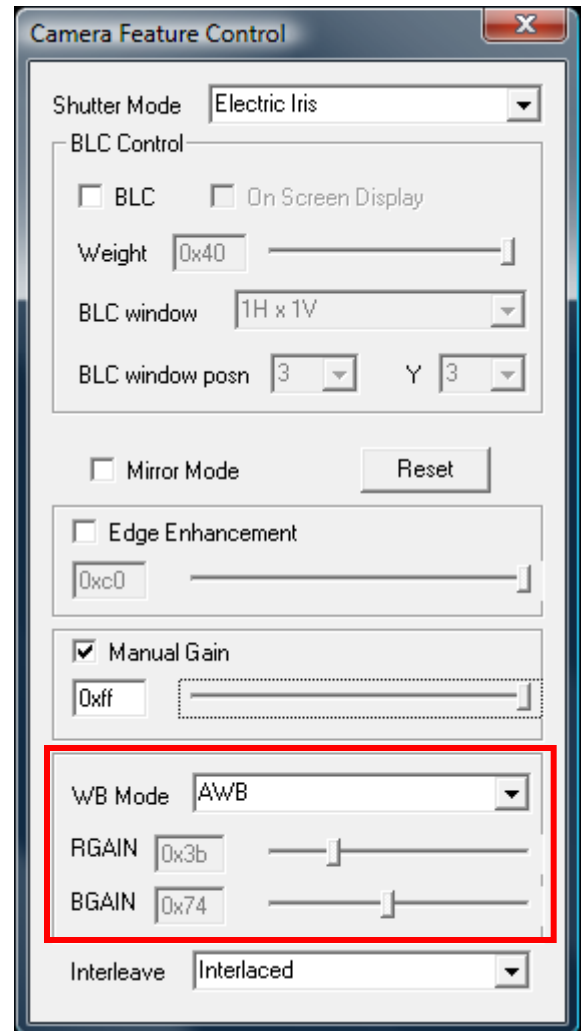
The White Balance control function is used to change the color settings within the camera so that white appears white.

There is an Automatic White Balance mode, in which the camera automatically adjusts according to the scene content.

In addition to the automatic white balance, there are three fixed white balance settings, WB mode1, WB mode2 and WB mode3.

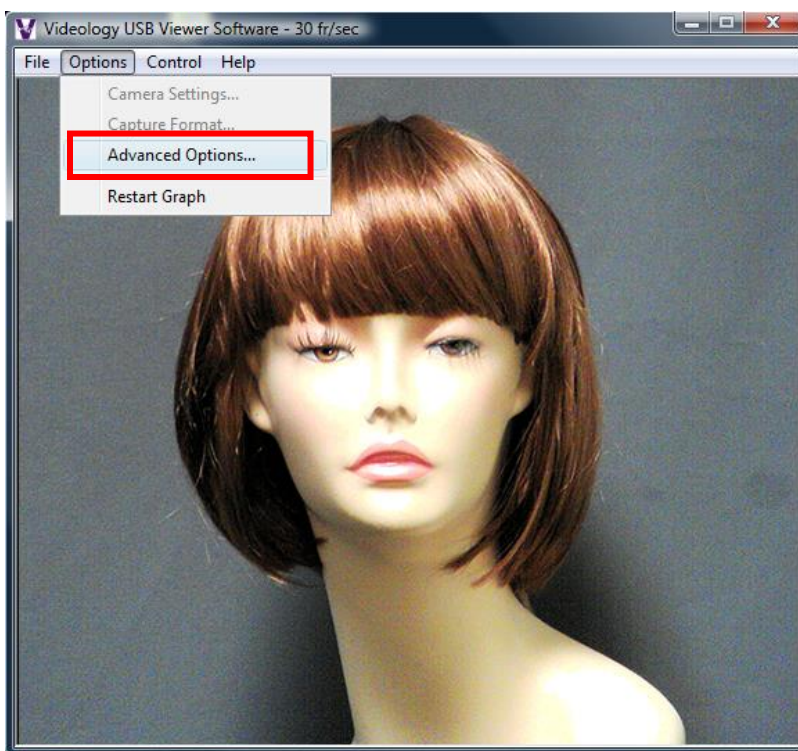
Mode 1 is user configurable, using the **Rgain** and **Bgain** controls within the control panel, and can be used to give the desired color reproduction under specific lighting conditions.

Modes 2 and 3 are preset for indoor (fluorescent lighting) and Outdoor (sunlight) use.



8.1.9. Advanced Options

Advanced Settings can be selected by **Options > Advanced Options...**



When Advanced Options is selected, the Advanced Options window is opened.

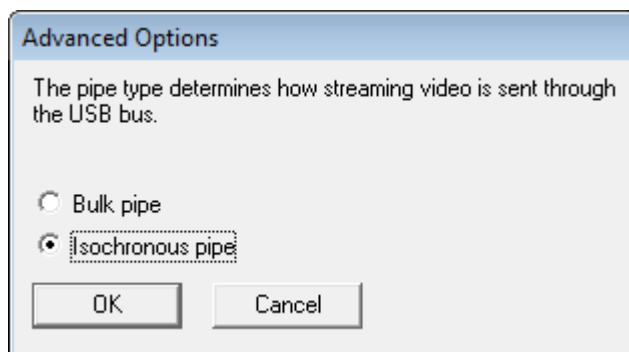


Figure 1. Advanced Properties Menu

8.1.9.1. Isochronous and Bulk transfer modes.

There are two basic transmission modes for data on the USB bus. These are referred to as Isochronous and Bulk Transfer.

Under the **Isochronous Transfer** mode a fixed bandwidth (up to a maximum of 40% of the total available) is assigned to the camera, ensuring a minimum speed of transmission. In this transfer mode, there is no error correction and any dropped data will not be re-transmitted. This mode is typically used for time sensitive data such as video and speech where there is little utility in repeating lost information.

Under the **Bulk Transfer** mode there is no fixed (upper or lower) limit to the available bandwidth, and data is simply transmitted whenever the bus is available. Bulk transfer includes error correction and dropped data packets, which are retransmitted.

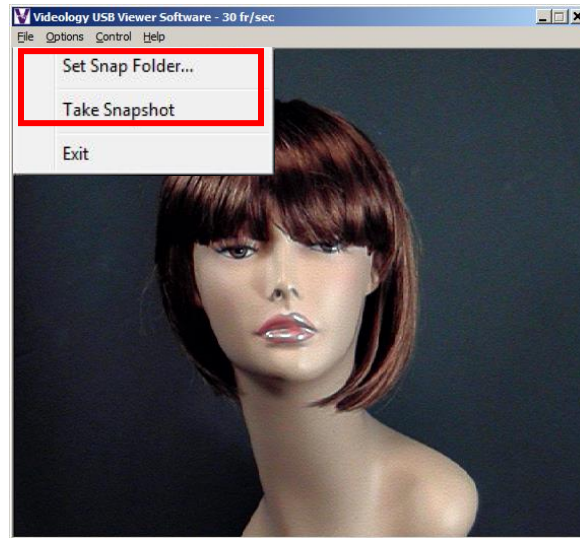
If multiple USB cameras are operated simultaneously, it is possible that the data rate from the camera will be reduced; resulting in a slower frame rate for the displayed image, and under this situation the isochronous display should be used.

If only one camera is being used, then the bulk transfer mode will probably provide the fastest display.

NOTE:

When changing the transfer mode from Isochronous to Bulk, it is necessary to close the application, unplug and reconnect the camera, and restart the application.

8.1.10. Still Image Capture (Snap Feature)

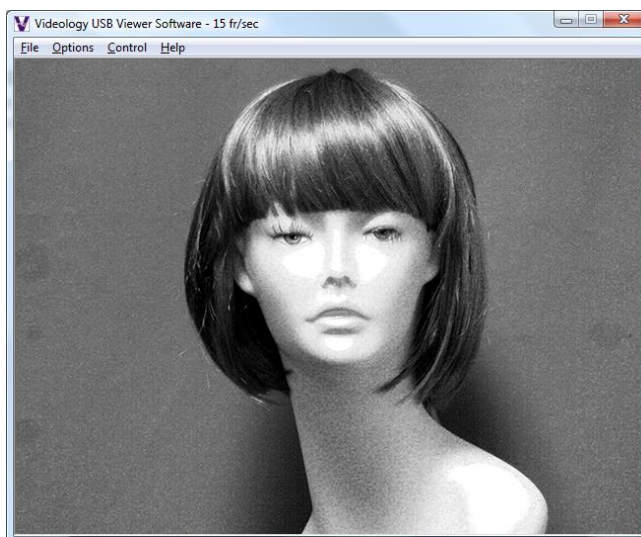


The Image Snap feature is located under the File menu and is used to acquire and store still images from the video display. The “**Set Snap Image Folder...**” button is used to change the location where snapshot images will be saved. The files are saved to the user’s desktop by default. The files are stored as Bitmap (BMP) files.

8.2. Using the Videology viewer with model 24B1.3XUSB-C

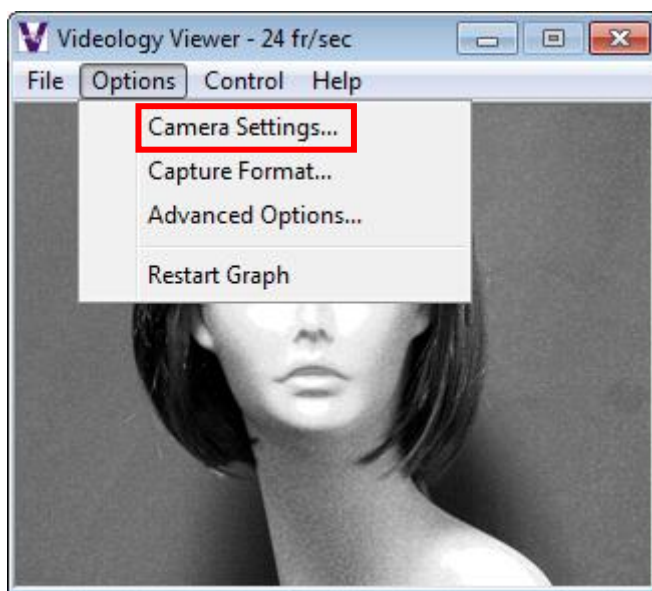
Please refer to section 6 **Viewer and USB Driver Installation** for viewer installation instructions.

To launch the viewer software, simply click on the Videology Icon on the Desktop. A window will appear displaying the camera image.



8.2.1. Camera Settings

The Camera Settings (gain, shutter speed etc.) can be selected via **Options > Camera Settings...**



8.2.1.1. Video Capture Filter Properties

When Camera Settings is selected, the Video Capture Filter Properties window is opened.

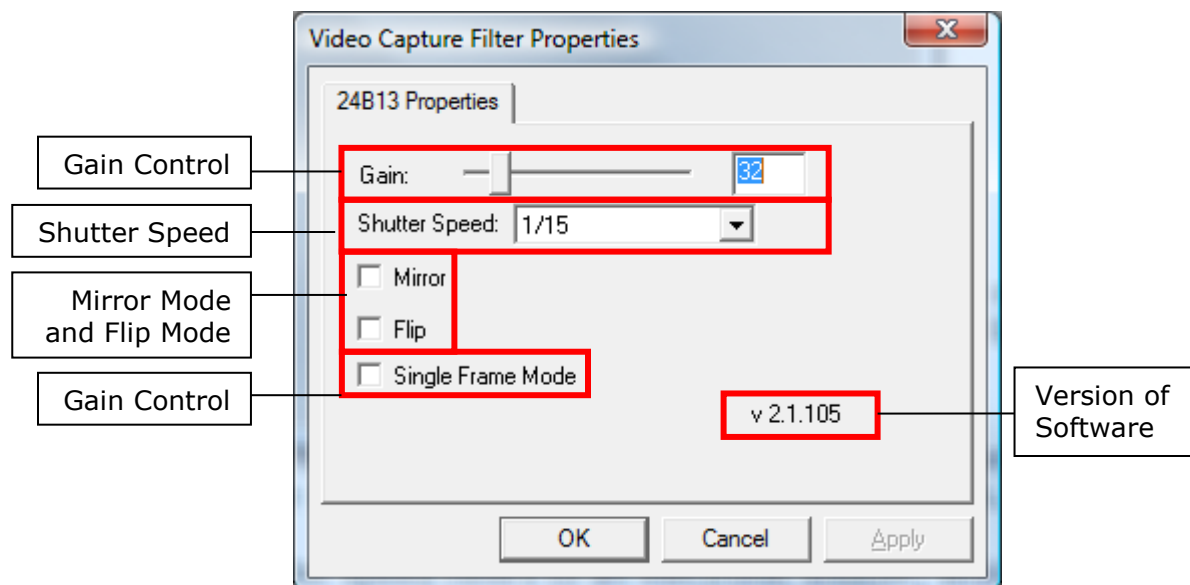


Figure 2. Video Capture Filter Properties

8.2.1.2. Gain Control

The gain control is used to vary the image contrast. To alter the gain, simply move the slider control and click on the Apply button on the bottom right corner of the box.

8.2.1.3. Shutter Speed and Frame Rate

The camera's shutter speed is analogous to the shutter speed of a conventional camera, although for a solid state imager there is no physical shutter. For this type of camera, shutter speed refers to an electronic shutter, which determines the length of time over which charge is accumulated on the image sensor.

In low light conditions, a slow shutter speed (long integration time) is required in order to get a good quality image.

Shutter speed for the 24B1.3XUSB-C camera can be varied from 0.6 second to 1/5000 second. The camera utilizes a rolling shutter, which operates in a fashion similar to a focal plane shutter on a conventional camera.

With this type of shutter, different parts of the sensor are exposed at different times, which can result in distortion of moving objects.

Note: Faster shutter speeds should not be used when operating the camera under fluorescent lighting. The intensity of the light varies at the AC line frequency (60Hz) and causes dark bands to appear across the image.

On all solid state cameras, the period of time over which the pixels are actively collecting light and converting it to charge is referred to as the integration time. (This is analogous to the shutter speed of a conventional camera).

For most CCD cameras, all pixels are exposed for the duration of the integration time (this is like a simple full frame shutter that opens and closes to expose the entire sensor).

Most CMOS sensors however employ what is known as a rolling shutter, in which only a band of pixels are exposed at any instant of time. This is just like the focal plane shutter of more expensive conventional cameras.

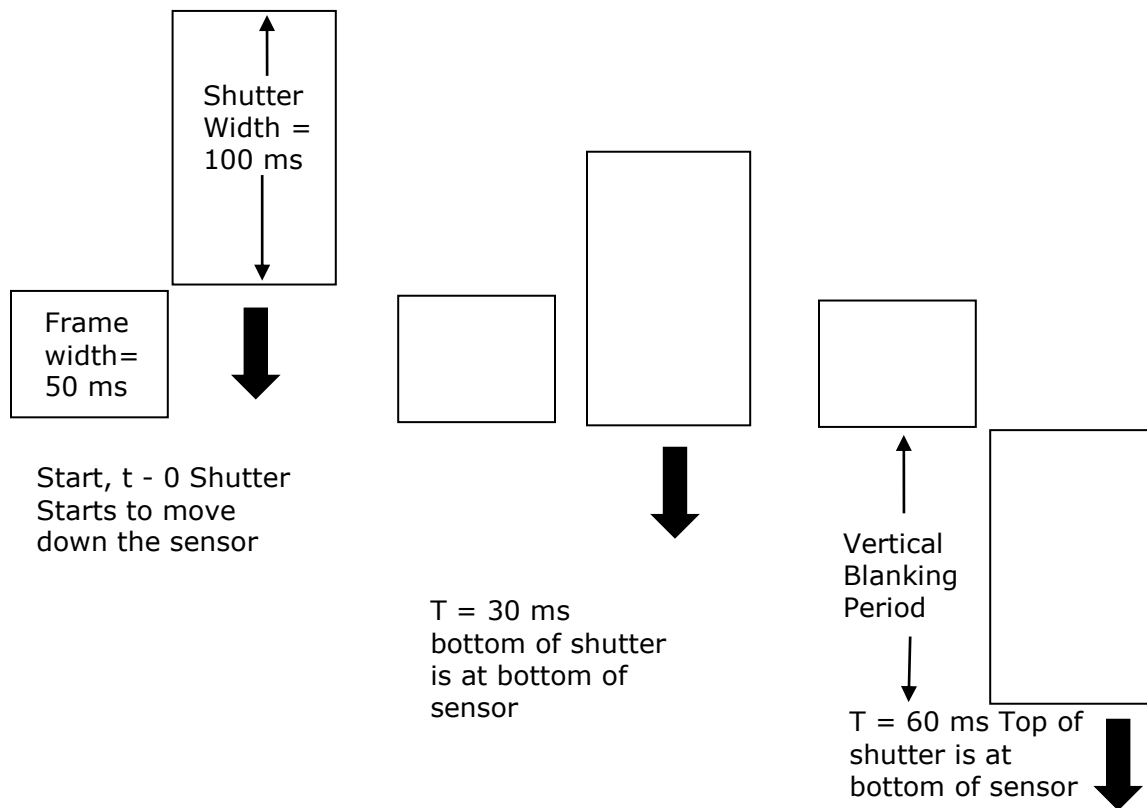
In this case the integration time is determined by the width of the moving band, which starts from the top of the sensor and works its way down.



Now it is possible for the integration time to exceed the frame period. When this happens the vertical blanking period is extended to accommodate the extra time. The frame rate will be slower, but the frame period will remain the same.

This is illustrated on the following page.

Basically the Rolling shutter begins "moving" on the trailing edge of the V sync Pulse.



In the example shown the frame period is 50 ms, and the integration time is 100 ms. You can see that this has the effect of increasing the vertical blanking by 50 ms and so it slows the frame rate down.

So for your application where you want to limit the LED "On time to 25 ms. I would recommend that you do the following.

The frame rate of the camera is about 20 fps at full resolution.

This corresponds to 50 ms frame time.

Set the shutter speed to 2/15 sec (~ 130 ms).

Trigger the camera and wait for about 50 ms. Then turn on the LEDs for 25 msec

This will ensure that all pixels are active while the LED is on.

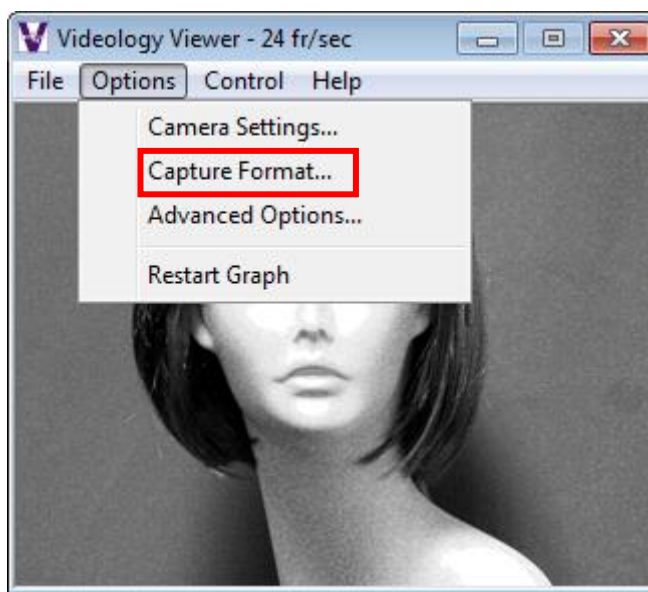
After the 130 ms you will get a single frame of video.

8.2.1.4. Mirror and Flip Mode

The Mirror and Flip options are used to create images which are mirrored about the Vertical and Horizontal axis respectively.

8.2.2. Capture Format

Capture Format can be selected by **Options > Capture Format...**



8.2.2.1. Video Capture Pin Properties

When Capture Format is selected, the Video Capture Pin Properties window is opened.

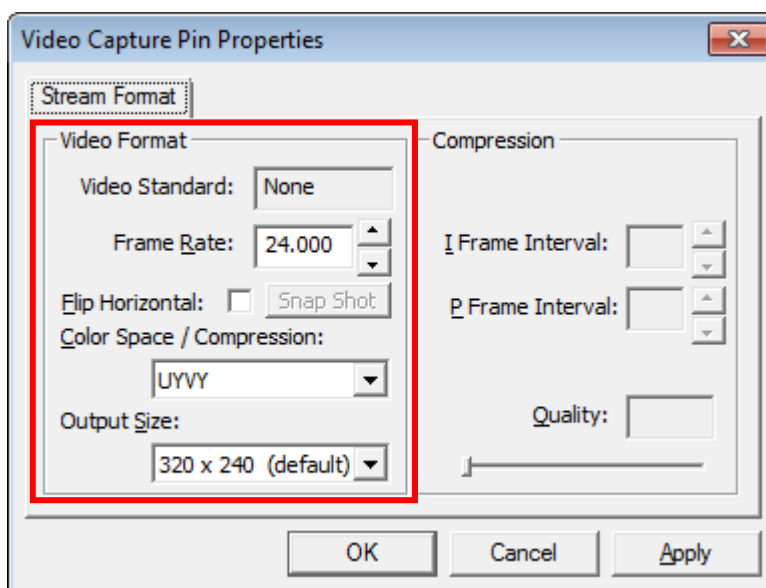


Figure 3. Video Capture Pin Properties

Frame Rate

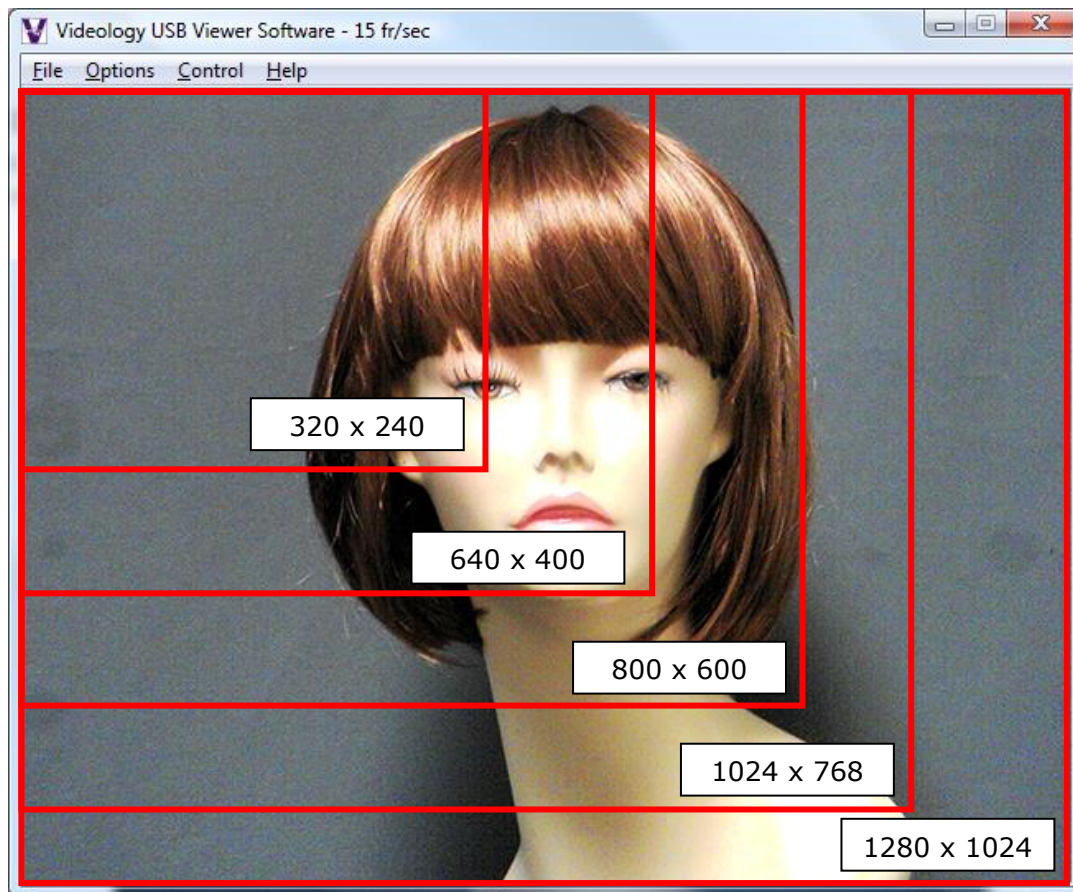
The Frame rate will vary depending upon the screen resolution.

Color Space/Compression

The Color Space/Compression is fixed to UYVY and cannot be varied.

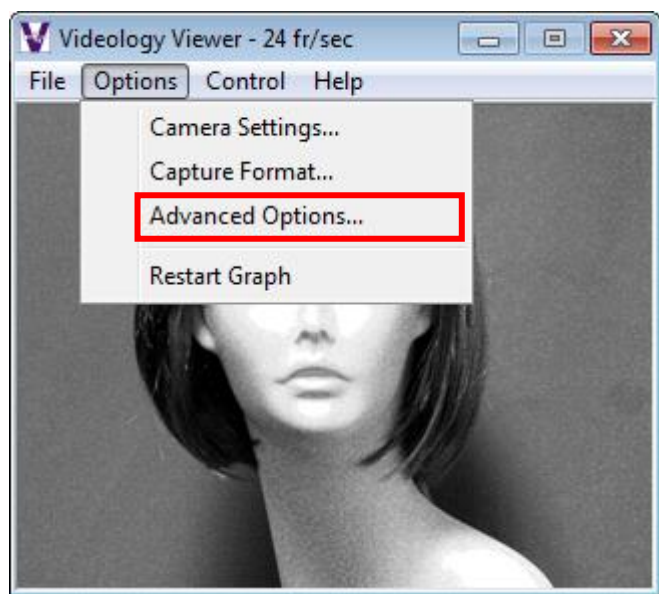
Resolution (pixels)	Maximum Frame rate
1280 x 1024	8 fps
1024 x 768	12 fps
800 x 600	20 fps
640 x 480	30 fps
320 x 240 (default)	60 fps

Table 1 Maximum Frame Rate for various screen resolutions.



8.2.3. Advanced Options

Advanced Settings can be selected by **Options > Advanced Options...**



When Advanced Options is selected, the Advanced Options window is opened.

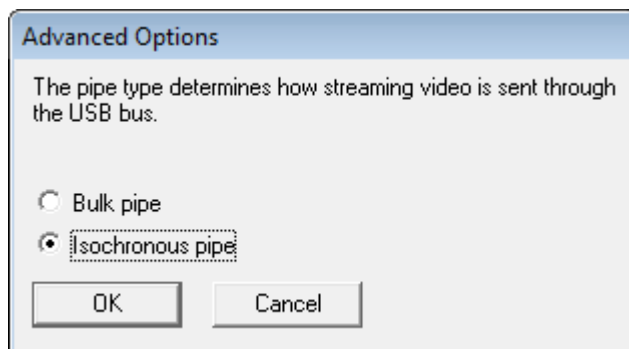


Figure 4. Advanced Properties Menu

8.2.3.1. Isochronous and Bulk transfer modes.

There are two basic transmission modes for data on the USB bus. These are referred to as Isochronous and Bulk Transfer.

Under the **Isochronous Transfer** mode a fixed bandwidth (up to a maximum of 40% of the total available) is assigned to the camera, ensuring a minimum speed of transmission. In this transfer mode, there is no error correction and any dropped data will not be re-transmitted. This mode is typically used for time sensitive data such as video and speech where there is little utility in repeating lost information.

Under the **Bulk Transfer** mode there is no fixed (upper or lower) limit to the available bandwidth, and data is simply transmitted whenever the bus is available. Bulk transfer includes error correction and dropped data packets, which are retransmitted.

If multiple USB cameras are operated simultaneously, it is possible that the data rate from the camera will be reduced; resulting in a slower frame rate for the displayed image, and under this situation the isochronous display should be used.

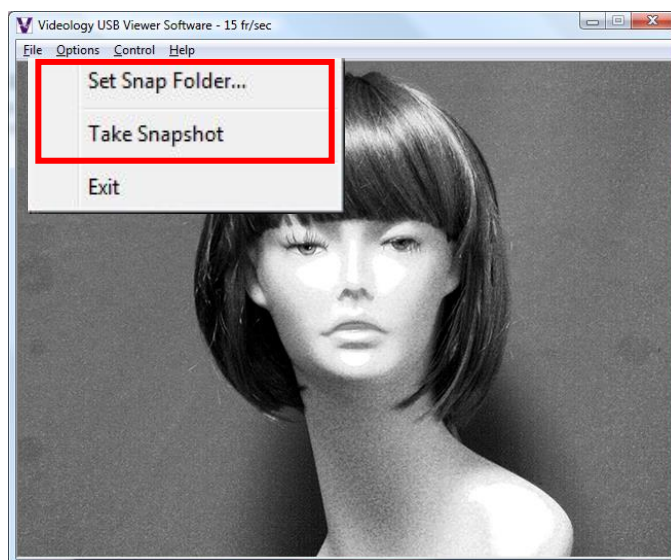
If only one camera is being used, then the bulk transfer mode will probably provide the fastest display.

NOTE: When changing the transfer mode from Isochronous to Bulk, it is necessary to close the application, unplug and reconnect the camera, and restart the application.

8.2.3.2. Still Image Capture (Snap Feature)/ V Sync. (24B1.3XUSB-V)

The camera features two still image “Snapshot modes”. In the first mode, the camera will deliver a single frame image in response to a trigger command. This option is ideal for capturing single, randomly timed events, such as moving bar codes.

In the second mode, using our 24B1.3XUSB-V, a single frame of video can be captured from the streaming video in response to a trigger signal. Using the Vertical Sync output signal, the trigger pulse can be synchronized with the start of each video frame. This feature is ideal for synchronizing the snapshot with a strobe light.



8.2.3.3. Acquiring a still image in Frame Grabber mode

In frame grabber mode, the still image can be captured by using the **Take Snapshot** option under the File Menu.

The “**Set Snap Image Folder...**” button is used to change the location where snapshot images will be saved. The files are saved to the user’s desktop by default. The files are stored as Bitmap (BMP) files.

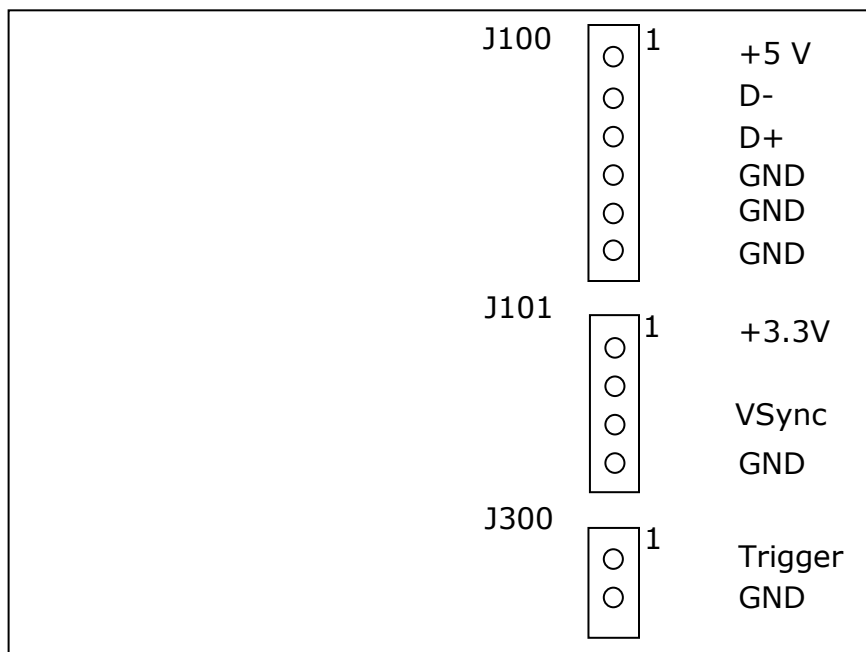
Filename = Still_DATE_TIME_NUMBER.bmp.

Alternatively, the image can be captured by putting a high level (3.3V) on pin 2 of connector J300 on the camera circuit board. This input is triggered by a Low to High transition of the pin, and holding the pin high will not result in multiple images.

Normally there will be some uncertainty as to which frame is acquired when the hardware trigger is used. If for example the trigger pulse is issued late within the vertical frame period of the camera, then there may be a latency of one frame before the still image is captured.

To overcome this uncertainty, it is possible to synchronize the hardware trigger with the Vertical sync signal of the camera. This feature is available on the 24B1.3XUSB-V camera only.

On this camera, a Vertical sync pulse is provided on pin 3 of J101 as shown.

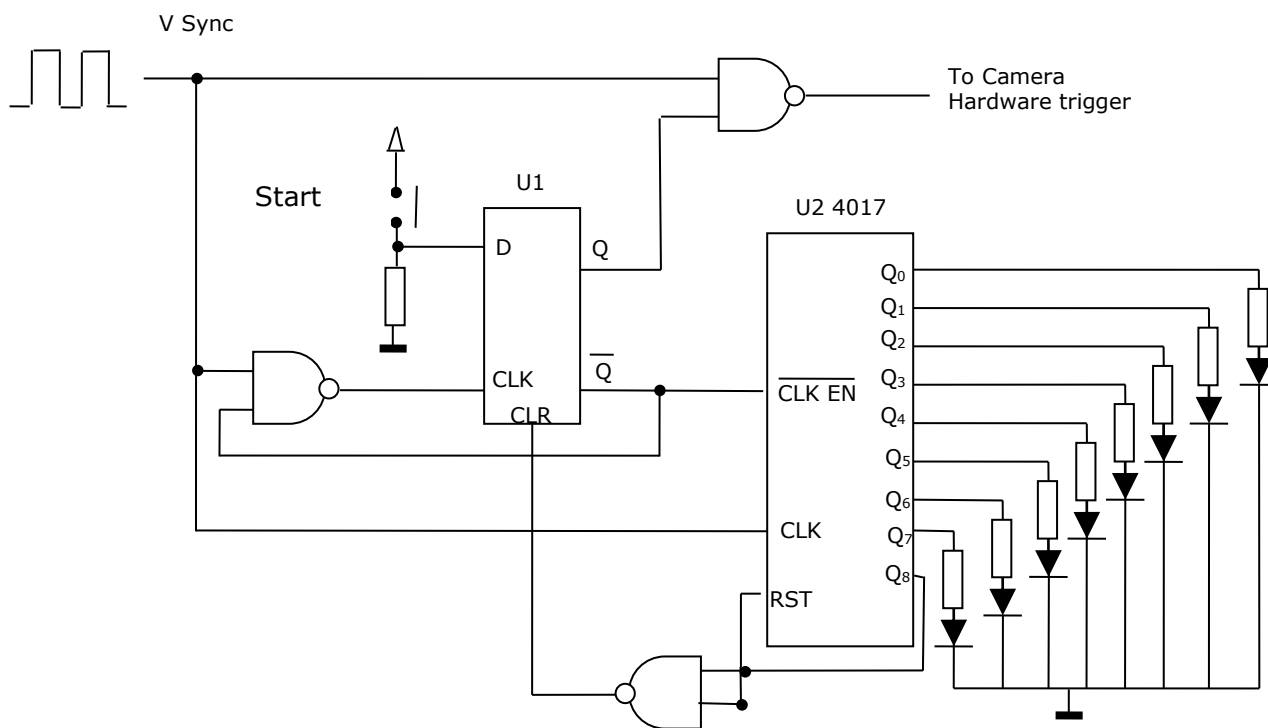


Connector Pin Outs for 24B1.3USB_V

8.2.3.4. Sample Circuit for Snapshot Synchronization.

Below is a simple circuit that can be used to synchronize the Hardware snapshot trigger with the vertical sync, so as to capture a sequence of 8 LEDs each of which is turned on for one full frame period. U1 is a D Type Flip Flop, U2 is a Decade counter with Decimal outputs.

Note that the hardware trigger needs to go low at the beginning of the frame in order to ensure that the frame is captured.



Circuit for Synchronizing Hardware Trigger with Vsync and LED Sequence.

8.2.4. Control

Control Option is inactive for the 1.3 Megapixel Cameras

8.2.5. Help (About Menu)

The Help feature states the properties of the software.

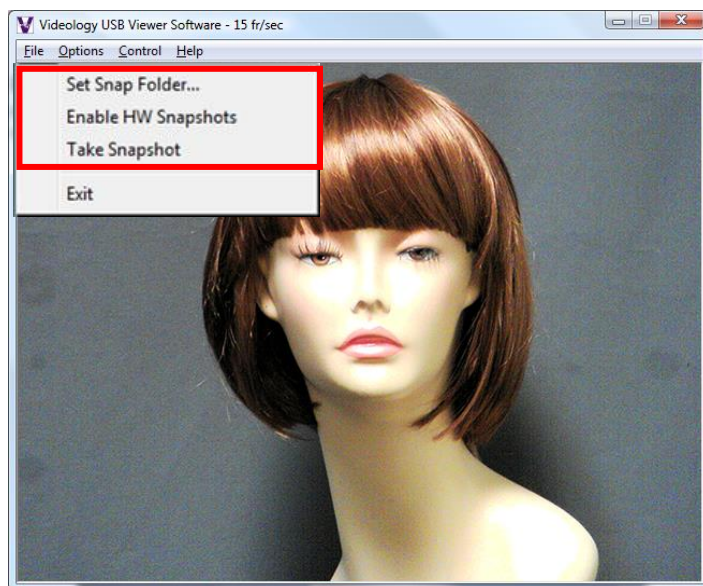


8.3. Using the Videology viewer with models 24C1.3XUSB and 24C7.38USB-F

Please refer to section 6 **Viewer and USB Driver Installation** for viewer installation instructions.

To launch the viewer software, simply click on the Videology Icon on the Desktop. A window will appear displaying the camera image.

8.3.1. Still Image Capture (Snap Feature)



The Image Snap feature is used to acquire and store still images from the video display and is initiated by selecting the **Take Snapshot** Option under the File menu.

The "**Set Snap Folder...**" button is used to change the location where snapshot images will be saved. The files are saved to the user's desktop by default and are stored as Bitmap (BMP) files.

Filename = Still_DATE_TIME_NUMBER.bmp.

If using 24C7.38USB-F, please see section 8.3.9 for flash option instructions

Enable HW Snapshots

Needs description.

Take Snapshot

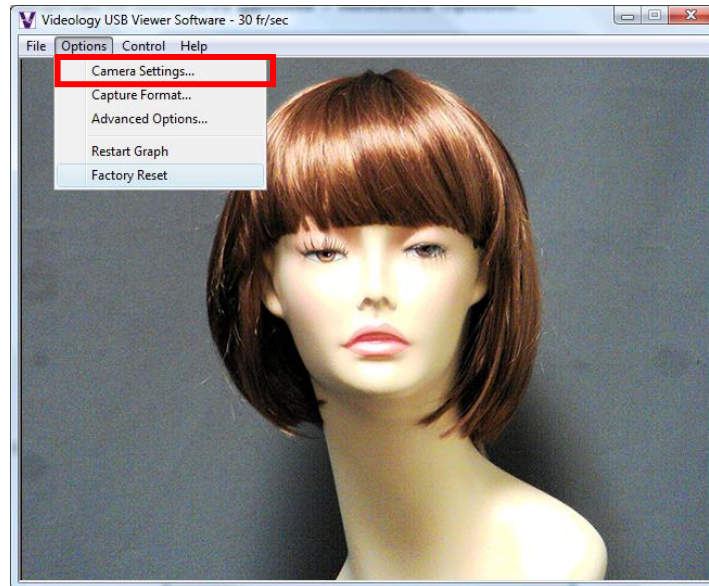
Takes a snapshot.

Exit

Exits the program

8.3.2. Camera Settings

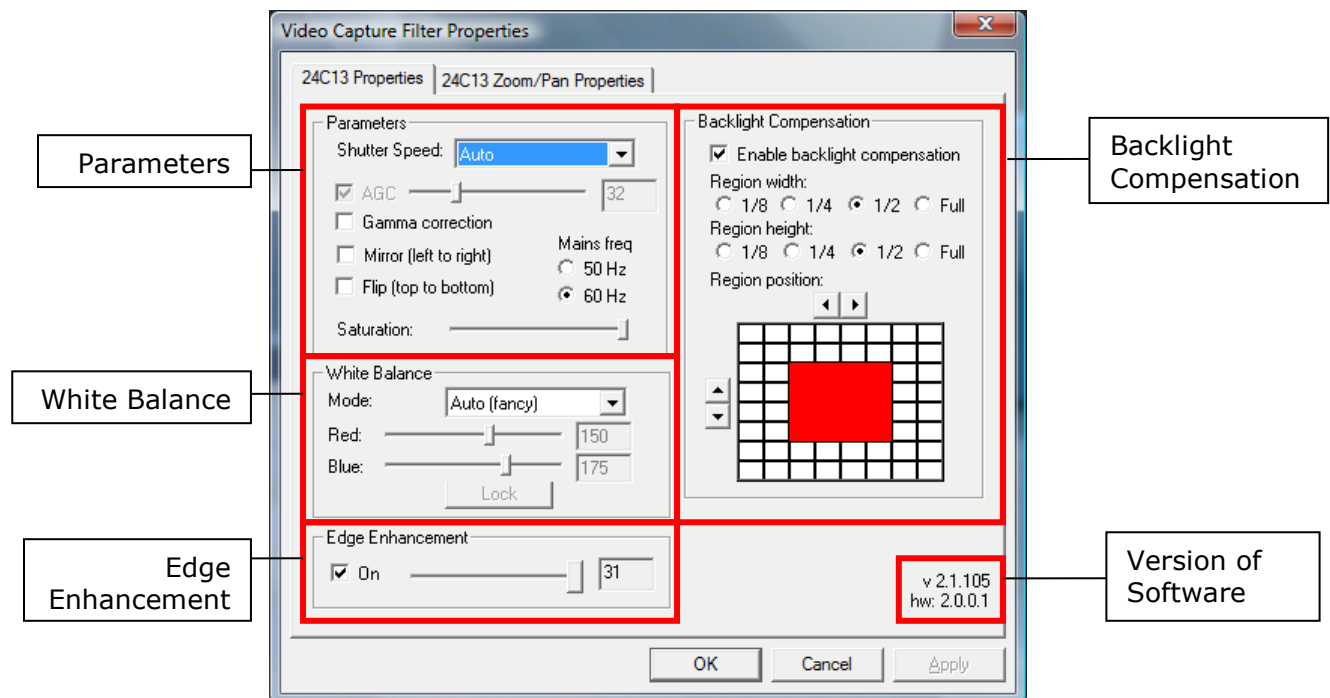
The Camera Settings (gain, shutter speed etc.) can be selected via **Options > Camera Settings...**



8.3.2.1. Video Capture Filter Properties

When Camera Settings is selected, the Video Capture Filter Properties window is opened. There are two tabs within the Video Capture Filter Properties; 24C13 Properties and 24C13 Zoom/Pan Properties.

8.3.2.2. 24C13 Properties



8.3.2.3. Parameters

8.3.2.3.1. Shutter Speed

The camera's shutter speed is analogous to the shutter speed of a conventional camera, although for a solid state imager there is no physical shutter. For this type of camera "shutter speed" refers to an electronic shutter, which determines the length of time over which charge is accumulated on the image sensor.

In low light conditions, a slow shutter speed (long integration time) is required in order to get a good quality image.

This camera's shutter speed can be varied from 1/15 sec. to 1/120 sec. The camera utilizes a rolling shutter, which operates in a fashion similar to a focal plane shutter on a conventional camera.

With this type of shutter, different parts of the sensor are exposed at different times, which can result in distortion of moving objects.

There is also an automatic setting (AUTO), in which the shutter speed is adjusted automatically according to the overall light level.

Note: Faster shutter speeds should not be used when operating the camera under fluorescent lighting. The intensity of the light varies at the AC line frequency (60Hz) and causes dark bands to appear across the image.

8.3.2.4. Gain Control

Gain can be set to automatic (unchecked), in which case the camera will automatically adjust to variation in illumination and subject matter or to manual (checked) in which the user controls the variation in illumination and subject matter.

8.3.2.5. Gamma Correction

Gamma correction switches between 0.45 and 1.0 to accommodate various monitors.

8.3.2.6. Mirror and Flip Mode

The Mirror and Flip options are used to create images, which are mirrored about the Vertical and Horizontal axis respectively.

8.3.2.7. Mains Freq

This is set to 50 Hz or 60 Hz to keep the shutter in sync with the line frequency.

8.3.2.8. Saturation Slider

This slider controls the scene's depth of color.

8.3.2.9. White Balance

Auto – Adjusts the colors based on the scene and corresponding internal measurements;
Fixed balance Red & blue – Allows the user to adjust the amount of red and blue in the scene.

8.3.2.10. Mode

Drop down

- Manual
- Auto (simple)
- Auto (fancy)
- PWB (push to set)

8.3.2.11. Manual White Balance

When Manual mode is selected, Red and Blue levels can be adjusted from 0 to 255.

8.3.2.12. Edge Enhancement

Edge enhancement is used to make the edges of lines appear sharper and more distinct. It gives the appearance of increased resolution, but in reality the resolution is determined purely by the number of pixels, and is fixed.

8.3.2.13. Back Light Compensation (BLC Control)

Under normal lighting conditions, with the Electronic Iris control activated, the camera will automatically adjust the image brightness so that all parts of the image are visible.

However when the background illumination is very bright, as when someone is standing in front of a window for example, the shutter speed will automatically be reduced causing the foreground image to appear darkened. With the image appearing in this way, faces may look almost in silhouette making it difficult to see any detail.

In this situation, Back Light Compensation (BLC) can be used to increase the brightness of certain parts of the image.

Back Light Compensation effectively limits the area of the screen in which the AGC operates, thus ensuring that details within the area will not be lost. As a consequence, regions of the image outside of the BLC area may become very bright and washed out.

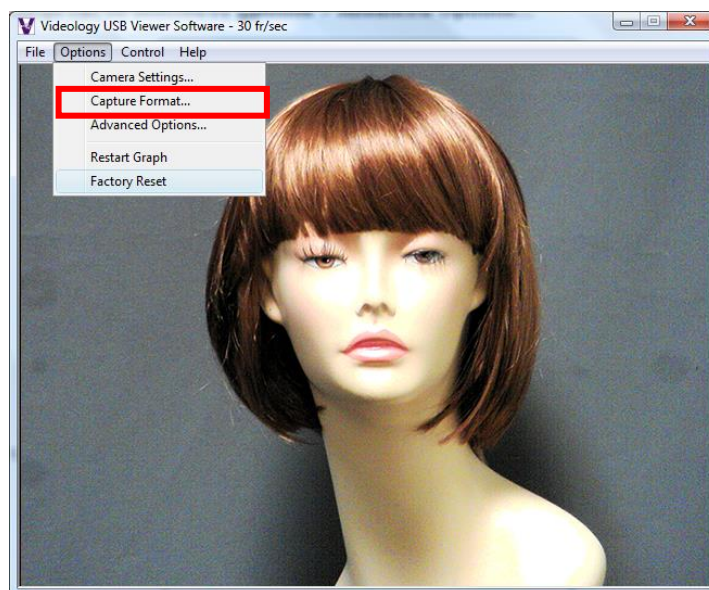
To enable BLC simply click on the Enable Backlight Compensation Check box.

The size of the BLC window can vary in both size and shape. To change the BLC size, click on the Region Width and/or the Region Height radial buttons and choose 1/8, 1/4, 1/2, or Full.

To change the X or Y position, click on the arrows provided above and/or to the left of the 8 x 8 grid.

8.3.3. Capture Format

Capture Format can be selected by **Options > Capture Format...**



8.3.3.1. Video Capture Pin Properties

When Camera Format is selected, the Video Capture Pin Properties window is opened.

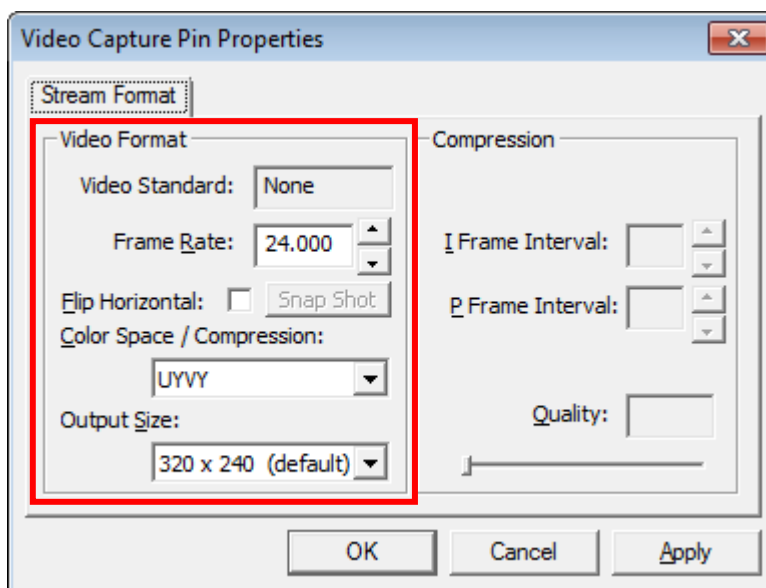


Figure 5. Video Capture Pin Properties

Frame Rate

The Frame rate will vary depending upon the screen resolution.

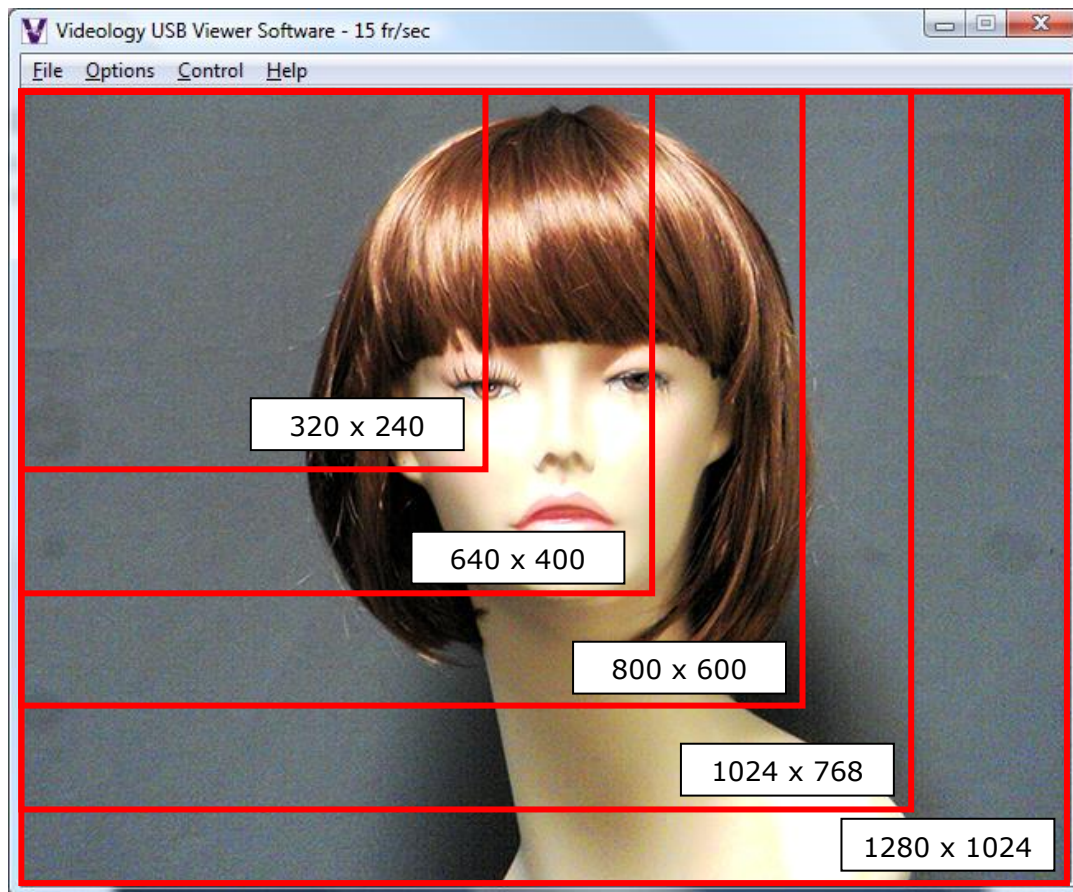
Color Space/Compression

The Color Space/Compression is fixed to UYVY and cannot be varied.

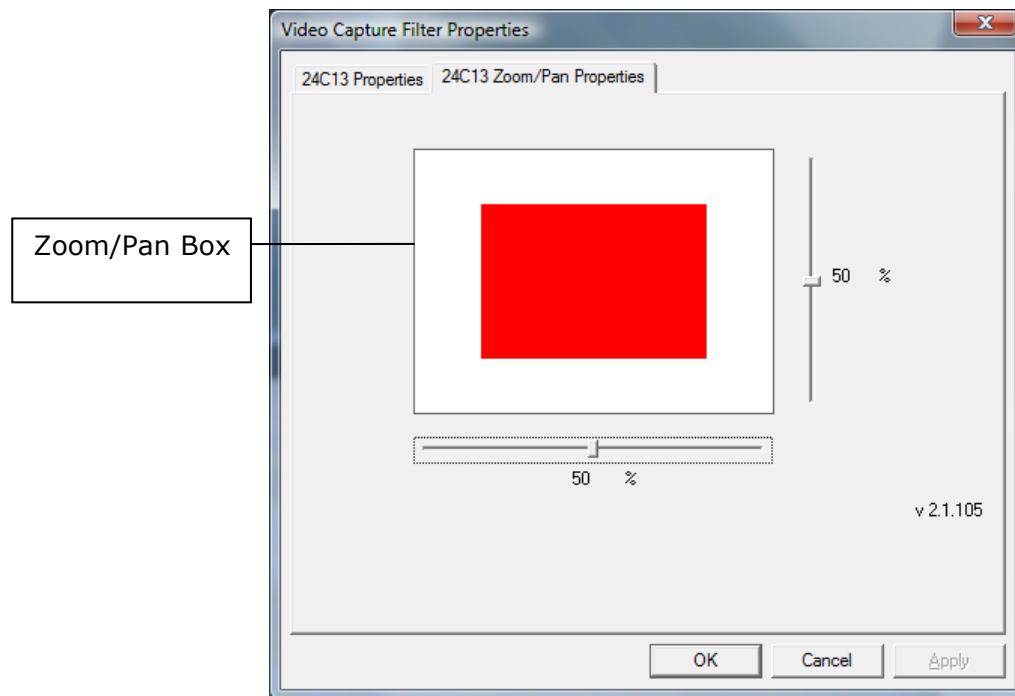
Output Size

Resolution (pixels)	Maximum Frame rate
1280 x 1024	8 fps
1024 x 768	12 fps
800 x 600	20 fps
640 x 480	30 fps
320 x 240 (default)	60 fps

Table 2 Maximum Frame Rate for various screen resolutions.



8.3.4. 24C13 Zoom/Pan Properties

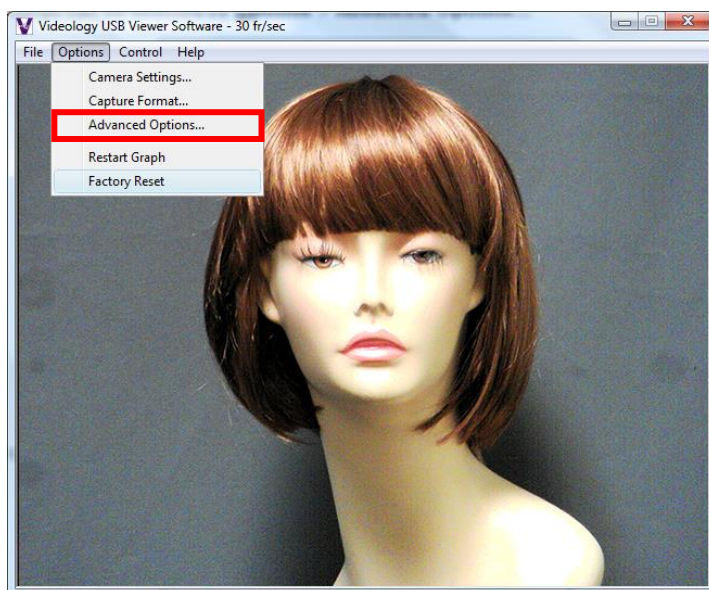


The red square is the area of interest.

The zoom feature enables the user to change where the viewing area is located. This area is dependent on what output size is selected within the Video Capture Pin Properties (section 8.3.2.1).

8.3.5. Advanced Options

Advanced Settings can be selected by **Options > Advanced Options...**



The Advanced Options window is opened.

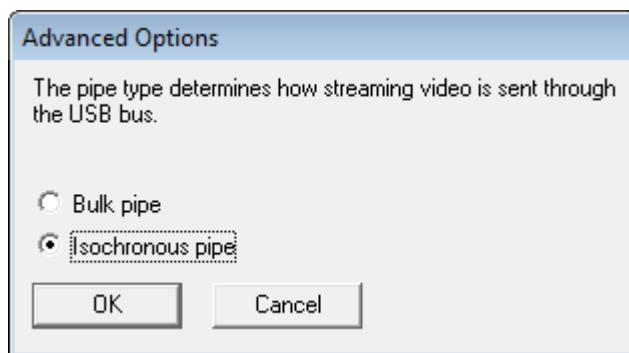


Figure 6. Advanced Options Menu

8.3.5.1. Isochronous and Bulk transfer modes.

There are two basic transmission modes for data on the USB bus, referred to as Isochronous and Bulk Transfer.

With **Isochronous Transfer** mode a fixed bandwidth (up to a maximum of 40% of the total available) is assigned to the camera, ensuring a minimum transmission speed. In this transfer mode, there is no error correction and any dropped data will not be re-transmitted. This mode is typically used for time sensitive data such as video and speech where there is little utility in repeating lost information.

With **Bulk Transfer** mode there is no fixed (upper or lower) limit to the available bandwidth, and data is simply transmitted whenever the bus is available. Bulk transfer includes error correction and dropped data packets, which are retransmitted.

If multiple USB cameras are being operated simultaneously, it is possible that the data rate from the camera will be reduced, resulting in a slower frame rate for the displayed image. In this situation the isochronous display should be used.

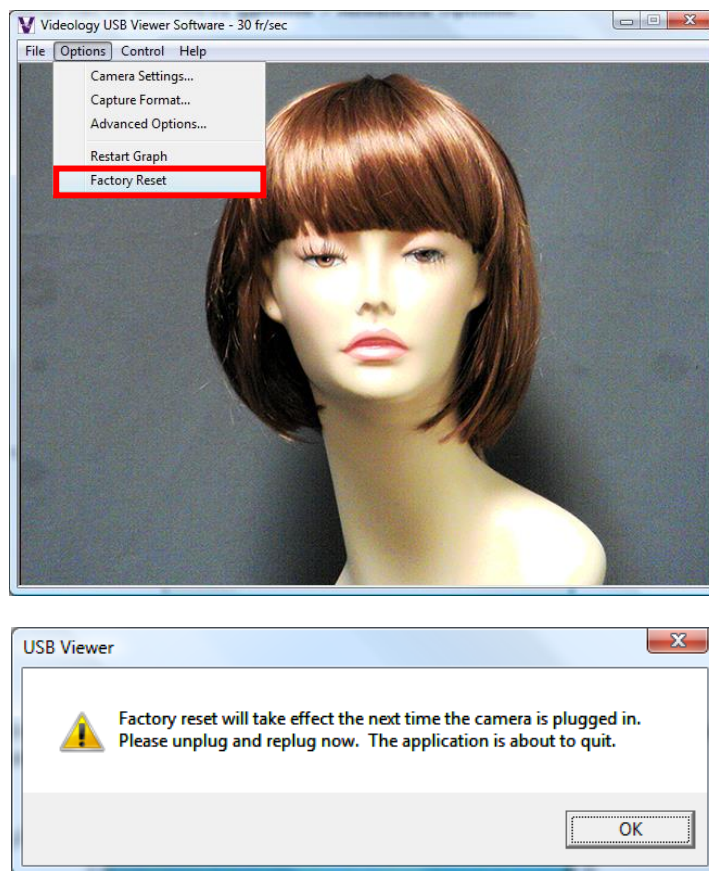
If a single camera is being used, then the bulk transfer mode will likely provide the fastest display.

NOTE:

When changing the transfer mode from Isochronous to Bulk, it is necessary to close the application, unplug and reconnect the camera, and restart the application.

8.3.6. Factory Reset

Factory Reset will bring up a dialog box. If "OK" is selected the camera will be reset the next time it is plugged into the PC.



8.3.7. Control

Control setting is inactive with 1.3 Megapixel Cameras

8.3.8. Help (About Menu)

The Help feature states the properties of the software.

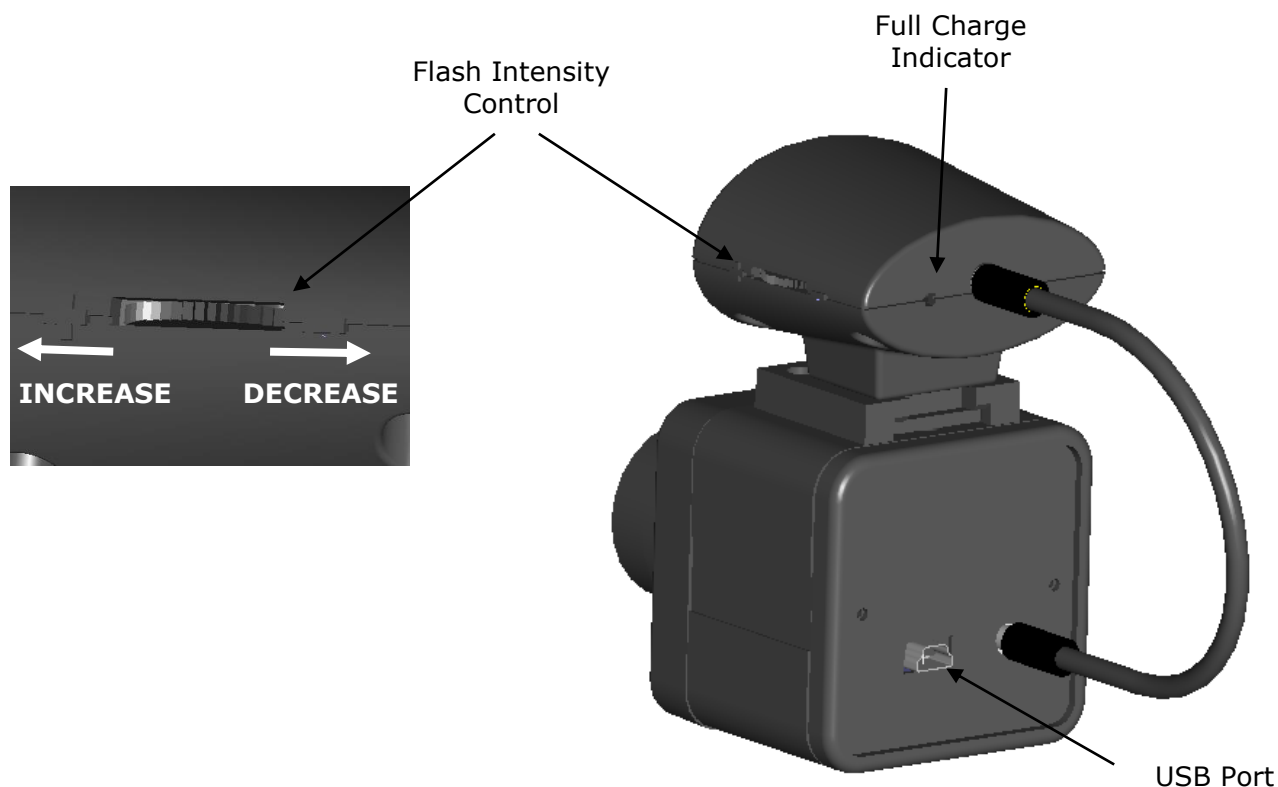


8.3.9. Taking Flash Pictures

For flash photography, you should set the camera up so that the distance to the subject is approximately 6 ft. If the camera is too close to the subject the image will be overexposed.

Once the camera is set up, adjust the manual focus control on the lens to bring the subject into sharp focus.

When you first connect the camera and flash module to the PC it will take approximately 15 seconds for the flash unit to charge. Full charge is indicated when the small amber light on the rear of the flash module is on. Re-charging between flash pictures takes only a second or two.



To take flash pictures, click on the "**Take Snapshot**" option from the file menu. You will see the flash light come on and a still image frame will be captured and stored in the assigned snapshot folder.

Please refer to section 8.3.7 for still image capture instructions.

8.3.9.1. Adjusting the Flash intensity

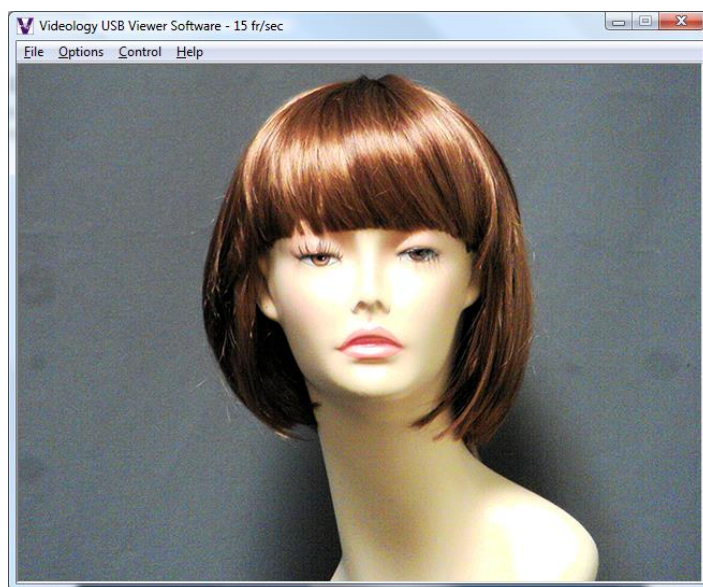
If the flash intensity is too high, it can be reduced simply by turning the control knob on the side of the flash module.

Moving the control towards the front of the unit will increase the flash intensity, moving it towards the back will decrease the intensity.

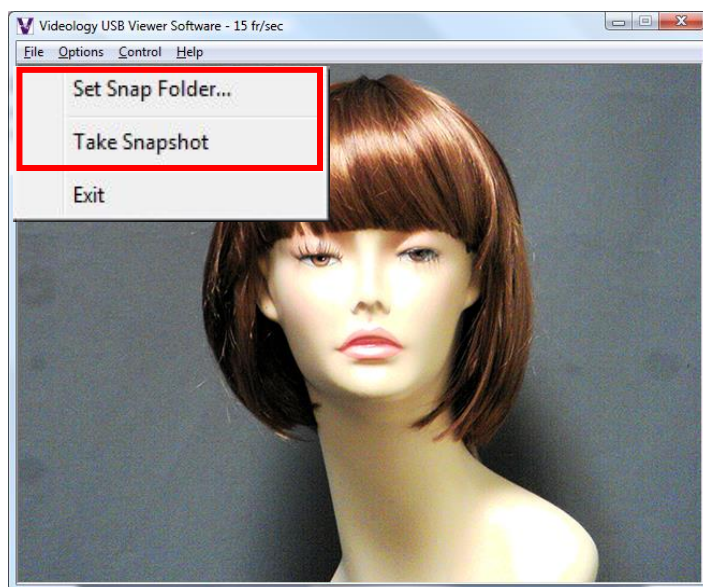
8.4. Using the Videology viewer with models 20/21C11XUSB and 20/21C21XWUSB

Please refer to section 6 **Viewer and USB Driver Installation** for viewer installation instructions.

To launch the viewer software, simply click on the Videology Icon on the Desktop. A window will appear displaying the camera image.



8.4.1. Still Image Capture (Snap Feature)



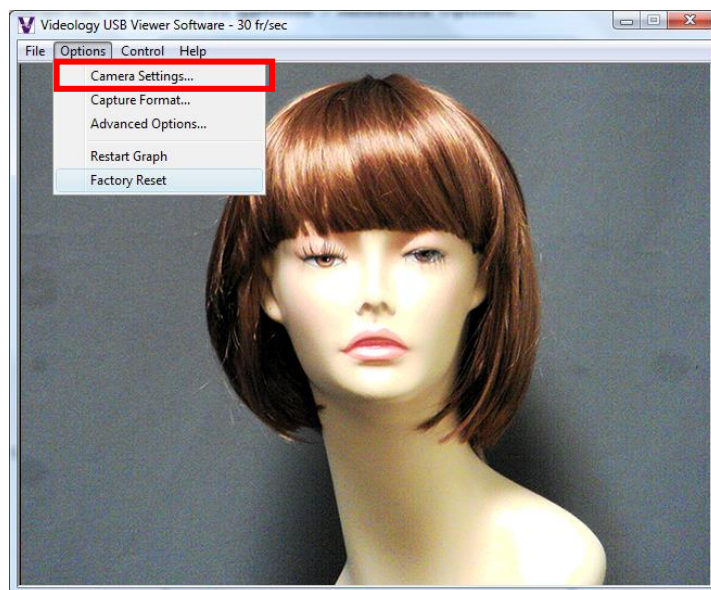
The Image Snap feature is used to acquire and store still images from the video display and is initiated by selecting the **Take Snapshot** Option under the File menu, after enabling the snapshots through **Enable HW Snapshots**.

The "**Set Snap Image Folder...**" button is used to change the location where snapshot images will be saved. The files are saved to the user's desktop by default and are stored as Bitmap (BMP) files.

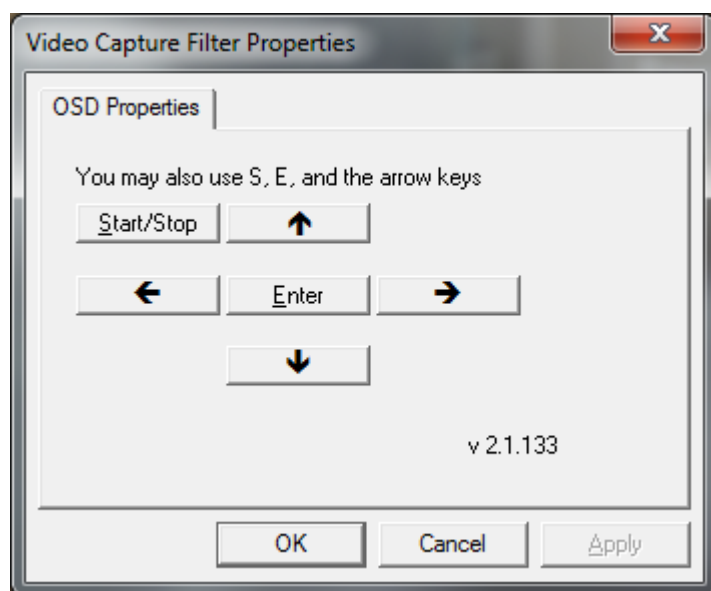
Filename = Still_DATE_TIME_NUMBER.bmp

8.4.2. Camera Settings

The Camera Settings (gain, shutter speed etc.) can be selected via **Options > Camera Settings...**



This selection will activate the OSD controller for this family of cameras.



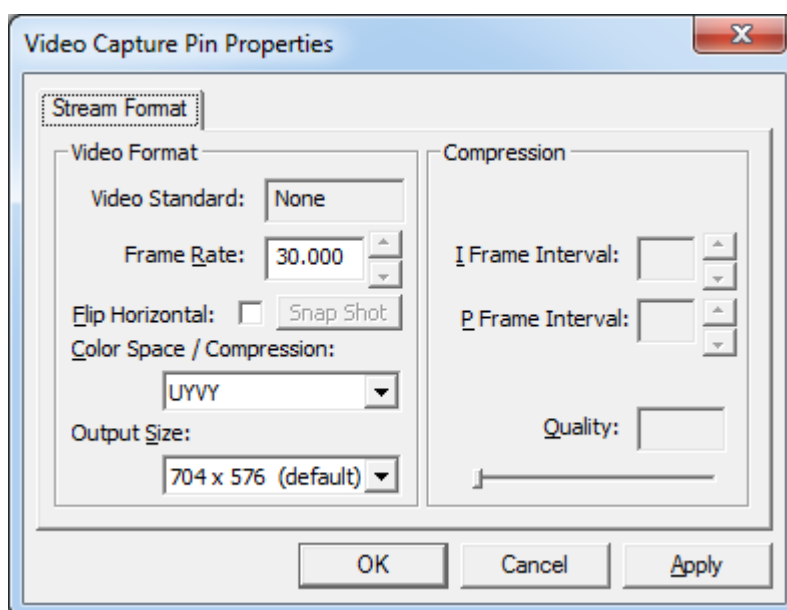
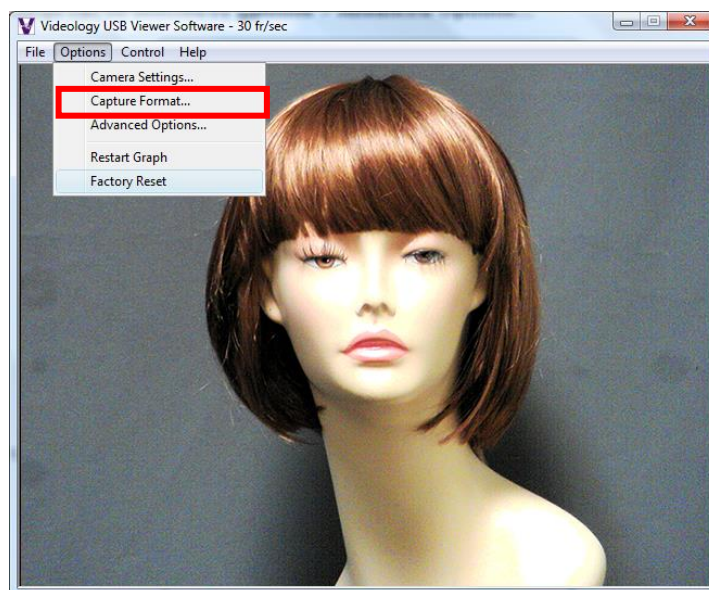
Using the mouse select the **Start/Stop** button.

The OSD menu will appear on the screen.

Please refer to and INS-2XC21XW-USB instructions on how to navigate the OSD menu.

8.4.3. Capture Format

Capture Format can be selected by **Options > Capture Format...**



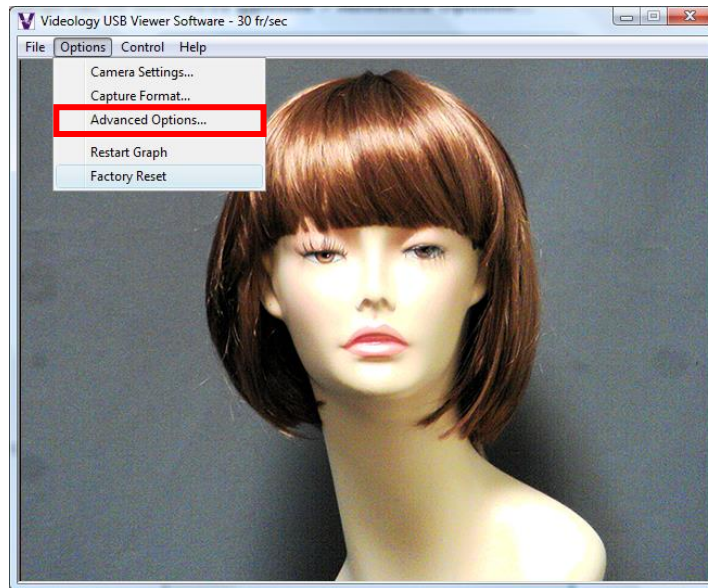
Frame Rate is locked in at 30 FPS.

Output Size is camera dependent and is locked in as follows:

20C20XW-USB	640 x 480
21C20XW-USB	640 x 576
20C20XW-USB	640 x 480
21C20XW-USB	640 x 576

8.4.4. Advanced Options

Advanced Settings can be selected by **Options > Advanced Options...**



The Advanced Options window is opened.

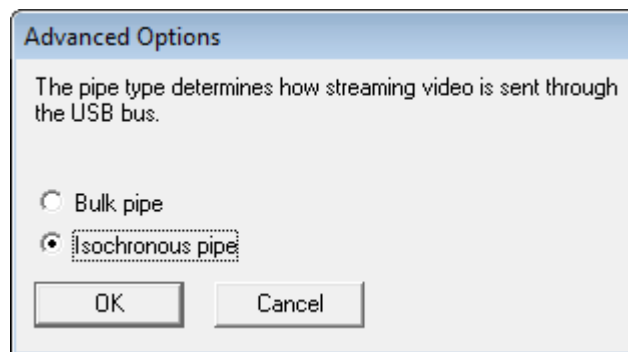


Figure 7. Advanced Options Menu

8.4.4.1. Isochronous and Bulk transfer modes.

There are two basic transmission modes for data on the USB bus, referred to as Isochronous and Bulk Transfer.

With **Isochronous Transfer** mode a fixed bandwidth (up to a maximum of 40% of the total available) is assigned to the camera, ensuring a minimum transmission speed. In this transfer mode, there is no error correction and any dropped data will not be re-transmitted. This mode is typically used for time sensitive data such as video and speech where there is little utility in repeating lost information.

With **Bulk Transfer** mode there is no fixed (upper or lower) limit to the available bandwidth, and data is simply transmitted whenever the bus is available. Bulk transfer includes error correction and dropped data packets, which are retransmitted.

If multiple USB cameras are being operated simultaneously, it is possible that the data rate from the camera will be reduced, resulting in a slower frame rate for the displayed image. In this situation the isochronous display should be used.

If a single camera is being used, then the bulk transfer mode will likely provide the fastest display.

NOTE:

When changing the transfer mode from Isochronous to Bulk, it is necessary to close the application, unplug and reconnect the camera, and restart the application.

8.4.5. Control

Control setting is inactive with the 2xC21XW-USB cameras.

8.4.6. Help (About Menu)

The Help feature states the properties of the software.



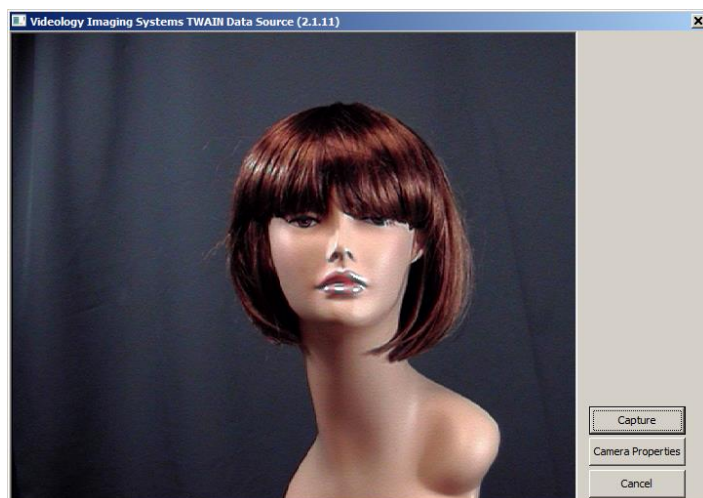
9. Using the TWAIN Interface - ALL MODELS

Please refer to section 7 for TWAIN installation instructions.

If the Twain interface (**SFT-10011**) is installed the camera can be used with any TWAIN Compliant Application.

The TWAIN interface will attach itself to the first Videology camera it finds connected to the computer. For best operation, run the TWAIN Interface on a system that has only one Videology camera installed.

Any application that supports a TWAIN Data Source as a capture device can access the camera. The camera's image will appear as shown below:



10. Troubleshooting

10.1. Focus Issues

If the video appears out of focus, check that the lens is focused properly. Typically, a lens is pre-installed and is pre-focused for an optimal head shot distance of 3.5 to 7 feet from the camera. If your subject is out of that range then you will need to make a slight adjustment to the lens.

Unlock the locking screw on the lens and rotate the lens very slightly watching to see if the subject comes in to focus. When you have the proper focus for the distance, lock the locking screw securely. It is possible for a very tight locking twist to cause a slight focus shift, so take care to lock the screw gently and to recheck that the image is still properly focused.

10.2. Noisy or Grainy Video

Be certain that there is enough light in the room where the images are snapped and that your subject is not located directly under a bright spotlight.

10.3. Poor Color Reproduction

Try the various white balance choices in the event that you have strange lighting conditions. The camera's default setting is set for standard fluorescent lighting. If the camera is setup outdoors, you may require a more optimal white balance.

10.4. Dark faces

Subjects should not be placed in front of overly bright backgrounds, such as a window with sunlight streaming through it. At the same time, be certain that the environment provides enough overall light. Additionally, a solid light grey backdrop is preferred for headshots.

10.5. Reflections

Take care that the camera lens is at approximately the same height as the subject's nose. There should not be a high light point source in the ceiling angled in to the subjects face. This may cause glasses to reflect or shadows to appear on the face. A hot white dispersed light aimed directly on to the face is sometimes needed for an ideal image capture.

10.6. Video display shows a green or black color

For Win XP and Win 2000, update USB 2.0 Host driver to the latest driver from the Microsoft® web site. For Win 98 SE and Win Me, an OS upgrade to either Win XP or Win 2000 with latest Microsoft® USB 2.0 Host driver is necessary.

10.7. Video display appears inoperable or exhibits a slow frame rate

Verify the system complies with the minimum system requirement specification.

Try a different USB 2.0 port in your system.

Try to lower the video quality, by going to Options > Capture Pin > quality > change the value to 0.

Try a different video format, YUY2 or I420.

Verify VGA card supports Direct Show, and upgrade VGA card to the latest driver.

10.8. An incomplete or scrambled video display on USB 1.1 port

Verify the system complies with the minimum system requirements.

Unplug all of USB1.1 devices from the system.

Verify that the USB1.1 video camera device is the only USB device in the system.

10.9. Cannot see video

Unplug and plug the camera in again.

Reinstall the USB Video driver. Follow the procedures below on how to reinstall the camera under different scenarios.

Scenario 1: Hardware-First, Driver Installed before, but not correctly

Windows XP

Make sure that the camera is plugged into one of the USB ports.

Insert the Videology CD that was provided with the camera into a CD-ROM drive. The "Videology USB2.0 Camera Installation Wizard" software will run automatically.

If the autorun.exe software does not run automatically, browse the CD files and double click on the "autorun.exe" file to run it.

(Note: The auto-run application runs or not when media CD inserted depend on the "auto insert notification" option checked in the properties of your CD drive. The method of changing this setting depends on what exact version of Windows you have. For information on how to do this, do a search in Windows Help for "auto insert notification.")

Click on the "Next" button.

If problems still persist, please email support@videologyinc.com

Please include:

- Date of purchase
- Software revision number
- Camera model number
- Company name
- Contact name
- Phone number
- Email address
- Issue with camera

11. Contact Information

For technical assistance with this product, please contact the supplier from whom the product was purchased.

For OEM inquiries, contact Videology Imaging Solutions:

Americas, Middle East, Far East & Australia:

Videology® Imaging Solutions Inc.
37M Lark Industrial Parkway
Greenville, RI 02828
USA

Tel: (401) 949-5332
Fax: (401) 949-5276

Europe & N. Eurasia:

Videology® Imaging Solutions Europe B.V.
Neutronenlaan 4
5405 NH Uden
The Netherlands

Tel: +31 (0) 413-256261
Fax: +31 (0) 413-251712

Please visit our website at: <http://www.videologyinc.com>

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