VIDEOLOGY®

IMAGING SOLUTIONS INC.

20/21K13XUSB (monochrome)
20/21K14XUSB (color)
20/21K15XUSB (color)
Camera Software Manual

Release 1.1.2.3

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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.

Videology's WDM drivers are digitally signed by Microsoft® certifying the software has been tested with Windows XP® and has not been altered since testing, enabling compatibility with your applications.

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

All cameras share the same simple, yet powerful API allowing easy migration from one camera to another.

SDKs are available for OEMs at a fee.

Housings: Mechanical design options can be quoted for OEMs

2. Current Cameras

20K14XUSB / 21K14XUSB Color Standard Resolution Camera

A special Day/Night Optical Low Pass Infrared filter (**Model 20K14XUSB-DN**) or no filter options are possible for maximum sensitivity in B&W mode. See Figure 15

Electrical	20K14XUSB NTSC	21K14XUSB PAL
CCD Sensor	1/4" IL Color CCD	
Active pixels (HxV)	510 x 492	500 x 582
Horizontal resolution (TVL)	≥330	
Viewer Display (USB 2.0, 30fps)	720 x 480 pixels max	720 x 576 pixels max
(USB 1.1, 30fps)	320 x 240 pixels max	
Sensitivity	< 0.5 Lux (50 IRE) F1.2, 3200°K, lens transmission 80%, scene reflection 75%	
	.05 lux in night mode (special filter of 20K14XUSB-DN)	
Signal to noise ratio	> 48 dB (AGC off)	
Gamma	0.45 default (1.0 via Software)	
Gain Control	Automatic 36 dB (AGC default) or Fixed options via software	
Scan Mode	Interlaced / Non Interlaced (selectable via Software)	
Mirror Mode	Selectable via software	
Synchronization	Internal	
Back light compensation	Default on (selectable via software)	
White Balance Mode	AWB auto white mode, Fixed modes selectable via software	
Contour enhancement	Default on	
Iris Control	CCD Iris default	
Shutter Speeds	Automatic from 1/60 to 1/100,000	Automatic from 1/50 to 1/100,000
	12 fixed speeds via software	
Control Communication	Camera control via USB bus	
Power supply	5VDC via USB bus	
Power consumption	< 1.3W	

Environmental

Ambient operating temp.	-15° C to + 55° C
Ambient operating Humidity	20 up to 93%RH
Storage temp.	-25° C to + 70° C
Storage Humidity	Up to 98%RH
Lifetime	MTBF > 150000 hours
Packaging	ESD safe package

Mechanical

Dimensions (WxHxD)	26mm x 22mm x 32mm (20K142USB pinhole mount)	
Lens mount	Metal CS:	20/21K148USB
	Metal M-12 board:	20/21K145USB
	Metal M-12 pinhole:	20/21K142USB
Connectors	Camera to USB board: Board to board connector	
	USB board connector: (6 pin) power & data	

20K15XUSB / 21K15XUSB Color High Resolution Camera

Model 20K15XUSB specification is same as above 20K14XUSB series except:

Electrical	20K15XUSB NTSC	21K15XUSB PAL
Active Pixels (HxV)	768 x 492	765 x 582
Horizontal resolution	≥460 TVL	
Sensitivity	<1.0 lux	

20K13XUSB / 21K13XUSB B&W High Resolution Camera

Model 20K13XUSB specification is same as above 20K15XUSB series except:

Electrical	20K13XUSB EIA	21K13XUSB CCIR
Active Pixels (HxV)	768 x 494	752 x 582
Horizontal resolution	N/A	
Sensitivity	< 0.005 lux, near IR sensitive	
White Balance Mode	N/A	

3. Other USB 2.0 Cameras

24B1.3XUSB (Preliminary Release 9/20/05) 1.3 mega pixel, 1/2" CMOS, B&W
24C1.3XUSB (In Development) 1.3 mega pixel, 1/2" CMOS, Color

Electrical

Image sensor	1/2" CMOS 6.6mm x 5.3mm array
Active pixels (HxV)	1280 x 960, 5.2um square pixels
Frame rate	15 fps at 1280 x 960 compressed, 8fps un-compressed
Sensitivity	<1.0 Lux
Signal to noise ratio	45dB
Gamma	1.0 default (0.45 selectable via software)
Gain control	22 dB automatic (AGC default) adjustable via software
Synchronization	Internal (X-tal controlled)
Shutter speed	Automatic / fixed selectable via software
Scan mode	Progressive scan
Mirror mode	Selectable via software
Dynamic range	68 db
Video output	USB 2.0
Power supply	USB bus
Power consumption	<1.1 Watts

Environmental

Ambient operating temp.	-15° C ~ 55° C
Storage temp.	-25° C ~ 70° C
Ambient operating humidity	20 to 93%RH, non-condensing
Operating humidity	Max. 98% RH

Mechanical

Dimensions WxHxD	42mm x 42mm x 16mm (single board)
Weight	<100g
Lens mount	CS-mount, M-12 mount
Interfaces	USB 2.0
Connectors	USB board connector - 5 pin, JST
Approbations	FCC class B, CE ready
Lifetime	MTBF > 150,000 hours

20D389USB (In Development) Monochrome camera

0.001 lux
1/3" CCD Sony Ex-View®
768 x 494 pixels NTSC, 752 x 582 PAL
Asynchronous reset
Near IR sensitive
Extended Integration
42mm x 42mm double board

Note: Monochrome Models will not react to white balance prompts.

4. Installing and Using the Camera

4.1. Installation

The Videology USB 2.0 High-Speed camera you have just purchased is designed to operate out of the box with minimal set-up.

The software can be found on the CD-ROM that shipped with your product.

4.1.1. Minimum System Requirements

A PC with USB 2.0 compatible port

Preview only
PIII- 1.1GHz or above
128MB of RAM (256MB preferred)
Windows XP/2000 for USB2.0
Windows XP/2000 for USB1.1
DirectX 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 9.0c or later
Windows XP Service Pack 1 (Service Pack 2 Preferred) Windows 2000 Service Pack 4

Verify your system has the latest USB 2.0 host driver from Microsoft® only. Verify that your USB host controller chipset is Microsoft certified. This product is not guaranteed to operate with a USB 2.0 host driver from OWC.

4.2. Camera Installation Procedure

Camera installation can be performed via the following software-first or hardware-first method. The software-first method is highly recommended.

4.2.1. Software-First Installation

4.2.1.1. Windows XP

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

In case that the autorun.exe software does not run automatically, browse the CD files and double click on the “autorun.exe” file to run it.

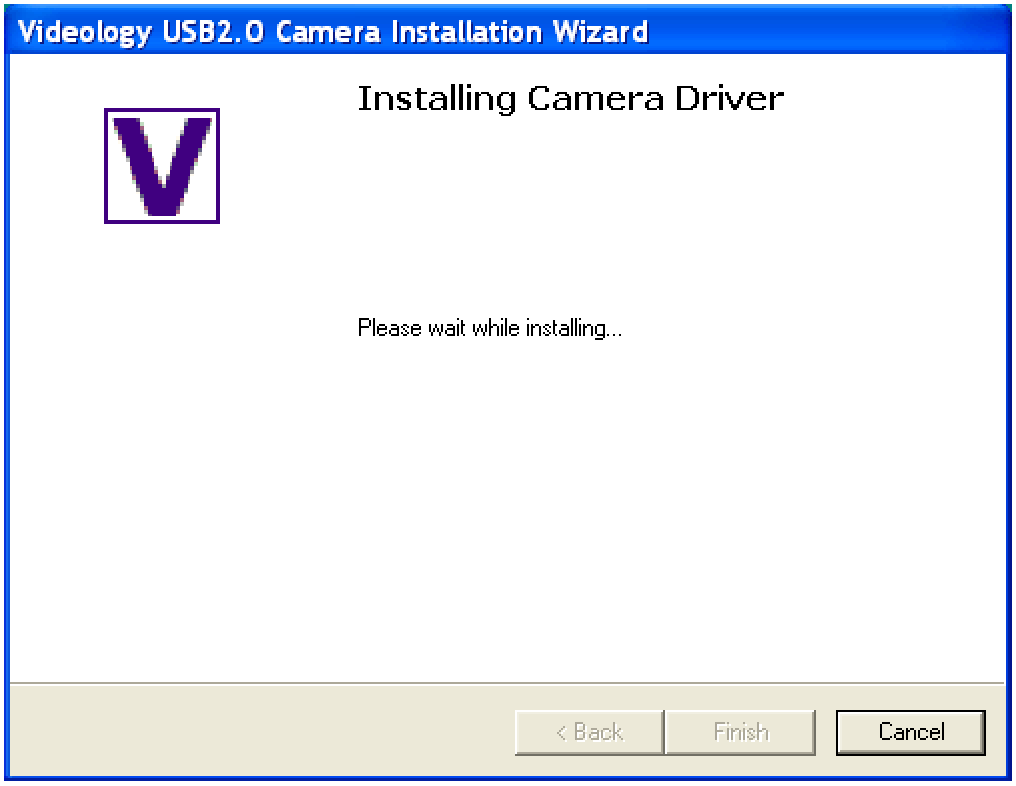
(Note: The auto-run application runs when the CD is inserted depending on the "auto insert notification" option checked in the properties of the CD drive. The method of changing this setting depends on what version of Windows is on the computer. For information on how to do this, Search Windows Help for "auto insert notification".)

Click on the “Next” button.

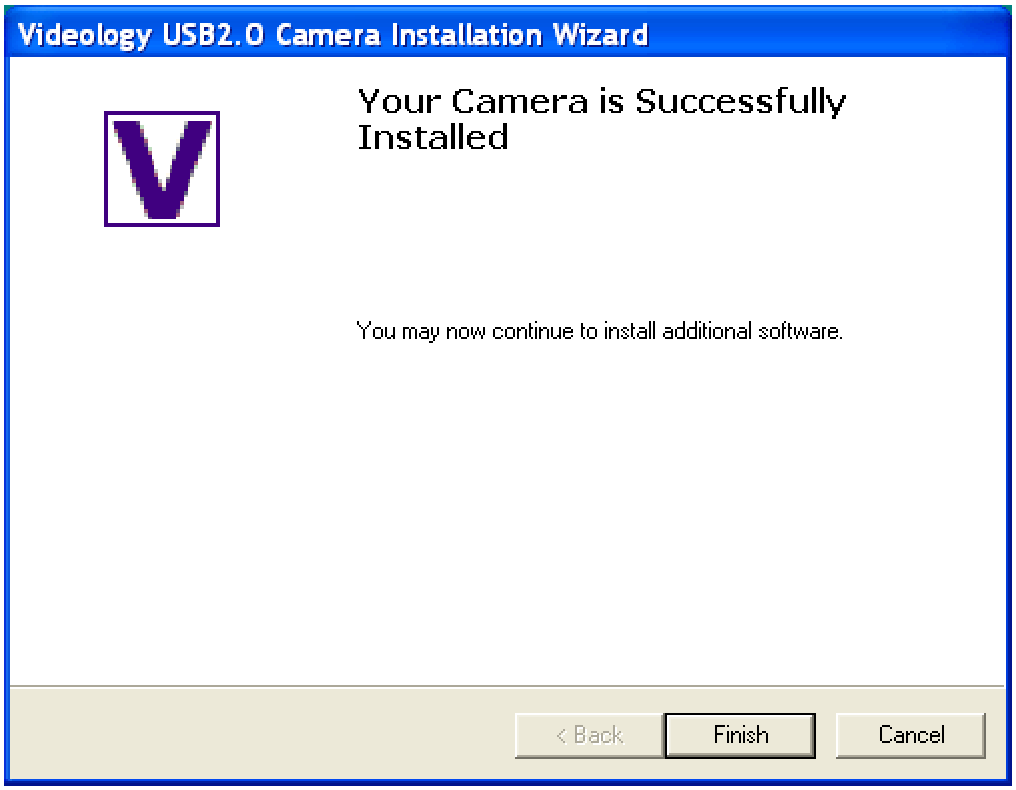
Videology USB2.0 Camera Installation Wizard continues. Plug camera into one of the USB ports and then click on the "Next" button.

Note: Failure to plug your camera in before clicking on the "Next" button may not install all required driver files into the computer.

Videology USB2.0 Camera Installation Wizard continues.



Videology USB2.0 Camera Installation Wizard continues. Click on the "Finish" button.



Videology USB2.0 Camera Installation Wizard continues. The "Videology USB 2.0 Camera Software Setup" software will pop up, from where you can select to open the user's manual or install additional software.

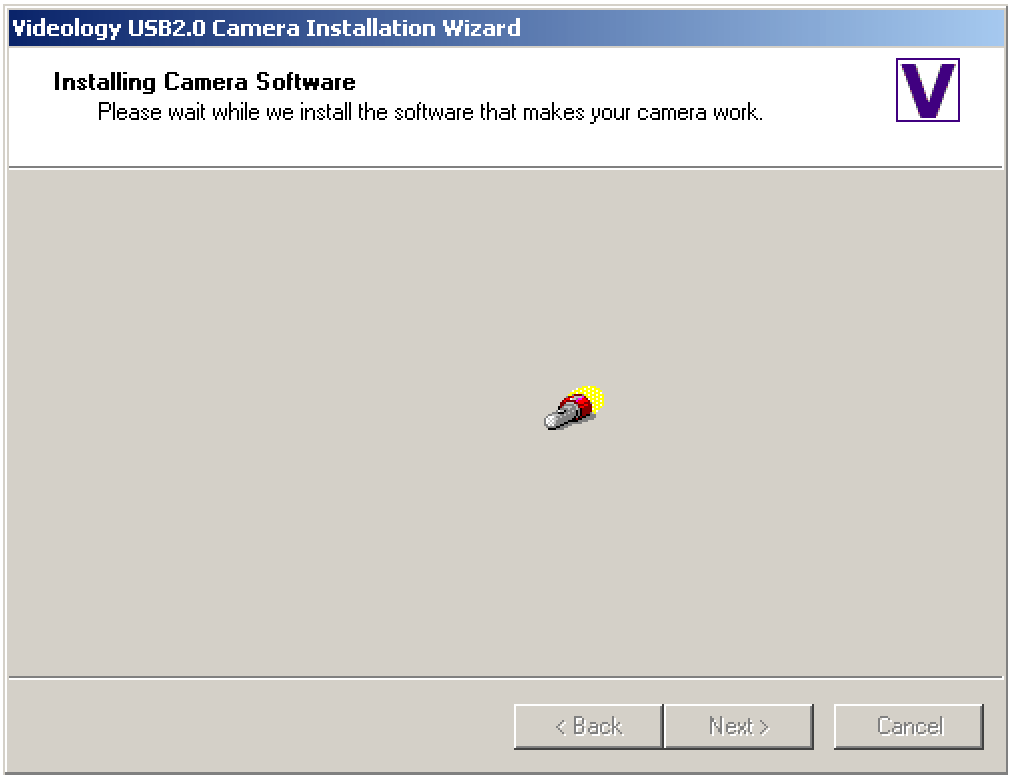
4.2.1.2. Windows 2000

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

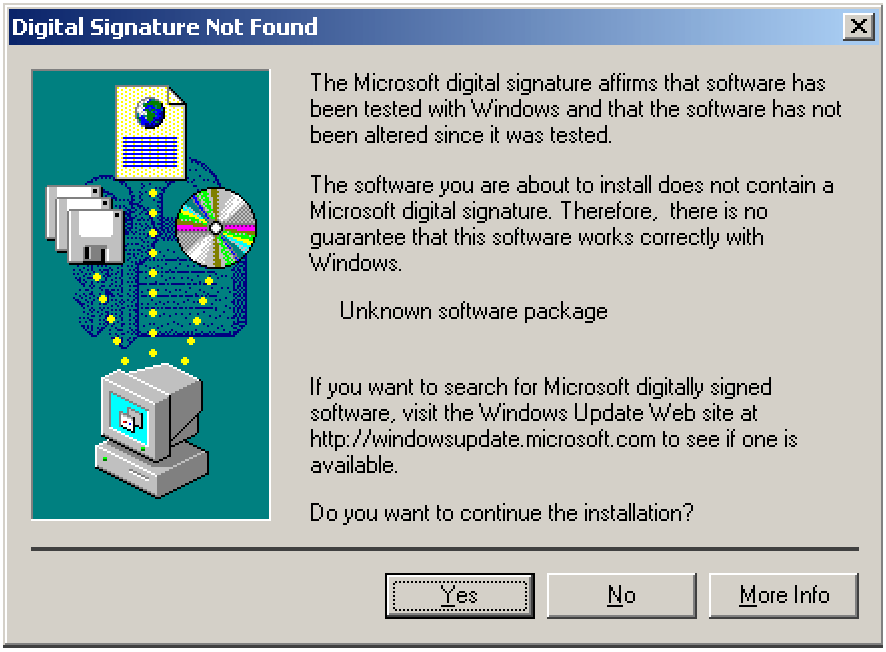
In the event that the autorun.exe software does not run automatically, browse the CD files and double click on the "autorun.exe" file to run it.

(Note: The auto-run application runs when the media CD is inserted depending on the "auto insert notification" option checked in the properties of the CD drive. The method of changing this setting depends on what exact version of Windows you have. For information on how to do this, you may do a search in Windows Help for "auto insert notification".) Click on the "Next" button.

Videology USB2.0 Camera Installation Wizard continues.



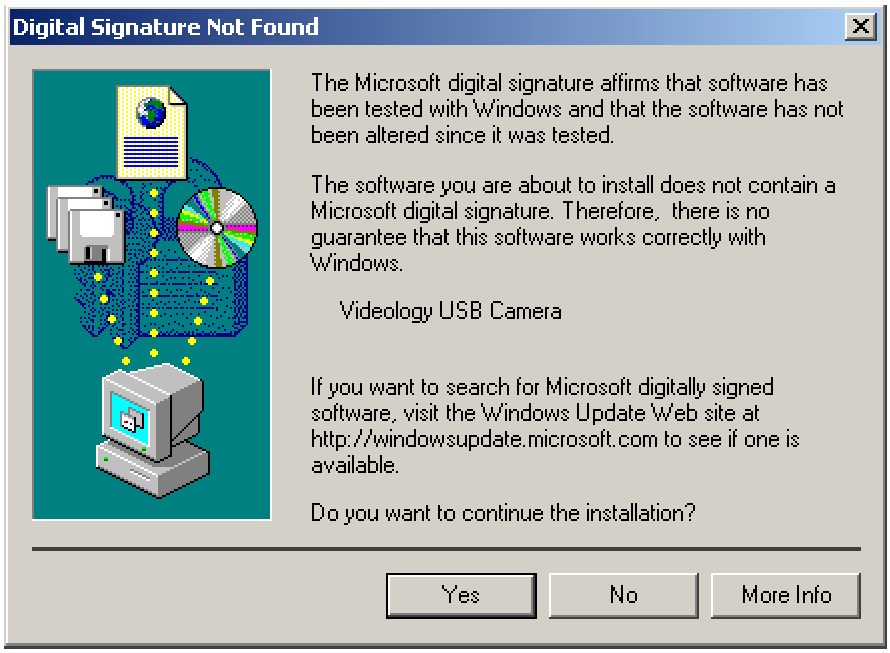
Videology USB2.0 Camera Installation Wizard continues. Click on the "Yes" button.



Videology USB2.0 Camera Installation Wizard continues. Plug camera into one of the USB ports and then click on the "Next" button.

Videology USB2.0 Camera Installation Wizard continues.

Once the camera is plugged in, the Windows Found New Hardware Wizard starts. Click on the "Yes" button.



Videology USB2.0 Camera Installation Wizard continues. Click on the "Finish" button.

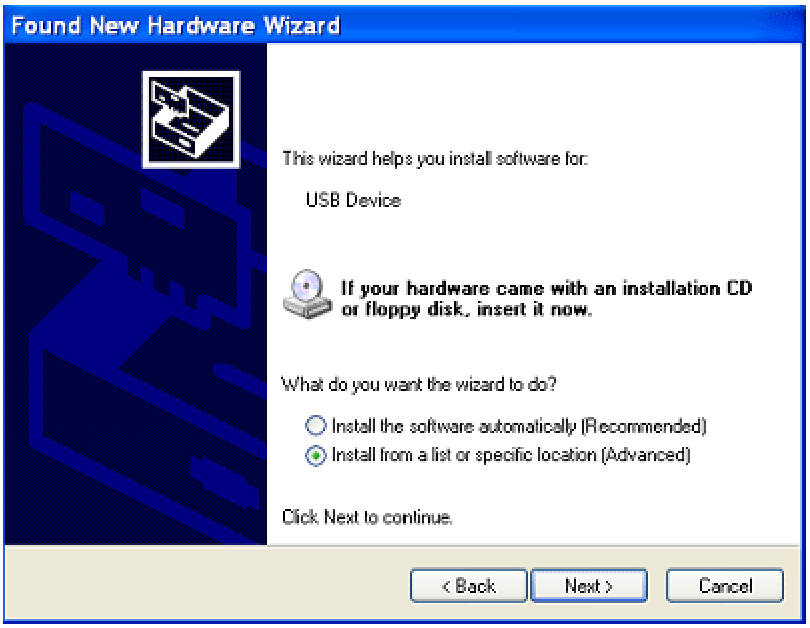
Videology USB2.0 Camera Installation Wizard continues. The "Videology USB 2.0 Camera Software Setup" software will pop up, from where the user can select to open up user's manual or install additional software. Click on the "Finish" Button.

4.2.2. Hardware-First Installation

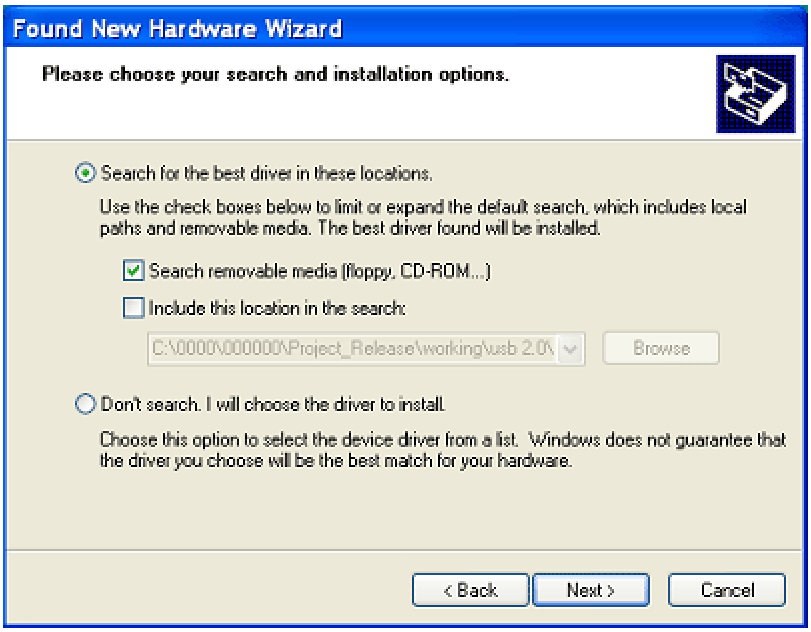
4.2.2.1. Windows XP

Plug the camera into a USB port.

Windows Found New Hardware Wizard window will pop up. Select “No, not this time” and click on the “Next” button.



Windows Found New Hardware Wizard continues. Select "Install from a list or specific location (Advanced)" and click on "Next" button.



Windows Found New Hardware Wizard continues. Make sure that "Search for the best driver in these locations." is located. Insert Videology CD provided with the camera into a CD-ROM drive and click on "Next" button.

Windows Found New Hardware Wizard will automatically discover the camera and configure it for you.

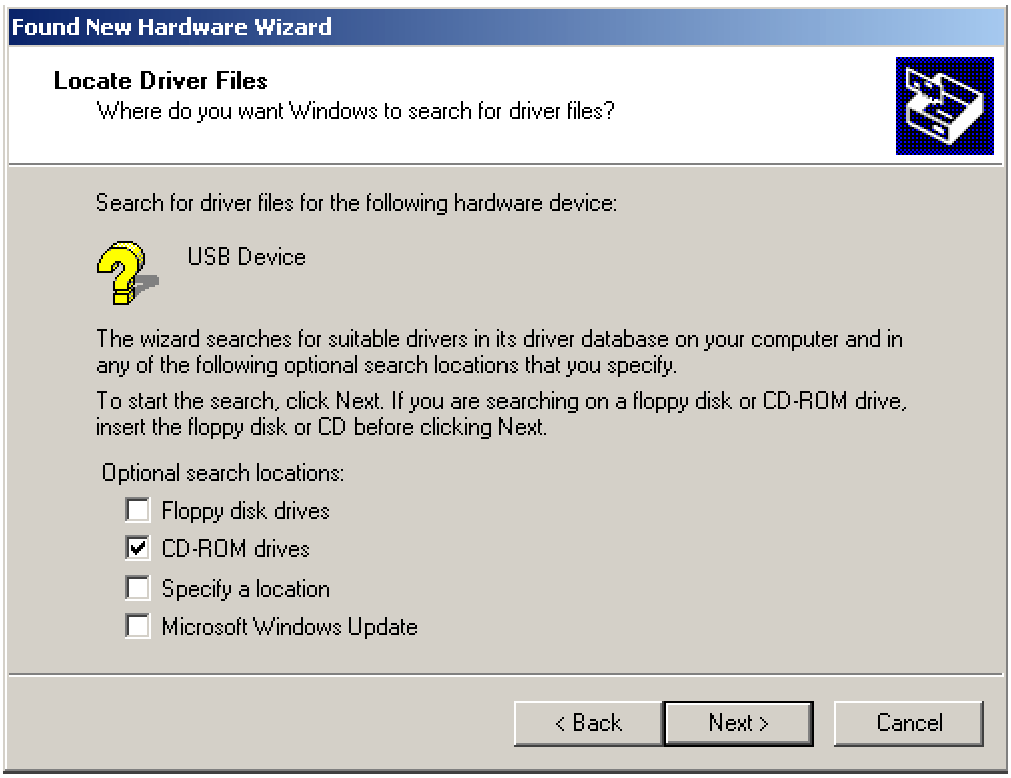
Windows Found New Hardware Wizard continues. Click on "Finish" button.

4.2.2.2. Windows 2000

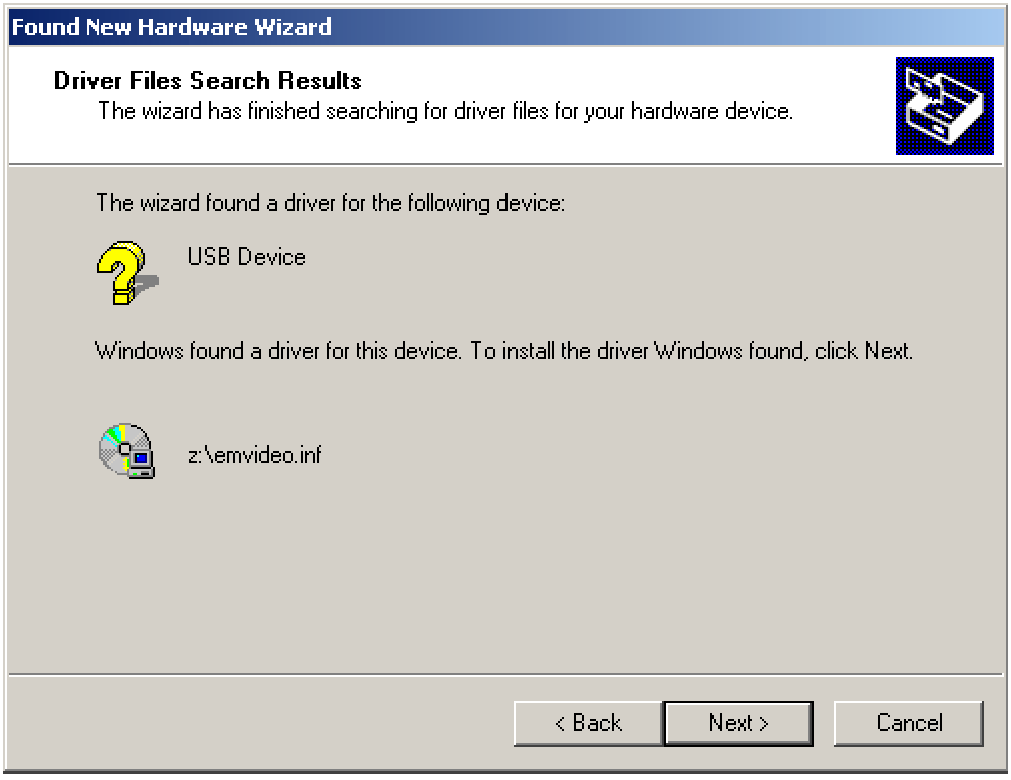
Plug the camera into a USB port.

Windows Found New Hardware Wizard window will pop up. Click on the "Next" button.

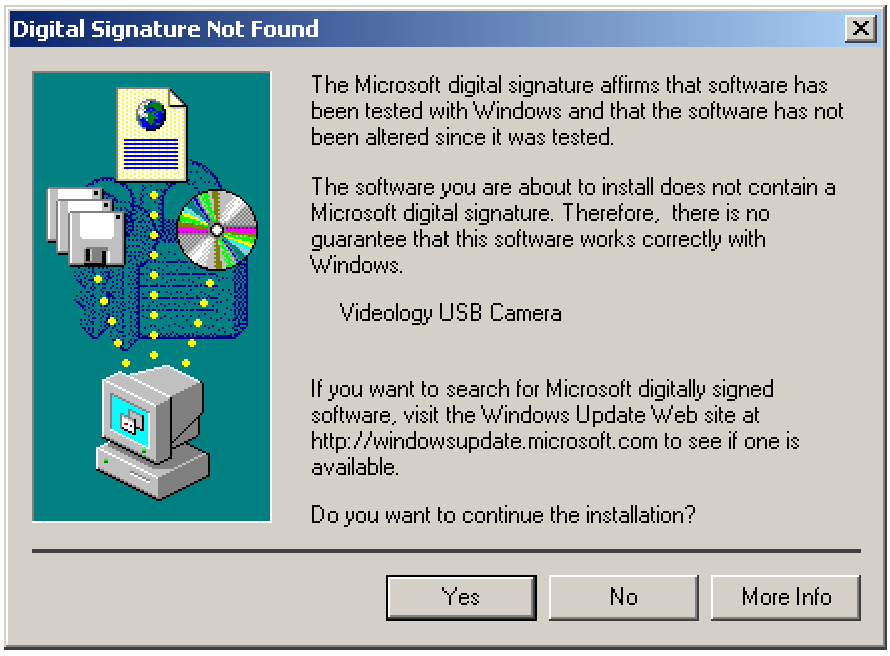
Windows Found New Hardware Wizard continues. Select "Search for a suitable driver for my device (recommended)" and click on "Next" button.



Found New Hardware Wizard continues. Make sure only the "CD-ROM drives" is checked and camera provided media CD is put into the CD-ROM drive. Click on the "Next" button.



Windows Found New Hardware Wizard continues. Click on the "Next" button.



Windows Found New Hardware Wizard continues. Click on the "Yes" button.

Windows Found New Hardware Wizard continues. Click on the "Finish" button.

4.2.2.3. Windows XP and Windows 2000

The "Videology USB2.0 Camera Software Setup" software, from which the user can select to open up user's manual or install additional software, may pop up, after the above procedure, if the CD-ROM drive's "auto insert notification" not being suppressed.

4.3. Software Installation

Note: *This version of viewer installation software runs a preview and capture mode concurrently, utilizing CPU capacity in excess of running preview alone. Please discuss with your sales support person if CPU utilization is critical to your application and Videology will provide optimal solutions.*

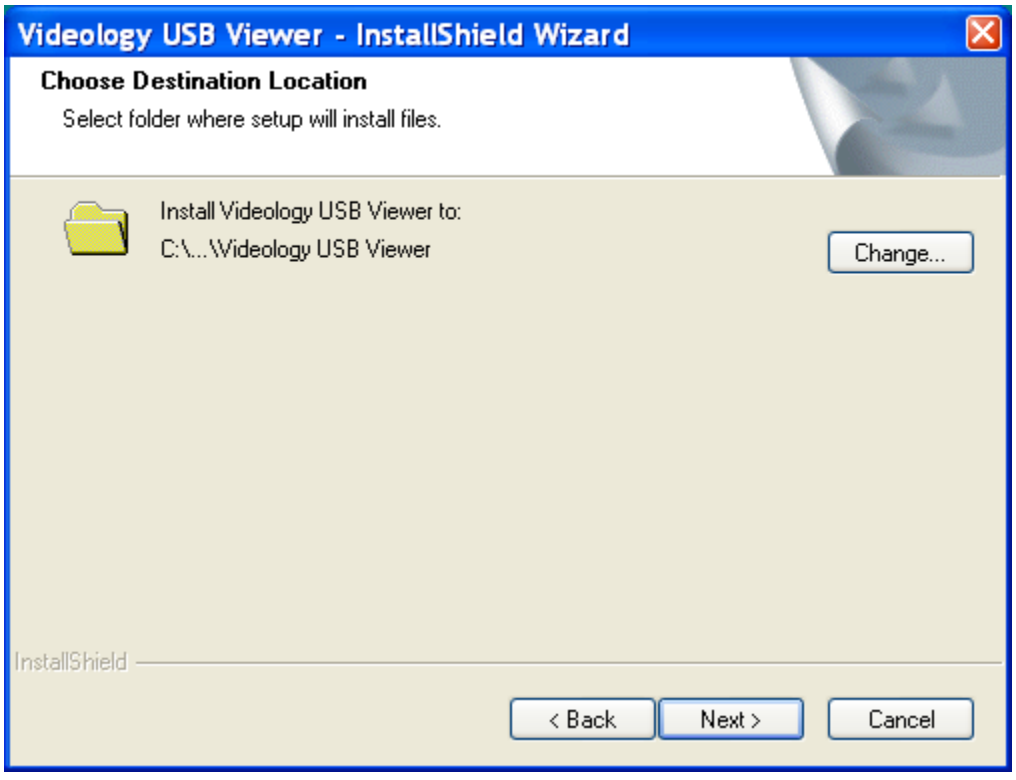
All of the additional software and user manual are contained in the software setup program "setup.exe" on the CD-ROM that comes with the camera.

The User can select to install software during your camera installation or run setup.exe software from CD-ROM. To manually run the software installation software:
Right click on the CD driver where camera provided media CD is located. Click on "Open".
Locate the "setup.exe" software in the media CD and double click on it.

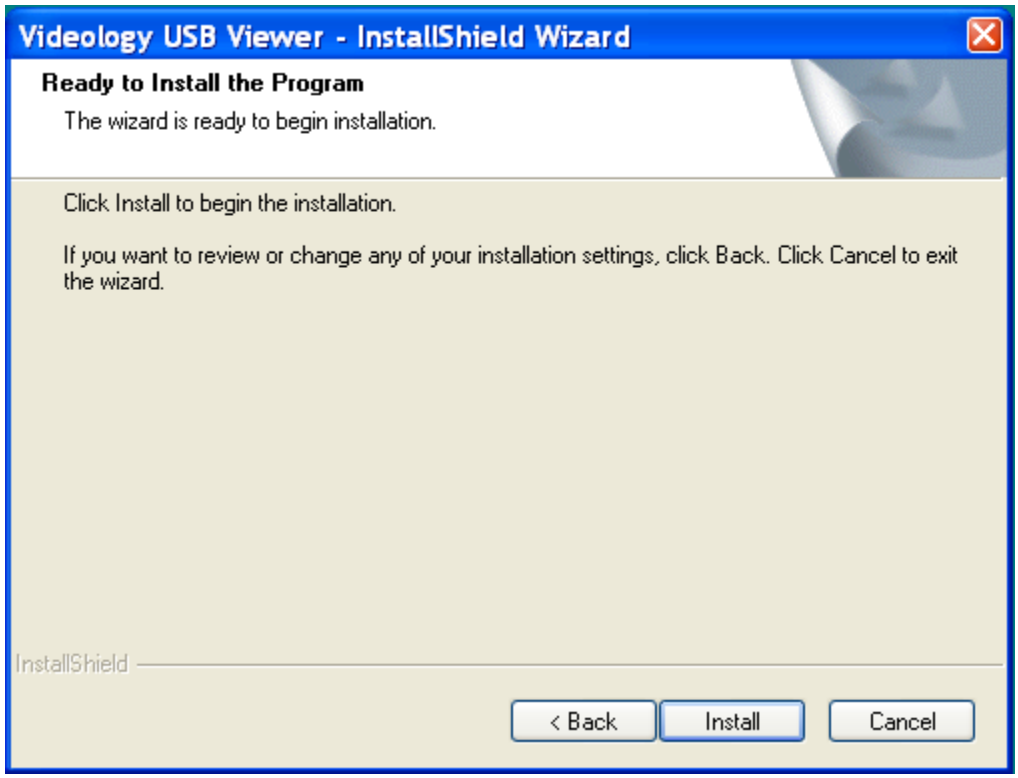
4.3.1. Videology USB Viewer Software Installation

Click on "Install Viewer" button on the "Video USB2.0 Software Setup" interface. The viewer Install Shield Wizard starts. Click on the "Next" button.

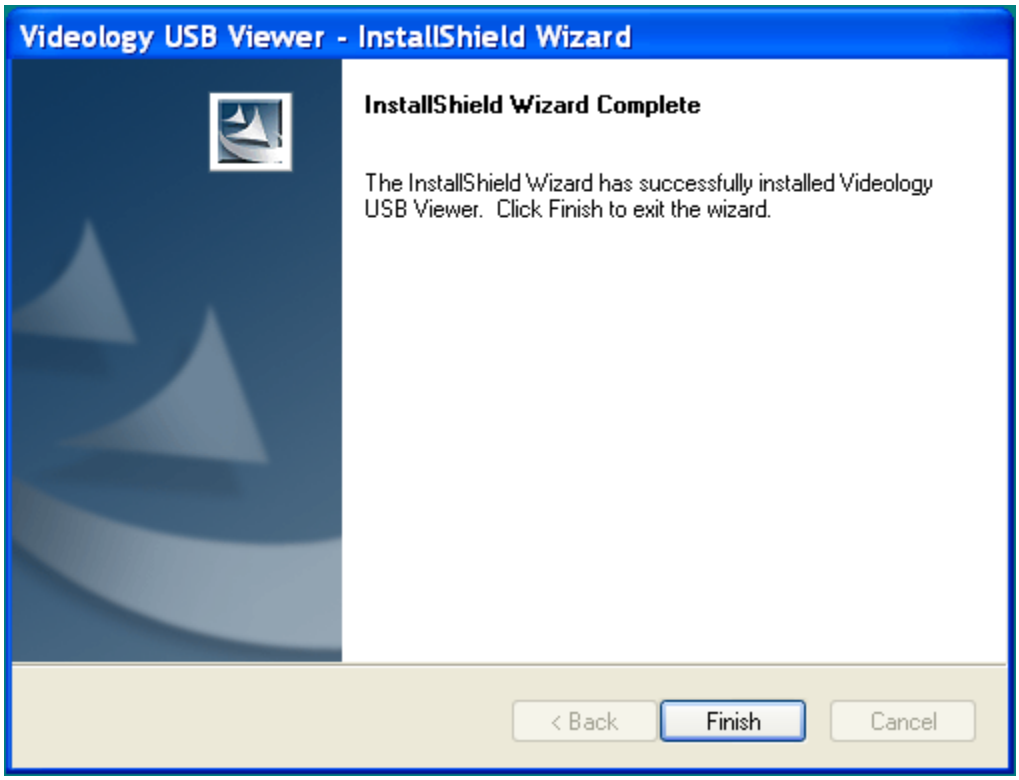
Viewer Install Sield Wizard continues. Click on the "Next" button.



Viewer Install Shield Wizard continues. Click on the "Install" button.



Viewer Install Shield Wizard continues. Click on the "Finish" button.



The Videology USB Viewer application (VidUSB2.exe) is installed in the default location: The user may change the location.

<Program Files directory>\Videology Imaging Solutions\Videology USB Viewer

A shortcut to this application is added to the Start Menu at the default location:

Start > Programs > Videology Imaging Solutions > Videology USB Viewer

4.4. Using Videology USB Viewer Software

The Videology USB viewer application is designed for ease-of-use. See figure 7.

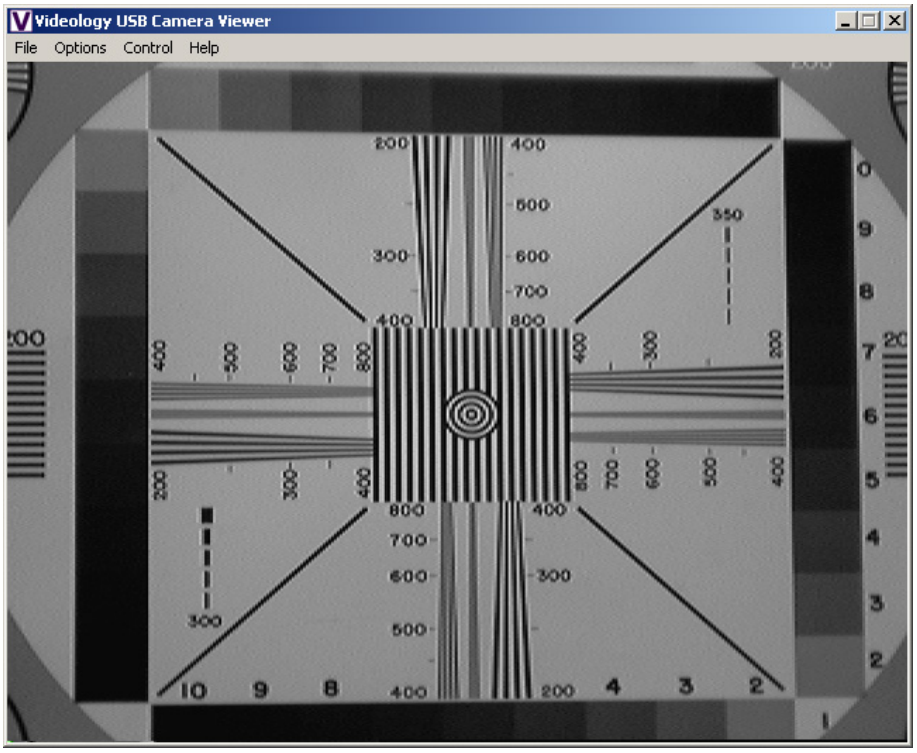


Figure 1. Viewer Application Software

4.4.1. Video Property Interfaces

The viewer exposes video property interfaces under the "Options" menu button, including **"Video Capture Filter…", "Video Capture Pin…"** and **"Video Crossbar…"**

"Video Capture Filter…" will display video capture filter property pages. See figure 8. Video Decoder: Change the Video Standard to NTSC_M, or PAL B, depending on the Videology camera model purchased. Model numbers that begin with 20 are NTSC_M format and those that begin with 21 are PAL B format. Please select the format that matches the camera. Other formats are listed as possible selections, however, for correct operation of the camera they should not be used.

Video Image: The image mask is user settable and the image can be changed vertically and horizontally. Note that the Audio properties are not applicable.

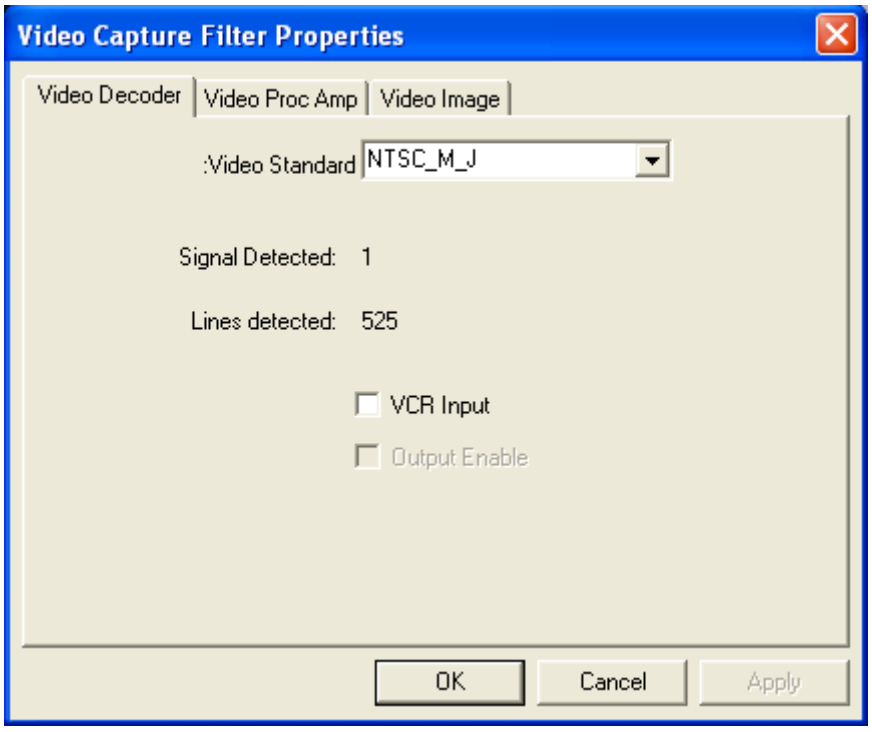


Figure 2. Video Capture Filter Properties

"Video Capture Pin..." will display video capture pin property pages. See figure 9.
Support Color Space Formats are YUV2 and I420.
Video output size is used to change video output resolutions.
Quality is used to change video stream format. Video stream will use compressed format when quality value is at a lower value.

NOTE: Do not try to set frame rate here, since the device driver automatically adjusts the frame rate setting according to the available bandwidth. Quality is only changeable when the camera is running under USB1.1.

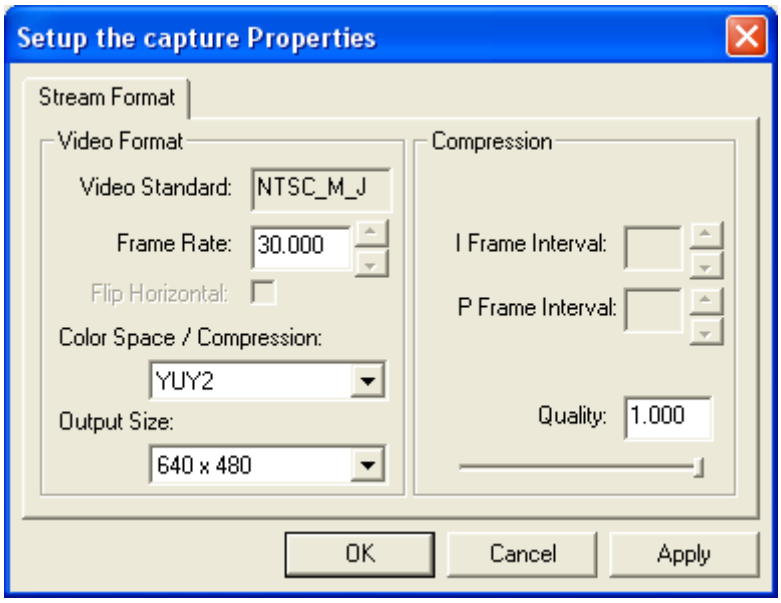


Figure 3. Video Capture Pin Properties

"Video Crossbar..." will display Video Crossbar property pages, from the video capture driver, which allows how video signals are routed. Select an output from the drop-down list,

and see where the signal comes from by checking the Input list. Change the input by selecting from the list. See figure 10.

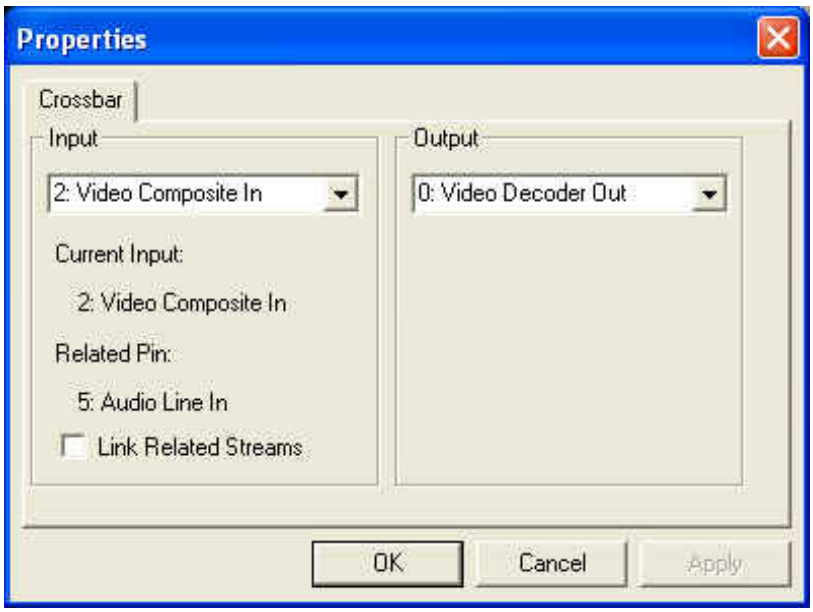


Figure 4. Video Capture Crossbar Properties

4.4.2. Enhanced Motion Stabilization Function

By default, Enhanced Motion Stabilization is set to be off. When power off, the camera will save the setting that was last selected by the user.

4.4.3. Video Camera Control

Important: "color only" functions that do not apply to the BW 20K13/ BW 21K13

"Camera Control Panel" will display the camera control toolbox, which is the same as the camera control toolbox in the TWAIN driver. See figure 11.

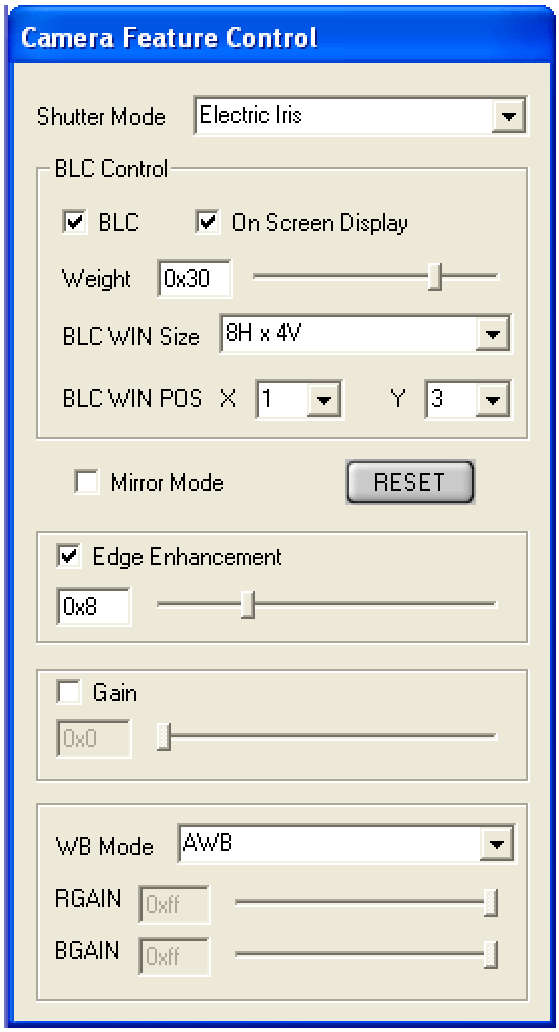


Figure 5. Camera Feature Control

"Show Control Panel" will display the camera control toolbox, which allows changes tothe camera features.

The "**Shutter Mode**" combo-box is used to select a shutter speed mode. There are 12 shutter speeds to choose from.

The "**BLC**" check box is used to toggle the back light compensation. When selected the BLC controls, including the BLC edit box, slider, "BLC WIN size" and "BLC WIN POS" combo-boxes will be in an active state, which allows changes to BLC weight, size and position. When not selected, these controls will remain gray and inactive.

The "**BLC**" edit-box and slider are used to change the BLC weight value, which ranges from 0x01 to 0x40. A value of 0 means no back light compensation.

The "**BLC WIN Size**" combo-box is used to select the BLC window size. There are 15 sizes to select and choose from.

The "**BLC WIN POS**" combo-box is used to select the BLC window position. There are 64 positions to select and choose from.

The "**On Screen Display**" check box is used to turn on or off the BLC window size and position the on screen help, which, when selected, divides the video screen into 8 x 8 blocks using gray lines. The current BLC window size and position are shown on the screen as a red rectangle box, see figure 12.

The BLC window position can be dragged to another position using the left mouse button. When the mouse is moved to the BLC window on the video screen, the mouse cursor becomes a hand-shaped cursor. To change the BLC window position, hold the left mouse button down, move the window to the new selected position and release the button.

The BLC window can also be resized or repositioned by redrawing, using the right mouse button. When the mouse is moved to any cross point of 8 x 8 gray lines, the mouse cursor will become a cross-line cursor. Holding the right mouse button down, the BLC window will be drawn until the button is release. Note that the window size can be selected as only 1, 2, 4, 8 blocks in the horizontal or vertical.

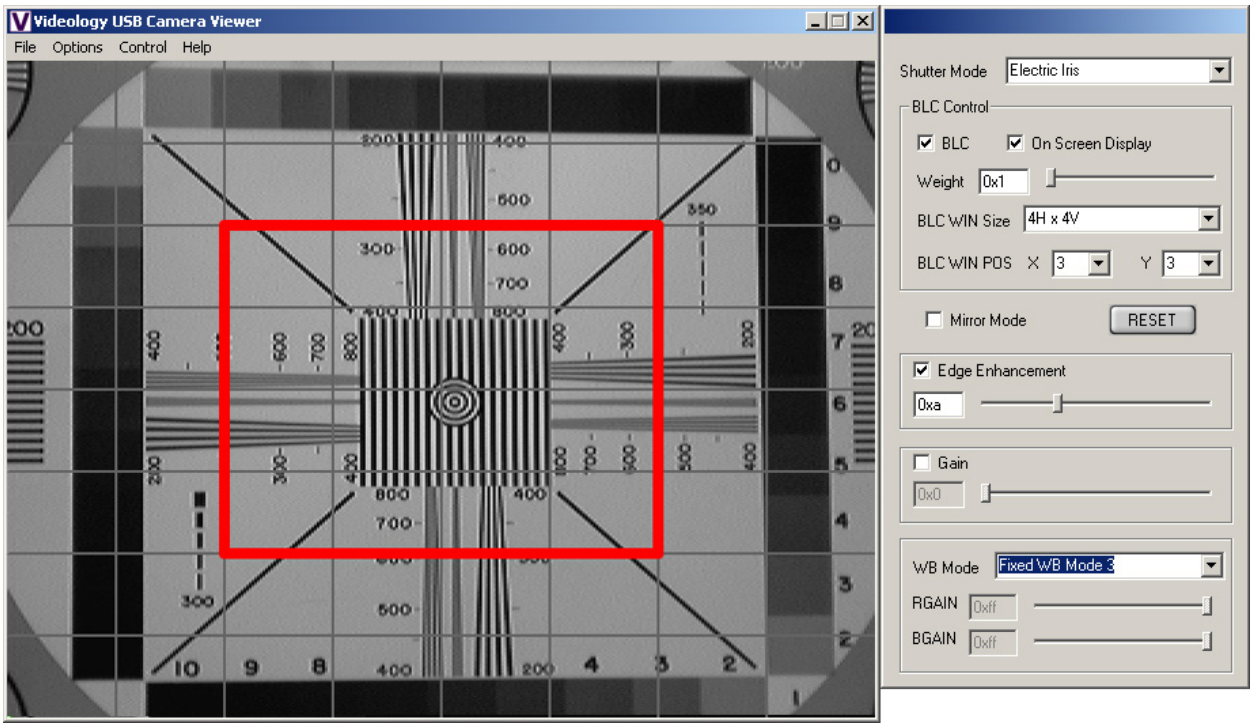


Figure 6. BLC On Screen Display Help

The "**Mirror Mode**" check box is used to toggle the mirror modes on/off.

The "**RESET**" button is used to reset the camera to the factory settings. ***Caution:*** Resetting the camera will cancel all changes made by the user.

The "**Edge Enhancement**" check box is used to toggle the edge enhancement modes on/off. When selected, the edit box and slider will be in the active state, which allows changes to the edge enhancement values. When not selected, these controls remain gray and inactive.

The "**Edge Enhancement**" edit box and slider allows changes to the edge enhancement values. The value ranges from 0x00 to 0x1f.

The "**Gain**" check box is used to toggle the manual gain control on/off. When selected, the edit box and slider will be in the active state and allows changes to the manual gain value. When not selected, these controls will remain gray and inactive and the camera will be in Auto Gain Control mode (AGC).

The "**Gain**" edit box and slider are used to adjust the manual gain level of the camera. The manual gain value ranges from 0x80 to 0xff.

The "**WB Mode**" combo-box is used to select white balance modes. When the white balance mode 1 is selected, the "RGAIN" and "BGAIN" edit boxes and sliders will allows changes to the red gain and blue gain. For the other modes, red and blue gain controls remain gray and inactive.

The "**RGAIN**" edit box and slider control are used to change the red gain level of the camera. The red gain value ranges from 0x00 to 0xff.

The "**BGAIN**" edit box and slider control are used to change the blue gain level of the camera. The blue gain value ranges from 0x00 to 0xff.

4.4.4. Still Image Capture

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 "**Snap**" button is used to grab an image from the camera and save it in a .bmp file.

4.5. Using the Twain Driver

TWAIN acquisition can be performed from any TWAIN compatible application, such as Photoshop, Imaging and Twack_32.exe. It provides a live video window with a main control panel and a camera control panel.

The TWAIN driver is installed in the default location (User may change the location):

<Window directory>\twain_32\USB2800

4.5.1. Main Control Panel

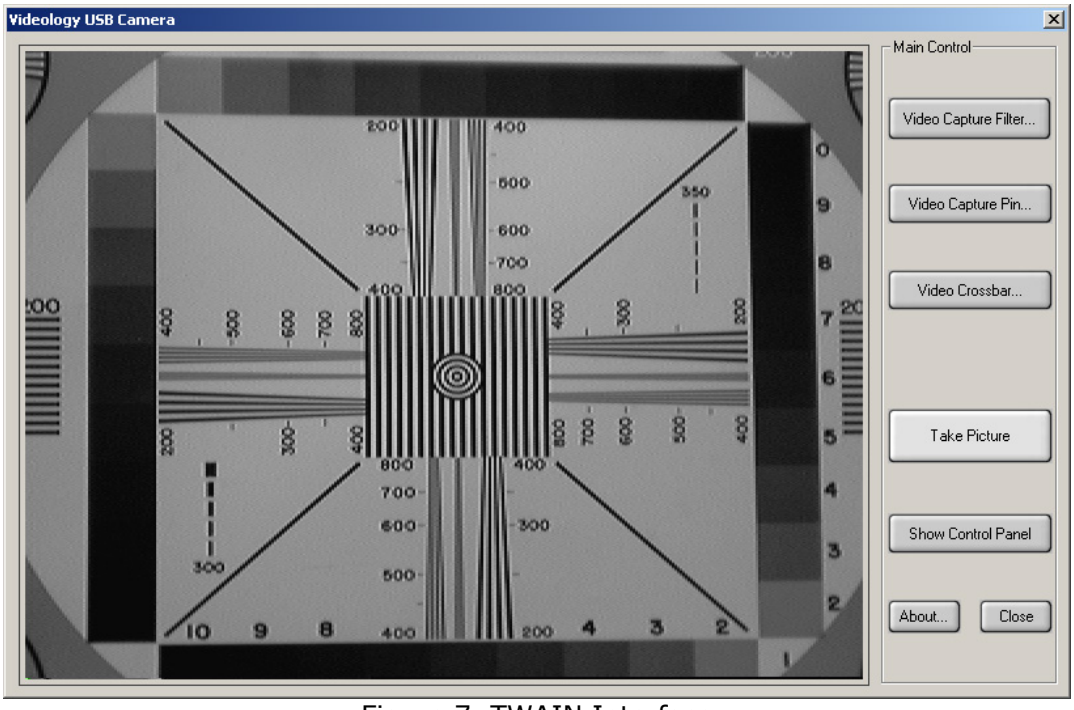


Figure 7. TWAIN Interface

"Video Capture Filter…" will display video capture filter property pages. See figure 2. Video Decoder: The user can change the Video Standard to NTSC_M, or PAL B, depending on the Videology camera model purchased. Model numbers that begin in 20 are NTSC_M

format and those that begin with 21 are PAL B format. Please select the format that matches your camera. Other formats are listed as possible selections, however for correct operation of the camera they should not be used.

Videology Proc Amp: You can change brightness, contrast, saturation or sharpness, etc. Please note that hue is not changeable.

Video Image: You can set the image mask, and flip the image vertically and horizontally. Note that the Audio properties are not applicable.

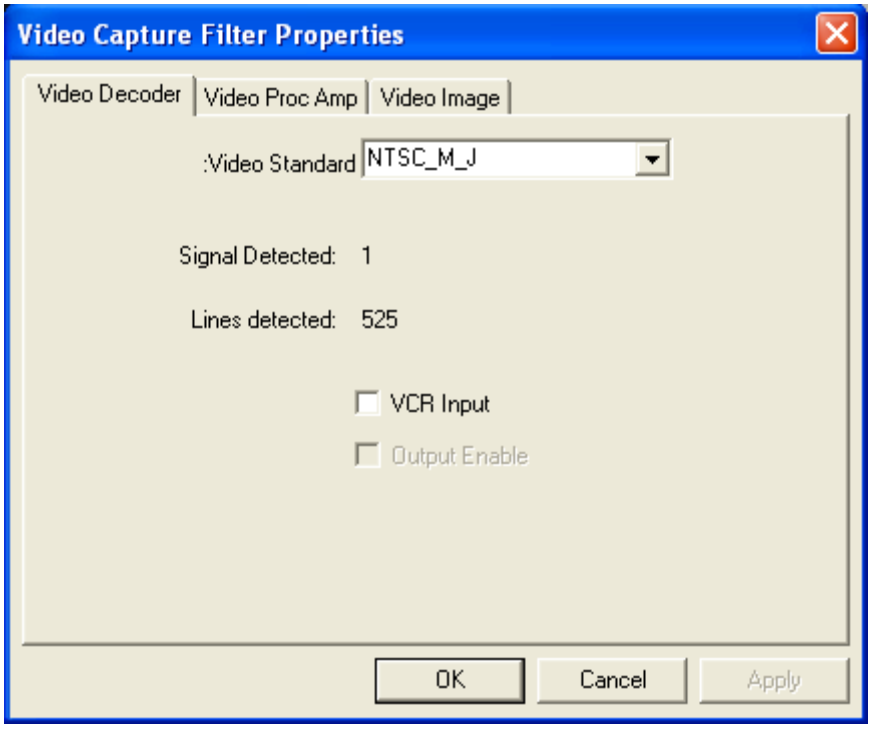


Figure 8. Video Capture Filter Properties

"Video Capture Pin..." will display video capture pin property pages. See figure 3.
Support Color Space Formats are YUV2 and I420.
Video output size is used to change video output resolutions.
Quality is used to change video stream format. Video stream will use compressed format when quality value is at a lower value.

NOTE: Do not try to set the frame rate here, the device driver automatically adjusts the frame rate setting according to the available bandwidth. Quality is only changeable when the camera is running under USB1.1.

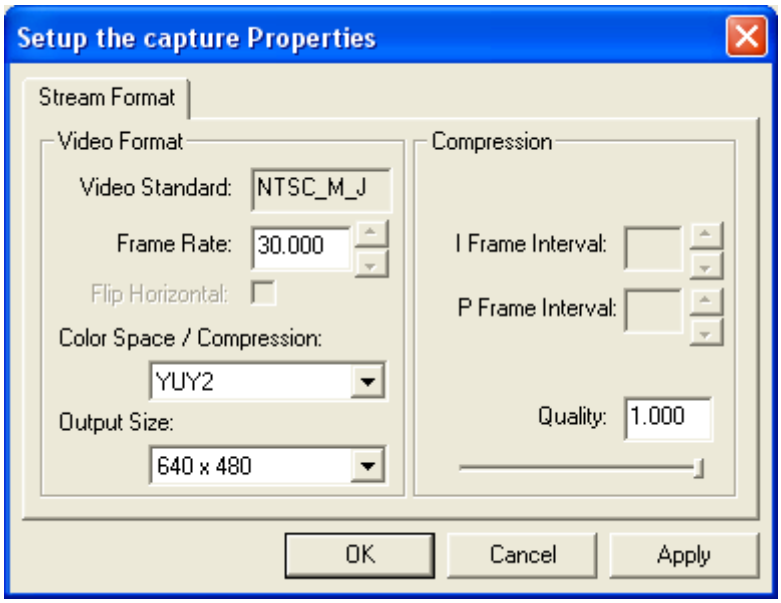


Figure 9. Video Capture Pin Properties

"Video Crossbar..." will display Video Crossbar property pages, from the video capture driver, which allows a user to control how video signals are routed. Select an output from the drop-down list, and see where the signal comes from by checking the Input list. Change the input by selecting from the list. See figure 4.

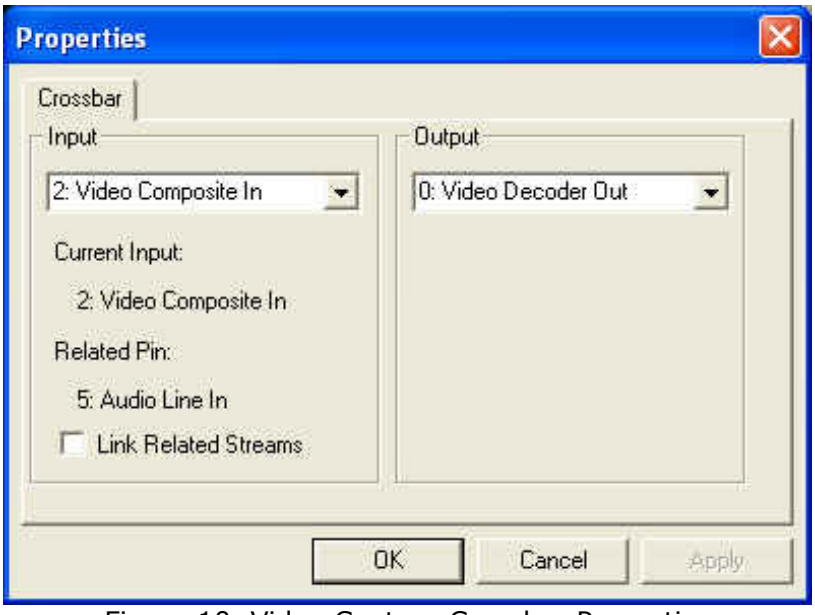


Figure 10. Video Capture Crossbar Properties

"Take Picture" will capture a picture from the camera and transfer it to the parent TWAIN application software.

4.5.2. Camera Control Panel

Important: "color only" functions that do not apply to the BW 20K13/ BW 21K13

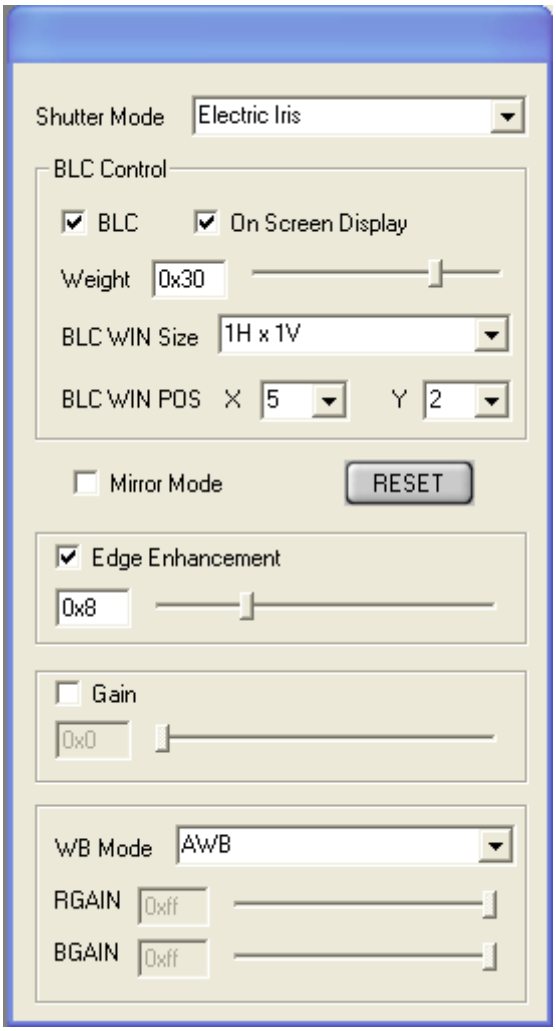


Figure 11. Camera Feature Control

"Show Control Panel" will display the camera control toolbox, which allows the user to change camera features.

The "**Shutter Mode**" combo-box is used to select a shutter speed mode. There are 12 shutter speeds to choose from.

The "**BLC**" check box is used to toggle the Back Light Compensation. When selected the BLC controls, including the BLC edit box, slider, "BLC WIN size" and "BLC WIN POS" combo-boxes will be in an active state, which allows you to make changes to BLC weight, size and position. When not selected, these controls will remain gray and inactive.
The "**BLC**" edit-box and slider are used to change the BLC weight value, which ranges from 0x01 to 0x40. A value of 0 means no back light compensation.

The "**BLC WIN Size**" combo-box is used to select the BLC window size. There are 15 sizes to select and choose from.

The "**BLC WIN POS**" combo-box is used to select the BLC window position. There are 64 positions to choose from.

The "**On Screen Display**" check box is used to turn on or off the BLC window size and position the on screen help, which, when selected, divides the video screen into 8 x 8 blocks using gray lines. The current BLC window size and position are shown on the screen as a red rectangle box, see figure 6.

The BLC window position can be dragged to another position using the left mouse button. When the mouse is moved to the BLC window on the video screen, the mouse cursor becomes a hand-shaped cursor. To change the BLC window position, hold the left mouse button down, move the window to the new selected position and release the button.

The BLC window can also be resized or repositioned by using the *right mouse button and* redrawing,. When the mouse is moved to any cross point of 8 x 8 gray lines, *the mouse cursor will become a cross-line cursor. Holding the right mouse button down*, the BLC window will be drawn until the button is released. Note that the window size can be selected as only 1, 2, 4, 8 blocks in the horizontal or vertical.

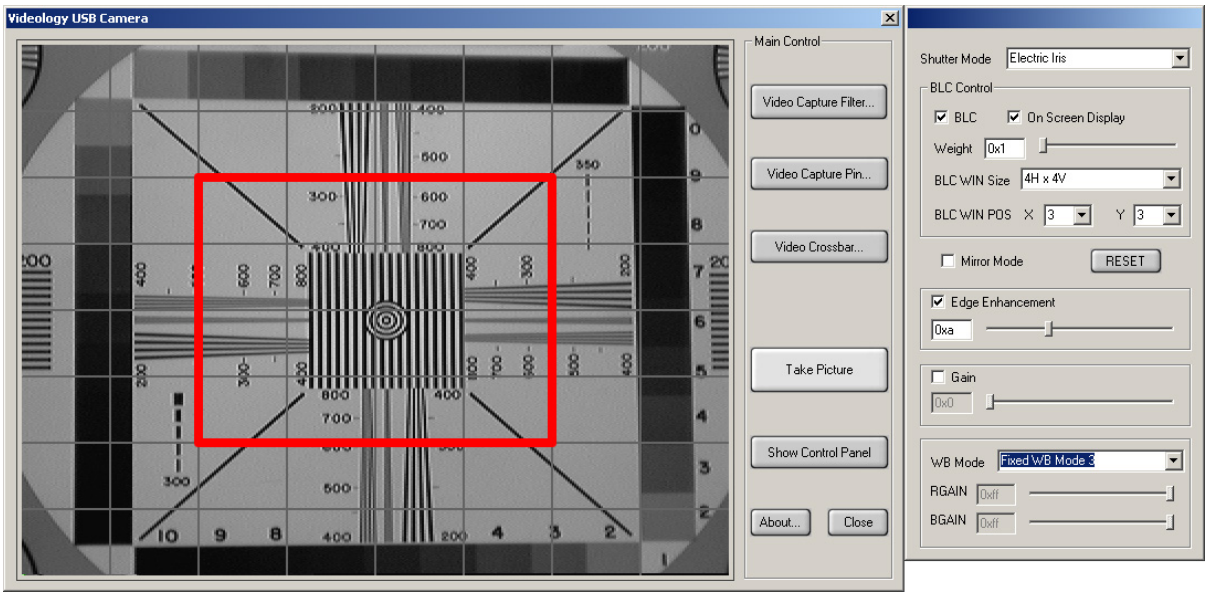


Figure 12. BLC On Screen Display Help

The "**Mirror Mode**" check box is used to toggle the mirror modes on/off.

The "**RESET**" button is used to reset the camera to the factory settings. ***Caution:*** Resetting the camera will cancel all changes made by the user.

The "**Edge Enhancement**" check box is used to toggle the edge enhancement modes on/off. When selected, the edit box and slider will be in the active state, which allows the user to change edge enhance values. When not selected, these controls remain gray and inactive.

The "**Edge Enhancement**" edit box and slider allows the users to change edge enhancement values. The value ranges from 0x00 to 0x1f.

The "**Gain**" check box is used to toggle the manual gain control on/off. When selected, the edit box and slider will be in the active state and allow changes to the manual gain value. When not selected, these controls will remain gray and inactive and the camera will be in Auto Gain Control mode (AGC).

The "**Gain**" edit box and slider are used to adjust the gain level of the camera. The gain value ranges from 0x80 to 0xff.

The "**WB Mode**" combo-box is used to select white balance modes. When the white balance mode 1 is selected, the "RGAIN" and "BGAIN" edit boxes and sliders will allow changes to the red gain and blue gain. For the other modes, red and blue gain controls remain gray and inactive.

The "**RGAIN**" edit box and slider control are used to change the red gain level of the camera. The red gain value ranges from 0x00 to 0xff.

The "**BGAIN**" edit box and slider control are used to change the blue gain level of the camera. The blue gain value ranges from 0x00 to 0xff.

5. Understanding Your Camera

5.1. Theory of Operation

The host PC communicates to the Videology USB 2.0 camera through the USB Controller. The USB Controller addresses:

An EEPROM that is always in Slave mode.
A Micro-controller that operates in Slave and Master mode.

This architecture was chosen to minimize the time for camera communications on the USB bus. When control data from the PC is sent to the camera, it is first transferred to the EEPROM by the USB controller. Following this control data transfer the Micro-controller (in Slave mode) receives a command indicating where and how many bytes must be collected for the command. The Micro-controller interprets the data and determines what registers in the camera must be changed. At this point, the Micro-controller switches to Master mode and transfers commands and data from the EEPROM to the camera board by the I^2C communication bus. Video data is sent directly to the USB Controller over a parallel bus.

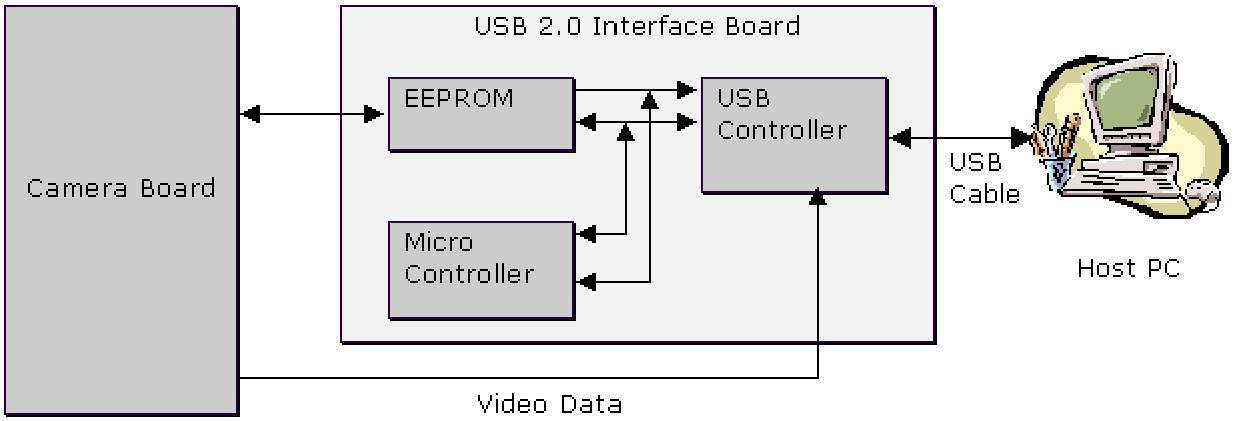


Figure 13. Block Diagram

5.2. IR/OLP Options

The Videology USB 2.0 color cameras are supplied with an IR/OLP filter that assures excellent color fidelity by blocking camera sensitive Infrared (IR) light. The IR content in certain light sources can cause the camera to produce incorrect color. The Optical Low Pass filter (OLP) part of the filter reduces color aliasing by limiting the high frequency elements of the scene to those that can be resolved by the CCD. The graph below illustrates the blocking of the IR wavelengths.

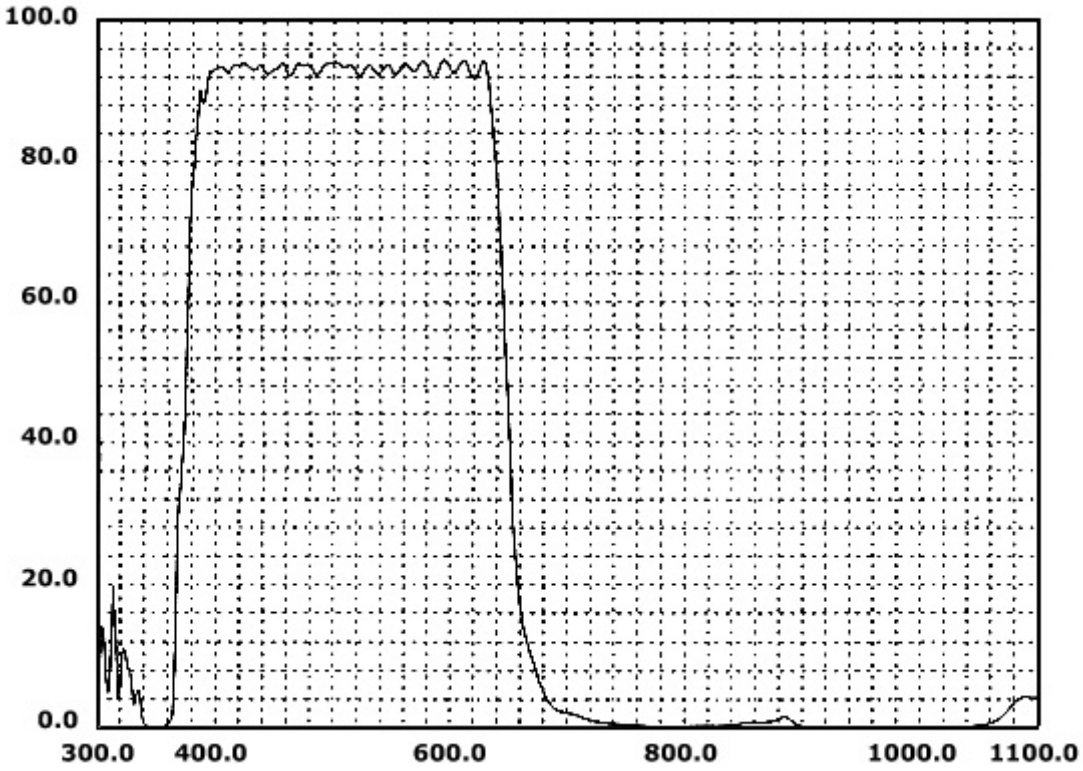
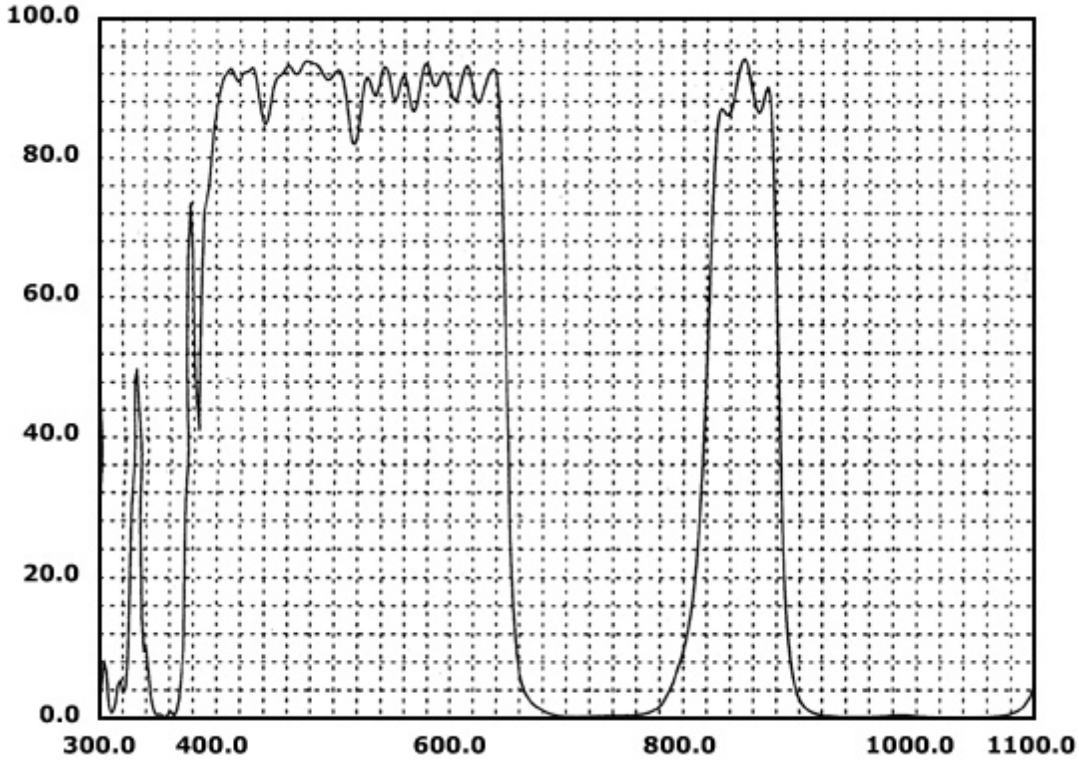


Figure 14. Normal IR/OLP Filter

The camera can alternativy be supplied with an IR/OLP Day/Night filter. This type of filter functions the same as the standard filter, except that it allows a narrow band-pass in the near infrared to allow the camera to be put into a monochrome mode for better images in low lighted scenes and optimal images with near IR illumination. This option is 20K14XUSB-DN. The graph below shows the band-pass of the IR/OLP Day/ Night filter.



Wavelength (.nm)
Figure 15. Day/night IR/OLP Filter

5.3. Shutter Mode

In default mode, the camera operates in the electronic iris mode. This means the output of the CCD, which is dependent on the light intensity, is controlled by the electronics of the camera and not a mechanical iris in the lens. To do this the camera utilizes a variable integration method called an Electronic Iris that controls the CCD output. When more CCD output current is required to maintain the nominal 1 V peak to peak video output signal, then the integration period becomes longer. If too much CCD output current is occurring due to CCD sensor light saturation, then the integration period is shortened to maintain the nominal video output.

However, sometimes it is preferred that the shutter is fixed and not adjusting automatically. An example where using a fixed shutter is beneficial is if there is a very fast moving object in the scene. The longer the integration time (maximum 1/50 sec for PAL and maximum 1/60 sec for NTSC) the less sharp the image will be due to movement of the object during the integration period. To prevent this, the camera has 12 fixed shutter speeds (see table 1). To switch the Electronic Iris off there are two options: software control or hardware control. To set the camera into the hardware control mode, set register 02h (mode out) to analog mode.

MODE	ELECTRONIC SHUTTER SPEED	
	NTSC	PAL
0	Electric Iris	Electric Iris
1	1/60 sec	1/50 sec
2	1/100 sec (flickerless)	1/120 sec (flickerless)
3	1/250 sec	1/250 sec
4	1/500 sec	1/500 sec
5	1/1000 sec	1/1000 sec
6	1/2000 sec	1/2000 sec

7	1/5000 sec	1/5000 sec
8	1/10000 sec	1/10000 sec
9	1/20000 sec	1/20000 sec
10	1/50000 sec	1/50000 sec
11	1/100000 sec	1/100000 sec

Table 1. Fixed Shutter Speed

Flicker-less means that a PAL camera can be used in a 60 Hz (or a NTSC camera in a 50 Hz) light environment without flickering.

5.4. Back Light Compensation

The camera's default setting for back light compensation (BLC) is off. This means that for the electronic iris circuit only the main part of the scene is taken into account to determine the level of the CCD output (see figure 17). When fixed shutter speeds are used, this function has no effect.

Sometimes it can be required that the complete image should be used to determine the CCD output level.

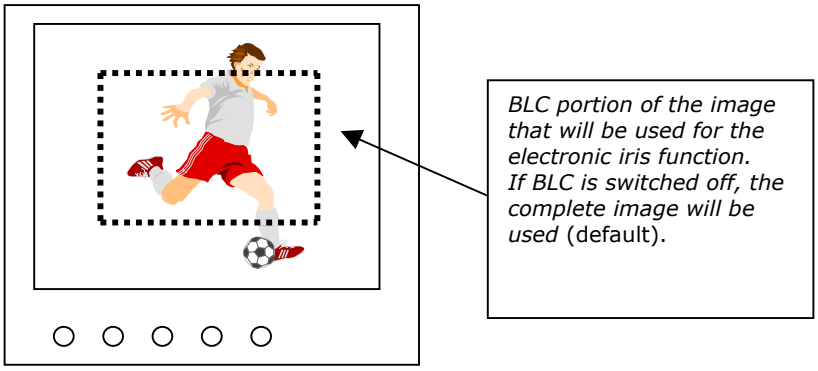


Figure 16. Back Light Compensation

5.4.1. BLC Window Size

For Back Light Compensation, the active pixel area is divided into 64 equally sized blocks in a grid. The default BLC window size is 8H X 4V blocks. The BLC window size can be selected from the list below:

1H X 1V: one block
1H X 2V: 2 blocks vertical adjacent
1H X 4V: 4 blocks vertical adjacent
1H X 8V: 8 blocks vertical adjacent
2H X 1V: two block horizontal adjacent
2H X 2V: 2 horizontal and 2 vertical blocks total 4
2H X 4V: 2 horizontal and 4 vertical blocks total 8
2H X 8V: 2 horizontal and 8 vertical blocks total 16
4H X 1V: 4 horizontal and 1 vertical blocks total 4
4H X 2V: 4 horizontal and 2 vertical blocks total 8
4H X 4V: 4 horizontal and 4 vertical blocks total 16
4H X 8V: 4 horizontal and 8 vertical blocks total 32
8H X 1V: 8 horizontal and 1 vertical blocks total 8
8H X 2V: 8 horizontal and 2 vertical blocks total 16
8H X 4V: 8 horizontal and 4 vertical blocks total 32

5.4.2. BLC Window Position

The default BLC window position is the center of the image. The BLC window may be moved and set over the active pixel area.

5.5. Mirror Mode

Select by checking the mirror image box to flip the camera image horizontally.

5.6. Reset

Pushing the reset button sets the camera to the original factory settings. This may take a few moments depending on the speed of the PC or laptop. ***Caution:*** Resetting the camera will cancel all changes made by the user.

5.7. Edge Enhancement

Switches edge enhancement on and off in the vertical and horizontal directions. Edge enhancement is the integration of a pulse at the transitions of video levels within a scene. This adds an artificial sharpness to edges in the scene and produces a crisper appearing video or captured still image. However, this process does add a small amount of noise to the video image. If the camera is used to capture images for processing it may be desired to reduce the amount of edge enhancement or turn it off completely to obtain the truest, cleanest possible images.

5.8. Gain

The camera's automatic gain control (AGC) is on by default. This function maintains the output signal at a constant level while the scene lighting changes. If the camera is pointed to gray scale staircase chart (.45 Gamma) the video signal output is normally set to 1Vp-p. This control circuit works with an integrator to create the average value of the video signal, which is then compared with an internal reference resulting in a gain increase or decrease to match the reference.

The AGC may be switched to Manual Gain Control (MGC). When the camera is in the MGC control mode, the gain can be selected by the slider bar and will not change due to light level or content changes in the scene. Moving the slider bar completely to the will also turn off the gain.

5.9. White Balance Mode

Note: Monochrome Models will not react to white balance prompts.

The color cameras have 4 different WB modes:

Auto mode: The camera will react continuously on changes in the scene and will adapt its Red and Blue gain to reproduce colors as well as white according to preset registers.

Beside the auto mode the camera has three default values. In these modes the camera will not change white balance in response to scene changes, but will set the white balance according to values preset in its registers.

The different W.B. modes:

1. Auto white balance mode
2. Indoor
3. 4500 K
4. Outdoor

6. Troubleshooting guide

6.1. Symptom 1

Video display shows a green color or black color.
Resolution 1:
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.

6.2. Symptom 2

Video display appears inoperable or exhibits a slow frame rate.
Resolution 2:
Verify the system complies with the minimum system requirement specification.
Try a different USB 2.0 port in your system.

A. 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.

6.3. Symptom 3

A incomplete or scrambled video display on USB 1.1 port.
Resolution 3:
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.

6.4. Symptom 4

Cannot see video.

Resolution 4:

Unplug and plug the camera in again.

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

6.4.1. Scenario 1

Hardware-First, Driver Installed Before, but not Correctly

6.4.1.1. Windows XP

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

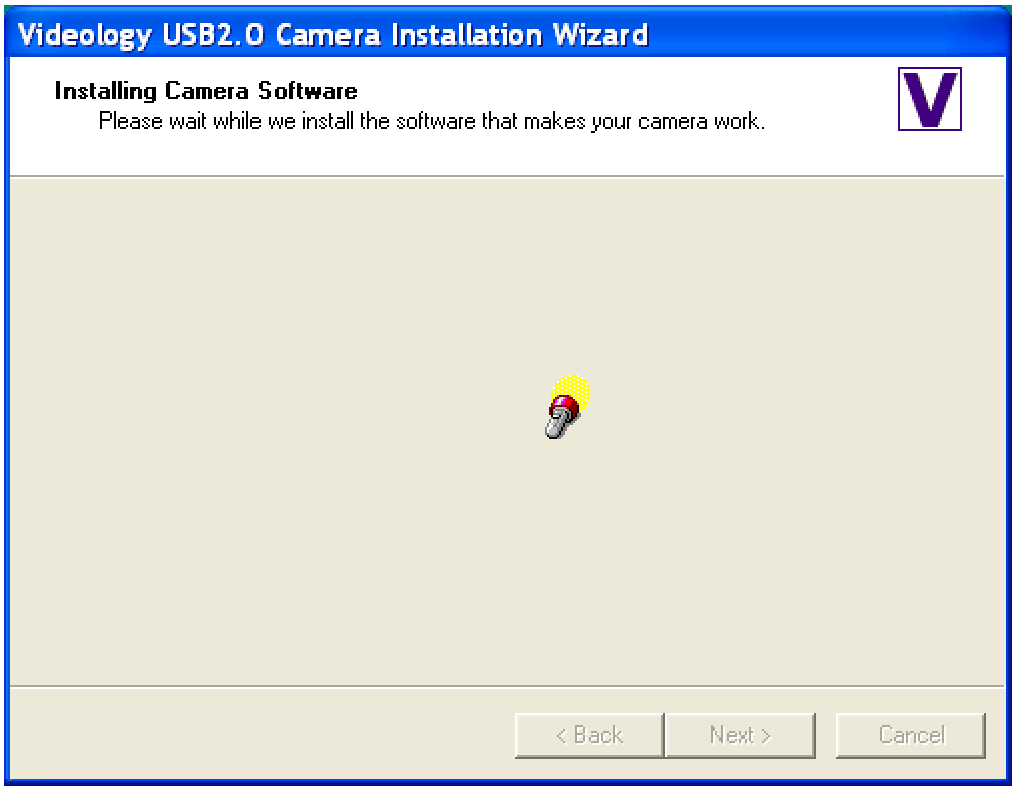
Insert Videology CD provided with the camera into a CD-ROM drive. The "Videology USB2.0 Camera Installation Wizard" software will run automatically.

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

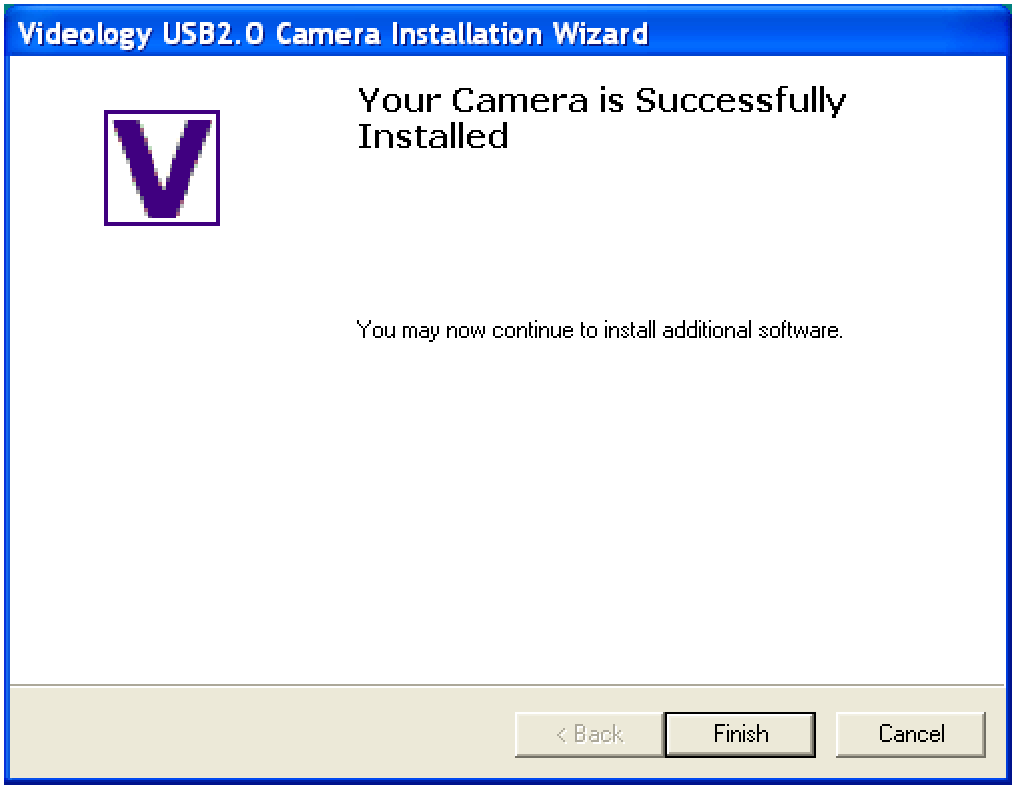
> (Note: The auto-run application runs or not when media CD inserted depend on the "auto insert notification" option checked in the properties of your CD drive. The method of changing this setting depends on what exact version of Windows you have. For information on how to do this, you may do a search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

Click on the "Next" button.

The Videology USB2.0 Camera Installation Wizard continues.



The Videology USB2.0 Camera Installation Wizard continues. Click on the "Finish" button.



The "Videology USB2.0 Camera Software Setup" software will pop up. Then select user's manual or install additional software.

6.4.1.2. Windows 2000

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

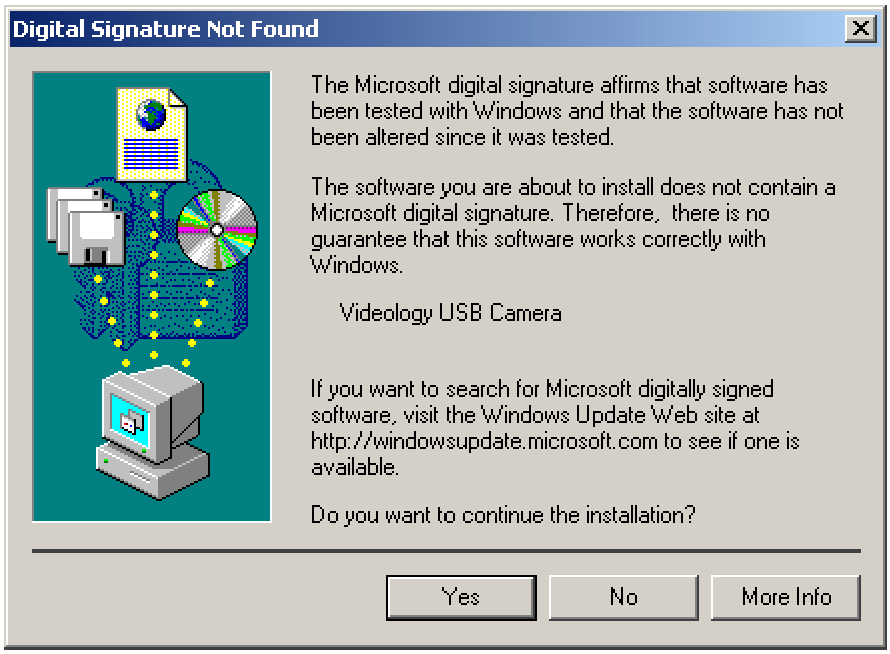
Insert Videology CD provided with the camera into a CD-ROM drive. The autorun.exe software in the CD will run automatically.

In case that 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, search in Windows Help for "auto insert notification".)

Click on the “Next” button.

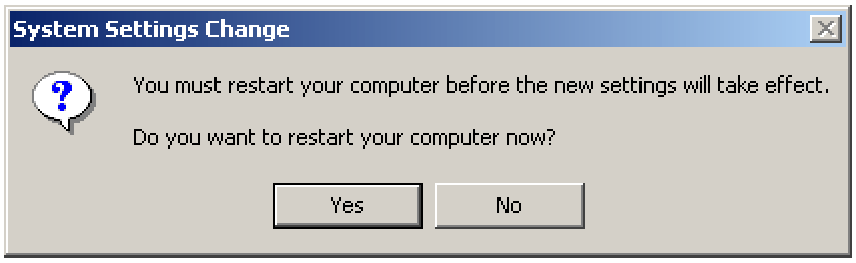
The Videology USB2.0 Camera Installation Wizard continues. Click on the "Next" button.



The Videology USB2.0 Camera Installation Wizard continues. Click on the "Yes" button.

The Videology USB2.0 Camera Installation Wizard continues. Click on the "Next" button.

The Videology USB2.0 Camera Installation Wizard continues. Click on the "Finish" button.



The Videology USB2.0 Camera Installation Wizard continues. Click on the "Yes" button. After the computer restart, the "Videology USB2.0 Camera Software Setup" software will pop up. Then select user's manual or install additional software.

6.4.2. Scenario 2

Software -First, Driver Installed Before, but not Correctly

6.4.2.1. Windows XP

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

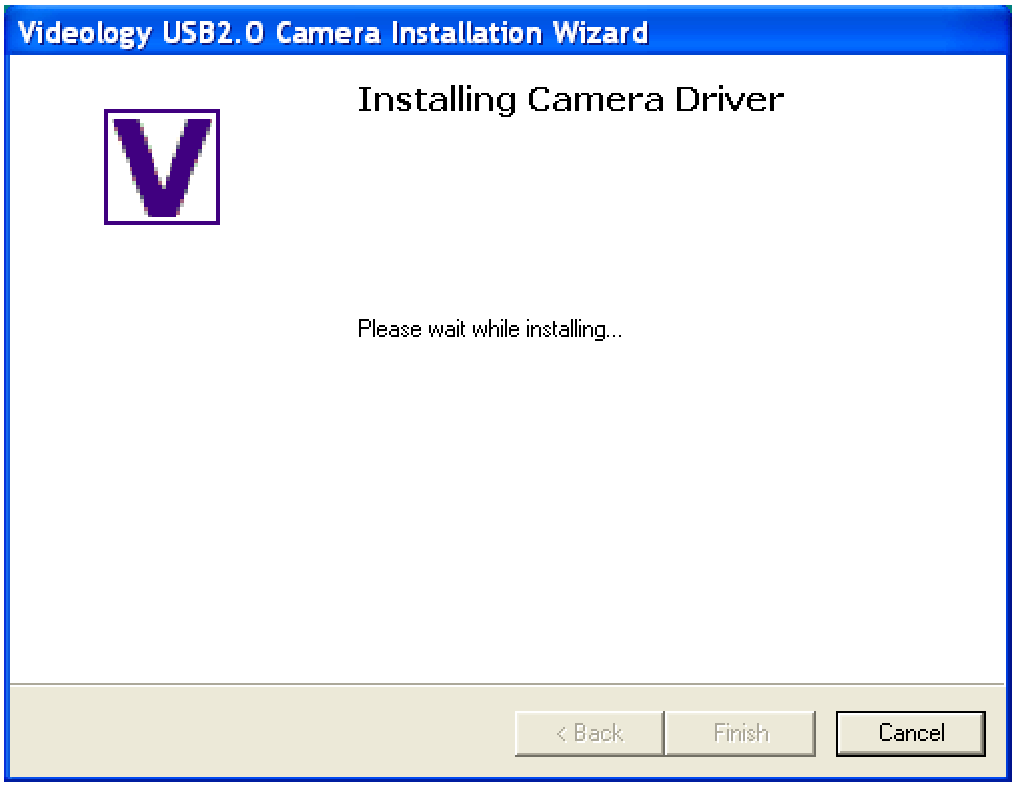
In case that the autorun.exe software does not run automatically, browse the CD files and double click on the "autorun.exe" file to run it.

> (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, search in Windows Help for "auto insert notification".)

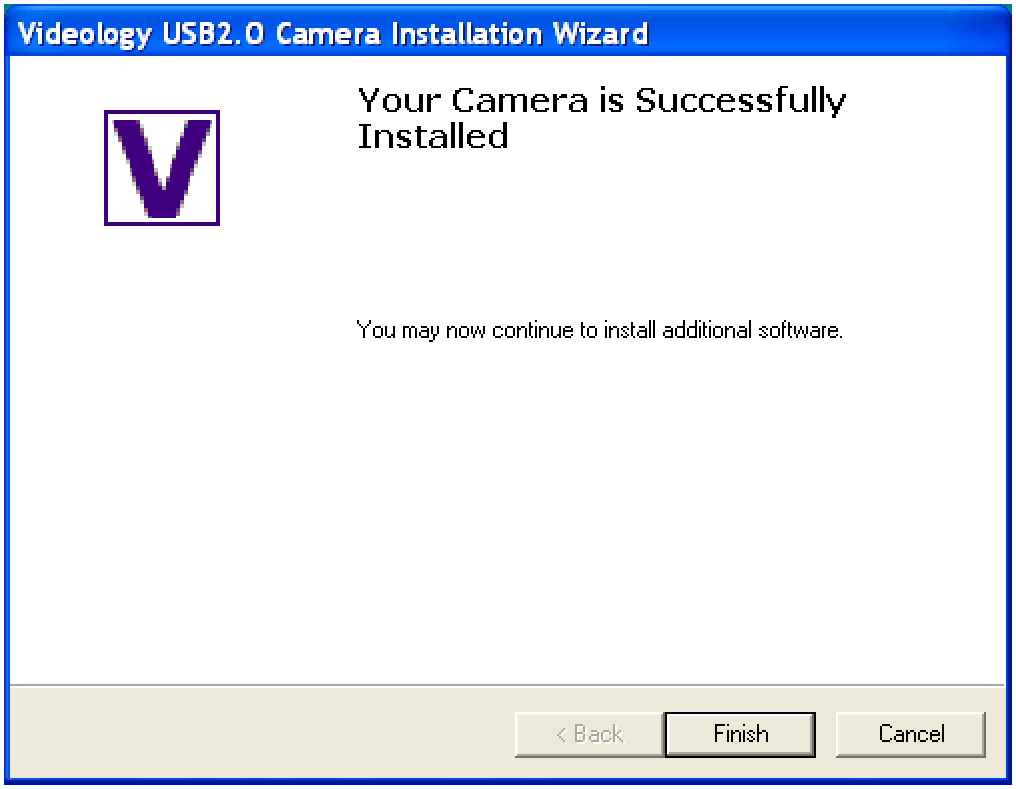
Click on the "Next" button.

Videology USB2.0 Camera Installation Wizard continues. Plug your camera into one of the USB ports and then click on the "Next" button.

Videology USB2.0 Camera Installation Wizard continues, click on the "Next" button.



Videology USB2.0 Camera Installation Wizard continues.



Videology USB2.0 Camera Installation Wizard continues. Click on the "Finish" button.

Videology USB2.0 Camera Installation Wizard continues. The "Videology USB2.0 Camera Software Setup" software will pop up, from where can select to open up user's manual or install additional software.

6.4.2.2. Windows 2000

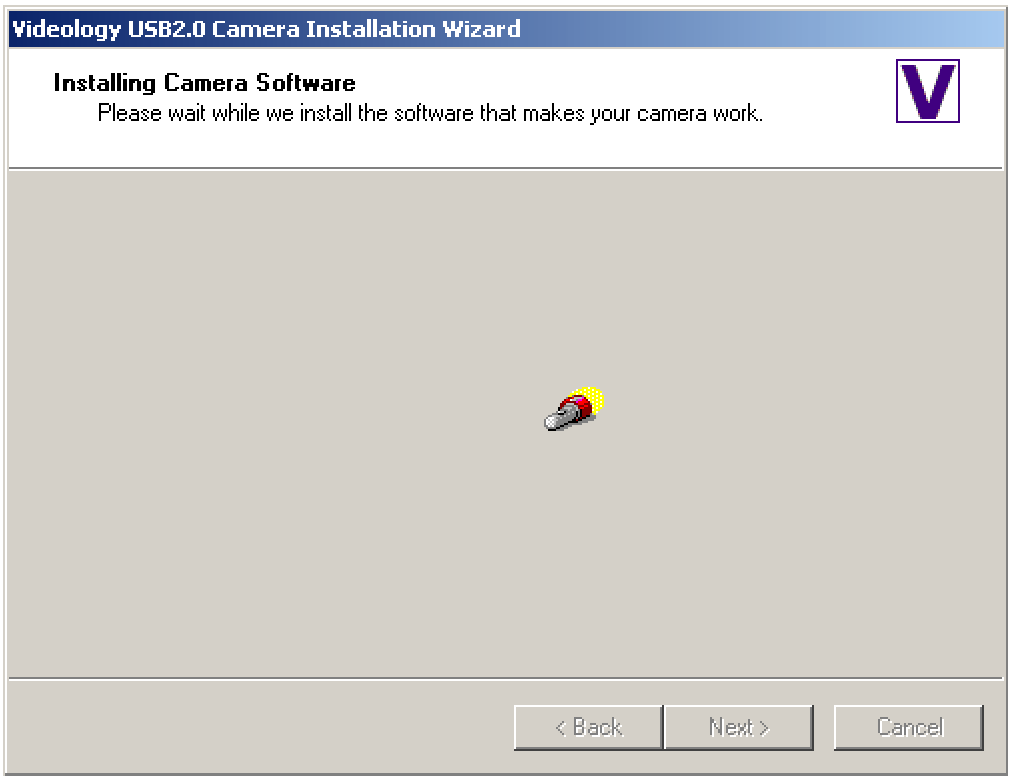
Insert Videology CD provided with the camera into a CD-ROM drive. The "Videology USB2.0 Camera Installation Wizard" software will run automatically.

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

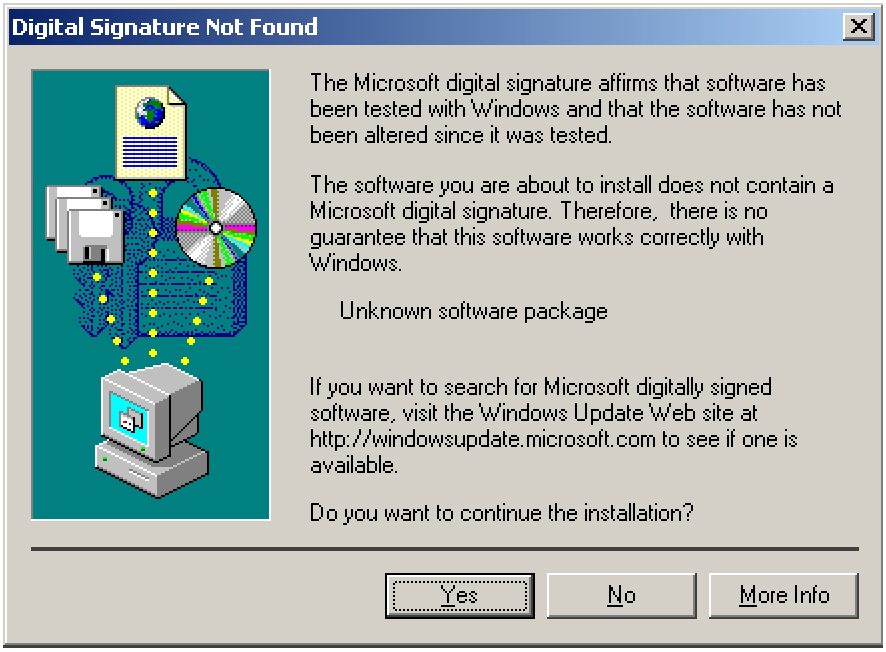
> (Note: The auto-run application runs or not when media CD inserted depend on the "auto insert notification" option checked in the properties of your CD drive. The method of changing this setting depends on what exact version of Windows you have. For information on how to do this, search in Windows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

Click on the "Next" button.

Videology USB2.0 Camera Installation Wizard continues.

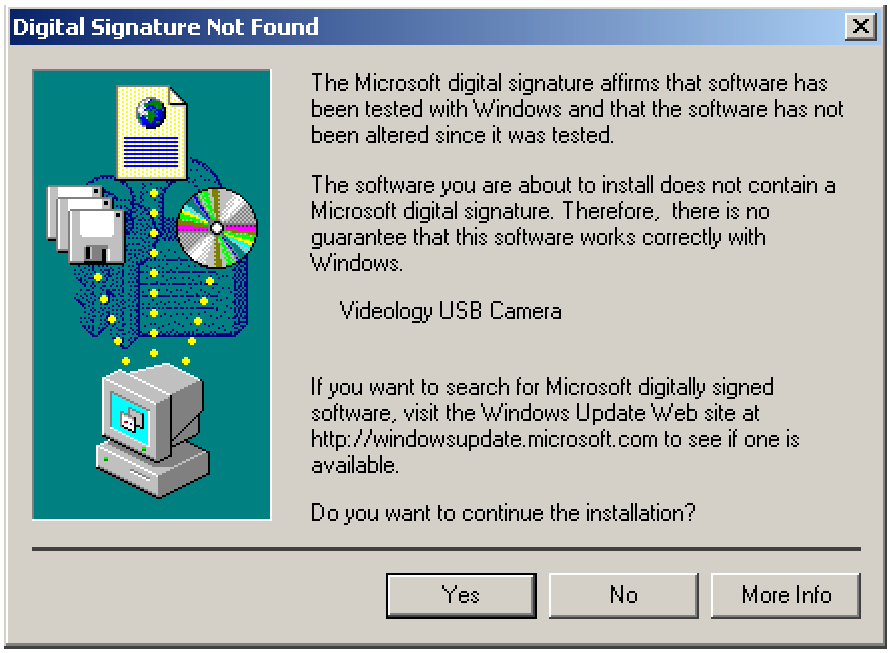


Videology USB2.0 Camera Installation Wizard continues. Click on the “Yes” button.

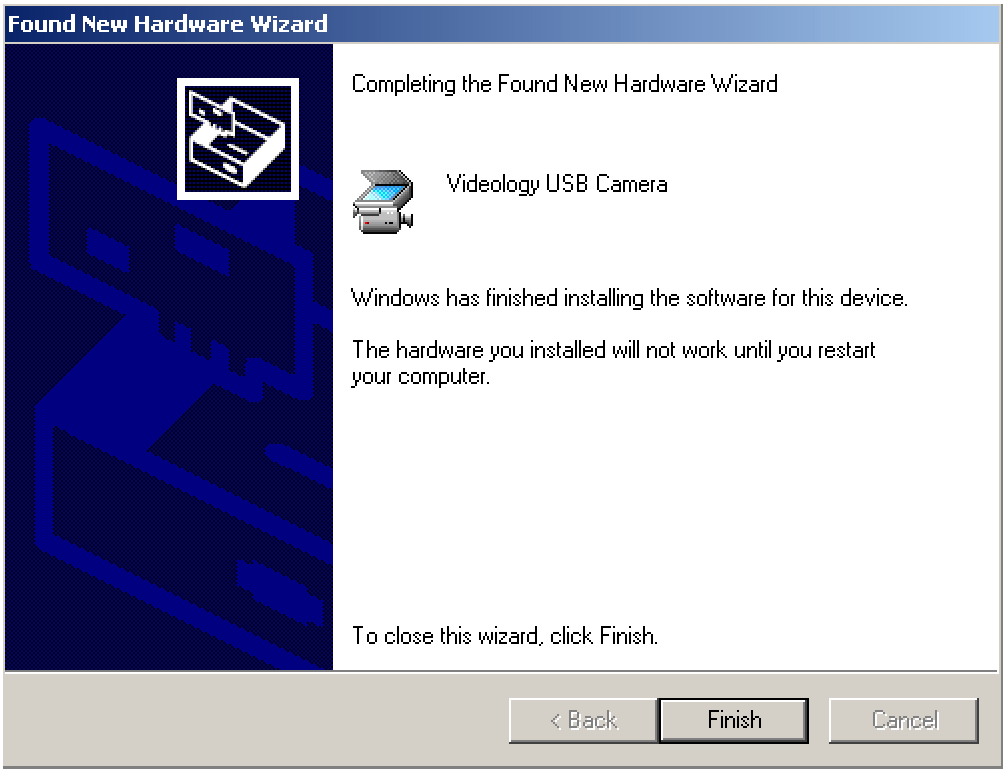


Videology USB2.0 Camera Installation Wizard continues. Plug your camera into one of the USB ports and then click on the "Next" button.

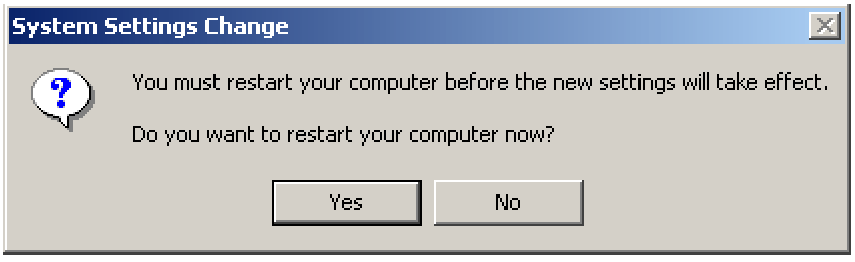
Once the camera is plugged in, the Windows Found New Hardware Wizard starts. Click on the "Yes" button.



Windows Found New Hardware Wizard continues. Click on the "Finish" button.



Windows Found New Hardware Wizard continues. Click on "No" button.



Videology USB2.0 Camera Installation Wizard continues. Click on the "Finish" button.

After the computer restarts, the "Videology USB2.0 Camera Software Setup" software will pop up, from where user's manual or install additional software can be selected. This software can also be started via running the "setup.exe" software from the CD provided with the camera.

To Update the camera driver, the computer must be reset.

6.5. Symptom 5

Under Windows XP, "High Speed device plugged into Full speed USB port" system message appears.

Resolution 5:

Verify the system supports a USB 2.0 Hardware port.

Verify the latest Microsoft® USB 2.0 Host Driver is installed on your system.

6.6. Symptom 6

Only 320 x 240 video resolution is visible while plugged into a USB 2.0 port?

Resolution 6:

Confirm the camera video resolution setting is correct.

Confirm the resolution setting is correct in the application.

Confirm your system has a USB2.0 Host driver installed, and it is operating properly under the device manager.

Unplug and Plug in again to reset the port.

Reinstall the USB Video driver.

If problems still persist, please mail to:support@videologyinc.com

Please include:

- Company name
- Date of purchase
- Software revision number

7. Contact

To contact Videology Imaging Solutions:

USA:
Videology Imaging Solutions Inc.
37M Lark Industrial Parkway
Greenville, RI 02828
USA
Tel: (401) 949-5332
Fax: (401) 949-5276

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Videology Imaging Solutions Inc. is an ISO 9001 registered video camera developer and manufacturer serving security, industrial and machine vision, biometric and specialty OEM markets. The main facility is based in Greenville, Rhode Island, USA and Videology Imaging Solutions BV is located in Uden The Netherlands. The company designs, develops, manufactures and distributes video, image acquisition and display products.