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USBCam4 User Guide

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◈ Safety Issues

Check USBCam4 before Using It

There are no customer-serviceable components in the USBCam4. However, before each usage, check the outer surface of the USBCam4 for any signs of physical damage or defect. The surface of the USBCam4 should have a smooth finish, with no evidence of chipping or damage to either the handpiece housing or the lens section. If detected, contact your local distributor of Schick Technologies products for further instructions.

To help ensure proper hygiene and to protect against infectious disease, refer to Section 5 on page 25 and follow all cleaning and patient protection recommendations specified there.

Avoid Excessive Temperatures when Using USBCam4

When in use, the LEDs in the USBCam4 may generate surface temperatures in excess of 106° F (41° C). To avoid the potential risk of burn, do not use the USBCam4 in a single hand-held position for a prolonged period. As an additional safety measure, the USBCam4 is equipped with an Auto-Off feature. This feature turns off the camera automatically after 5 minutes of continuous use. The camera can be turned back on by simply pressing the ON/OFF button on the handpiece.

Operate the USBCam4 as Directed

Always use the USBCam4 in accordance with the directions and recommendations contained in this User Guide. Do not attempt to modify the USBCam4 or use it in system configurations not specified in this document.

RF Interference Considerations

Although the USBCam4 equipment is designed to provide a reasonable degree of protection from electromagnetic interference, according to IEC International regulations, it must be installed at an adequate distance from electricity transformer rooms, static continuity units, two-way amateur radios and cellular phones. To ensure proper operation, the latter (meaning, electricity transformer rooms, static continuity units, two-way amateur radios and cellular phones) can be used only at a minimum distance of 5 feet (1.5m) from any part of the USBCam4 system.

Any instrumentation or equipment for professional use located near USBCam4 must conform to Electromagnetic Compatibility regulations. Non-conforming equipment, with known poor immunity to electromagnetic fields, may not operate properly unless

they are installed at a distance of at least 10 feet (3m) and supplied by a dedicated electric line.

Apply Recommended Procedures for Cleaning the Equipment

Safe and proper operation of the equipment requires that a regular schedule of preventive maintenance be followed. Refer to the Protective Measures section of this manual on page 25 for details.

Do Not Connect Items that are Not Part of the System

Only items specified for use with the equipment are to be connected to the system. The equipment should not be used adjacent to other equipment that is not part of the system. If, however, use with adjacent equipment is necessary, normal operation should be observed and verified in that configuration.

Installers to Ensure that USBCam4 Operates Optimally

Installers must ensure that the USBCam4 provides the user with the optimal use of the equipment. This includes, but is not limited to, ensuring the system operates as described in this document. Installers must also ensure that the system presents no physical obstacles or hazards during operation and when not in use. To verify this requirement, installers shall confirm that the USBCam4 is installed as described in this User Guide and shall perform the appropriate procedures therein.

Ensure Proper System and PC Workstation Installation and Operation

The USBCam4 has been determined to be in accordance with international safety standards and is deemed suitable for use within the patient area, which extends from the patient for a distance of 5 feet (1.5m). To comply with these standards, do not operate non-medical equipment (such as a PC workstation) inside the patient area. Outside the patient area, the presence of approved non-medical grade equipment and Listed / Approved / certified Information technology Equipment (ITE) computer equipment is acceptable.

The PC workstation that connects to the USBCam4 via compatible USB cable is an integral part of a Medical Electrical System. The PC must be a CE-approved computer system conforming with the Low Voltage [73/23/EC] and EMC Directive [89/336/ERC]. Also, to help ensure optimal performance, make sure that all software programs residing on the workstation are virus-free and have been adequately tested so they will not impact imaging applications after installation.

Please refer to documentation provided by the PC manufacturer for important information about its safe operation and usage.

Observe Proper PC Workstation Cleaning Methods

To avoid cross contamination, be sure to follow the cleaning instructions provided by your computer manufacturer and implement them as part of your normal routine for ensuring proper sterilization and disinfectant of tools in your dental practice.

Disconnect Camera from USB Cable before Cleaning and Disinfecting

Be sure to disconnect the camera from its USB cable before performing the cleaning and disinfecting steps. When the procedure is complete, make sure the camera is completely dry before reconnecting it.
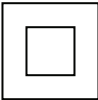
Product Manuals from Schick Technologies

The contents of this manual are subject to change without prior notice. For the latest version of this user guide and other product manuals from Schick Technologies, please consult our website: www.schicktech.com.

Explanation of Symbols

Schick Technologies' products display a number of markings that indicate compliance with regulatory requirements or that provide information in accordance with applicable technical standards.

The symbols and their descriptions are provided below.

Symbol	Description
	Indicates Class II equipment in accordance with applicable medical device safety standards (IEC/EN/UL 60601-1)
	Indicates Type BF equipment in accordance with applicable medical device safety standards (IEC/EN/UL 60601-1)
	Indicates an attention to users to consult accompanying documents (this User Guide) for more information
	Conforms to European Union Medical Devices Directive (MDD) 93/42/EEC
	Indicates that this product meets North American safety standards. The ETL mark is a Nationally Recognized Testing Lab (NRTL) marking and indicates conformance with UL 60601-1 and CAN/CSA STD C22.2 NO 601.1-M90
	Indicates that in the European Union, at the end of product life this device must be disposed of in accordance with the requirements of the Waste Electrical and Electronic Equipment (WEEE) directive 2002/96/EC
	Indicates the location of the Power On / Off button on the USBCam4 camera
	Indicates the location of the Freeze Frame Capture button on the USBCam4 camera

Label Location

The Schick logo and the following label can be found on the USBCam4 camera.

Waste Electrical and Electronic Equipment

Background

The European Union's Waste Electrical and Electronic Equipment (WEEE) Directive (2002/96/EC) has been implemented in member states as of August 13, 2005. This directive, which seeks to reduce the waste of electrical and electronic equipment through re-use, recycling, and recovery, imposes several requirements on producers. Schick Technologies and its Dealers are committed to complying with the Directive.

WEEE Marking

All Schick products subject to the WEEE Directive and shipped after August 13, 2005 will be compliant with the WEEE marking requirements. These products will be identified with the "crossed-out wheeled bin" WEEE symbol shown below, as defined in European Standard EN 50419, and in accordance with WEEE Directive 2002/96/EC.

This "crossed-out wheeled bin" symbol on the product or on its packaging indicates that this product must not be disposed of with other unsorted municipal waste. Instead, it is user's responsibility to dispose of EE waste equipment by handing it over to a designated collection point for the reuse or recycling of waste electrical and electronic equipment. The separate collection and reuse or recycling of Electrical & Electronic waste equipment will help to conserve natural resources and ensure that it is recycled in a manner that protects the environment and human health. For more information about where you can drop off your waste equipment for recycling, please contact your local officials.

Reporting

According to the WEEE Directive, Schick Technologies or its Dealers will ensure that information needed to calculate the financial obligations with respect to EEE products will be provided as required.

WEEE from Users other than Private Households

According to the WEEE Directive, Schick Technologies or its Dealers will fulfill its obligations for the management of WEEE from users other than private households.

Furthermore, as required by the WEEE Directive, in order to determine unequivocally when the equipment was put on the market, the manufacturer's date is placed on the equipment.

Information for Reuse Centers, Treatment and Recycling Facilities

As required by the WEEE Directive, Schick Technologies or its Dealers will provide reuse, treatment, and recycling information for each type of new EEE put on the market within one year of the date in which the equipment is put on the market.

Information will include the different EEE components and materials as well as the location of substances in these items. The information will be provided as a printed document or in electronic media (on CD-ROM or by web download, for example).
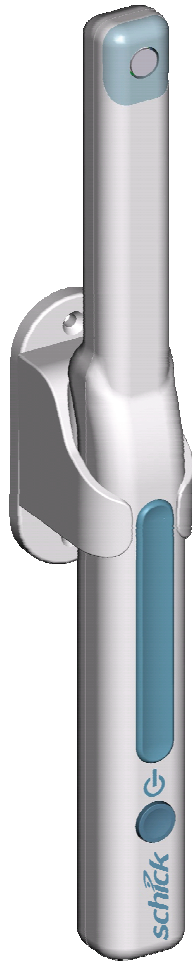
USBCam4 with Handpiece Holder

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1. Overview

1.1. Purpose

An effective communication tool, USBCam4 (Schick P/N B6306100) supports streaming video and still frame capture to help dental professionals demonstrate the current condition and post-treatment outcomes of their patients' dental health. Video frames can be archived with dental exams as permanent records and retrieved for comparison or subsequent review.

Ergonomic, the USBCam4 provides slim, smooth contours and a small head profile for comfortable use and operation. Taking images with the USBCam4 integrated capture button makes video frame capture a simple one-pushbutton step. Bright, built-in LEDs supply superior illumination and advanced optics provide excellent depth of field for optimal performance.

Adding USBCam4 to your office provides the following advantages:

- Works on 64-bit and 32-bit Windows systems
- Automatically advances to capture the next video image *(CDR DICOM)*
- Digital output over high-speed USB 2.0
- Full motion video, full color depth, and VGA resolution quality with no compression artifacts
- Plugs directly into your computer, no separate power supply required, and ports quickly from operatory to operatory — just disconnect and reconnect
- Uses Microsoft Windows ® DirectX ® drivers — no special "frame-grabbing" video card needed.

1.2. Indications for Use

USBCam4 is to be used as an intraoral video source and is indicated for individuals who may benefit from the addition of video images in intraoral dental examinations.

1.3. System Description

The USBCam4 system hardware consists of the following components: USBCam4 Handpiece and Holder, USB 2.0 Cable, and Camera Sheaths. The USBCam4 is connected by USB 2.0 type A-B cable to a compatible Windows 7 (32- or 64-bit), Windows Vista (32- or 64-bit) or Windows XP (32- or 64-bit) PC workstation, which provides the power source for the device. To turn on the USBCam4, press the Power button located near the base of the handpiece; pressing the button a second time turns the USBCam4 off (Figure 6).

The holder for the USBCam4 serves as storage for the device when not in use and can be installed in a variety of chair-side or adjacent surface options, providing quick access as well as protection from accidental damage. The holder also turns off the camera automatically when the handpiece is stored. When the handpiece is removed, the camera is turned on automatically and is ready for use.

A button to Freeze and Capture / Unfreeze video is located at the side opposite from the camera LEDs, near the middle of the handpiece (Figure 6). Built-in support for these video functions is provided by compatible software programs such as CDR DICOM for Windows 3.5 and higher, EagleSoft 15.0 and higher, and Patterson Imaging 15.0 and higher. For other custom applications, code samples and documentation are available on the driver CD.

Optically clear sheaths are required for each new patient and provide an effective measure for ensuring proper hygiene and protection against infectious disease. Cleaning and disinfection information for the USBCam4 handpiece and the holder can be found in Section 5, on page 25, which includes a list of recommended products and procedures.

1.4. Getting the Best Images with USBCam4

Getting the best results from your USBCam4 begins with having a computer system suitable for displaying and capturing video images. For optimum performance we recommend: (a) PCs equipped with Pentium IV processors, (b) available USB 2.0 port, (c) minimum 8MB video memory, and (d) display values for your monitor set at least to 1024 x 768 x 24-bit color. We also recommend using the factory defaults for the USBCam4.[1]

> **IMPORTANT!** USB bandwidth is shared among all USB devices. Achieving optimum performance with the USBCam4 (30 frames-per-second video streams) may not be possible if other USB devices are in use at the same time.

Image Optimization [2] is a software feature that refers to the automatic correction of distortion created by the lens barrel of the camera. Whether image optimization is enabled or not depends on the capabilities of the video card installed on your system. While most new systems have video cards that will support image optimization, some older systems may not.

For optimal system performance, we recommend the use of USB 2.0 cables with lengths not more than 5 meters (5.5 yards) and cable gauge not less than 20 AWG for power conductors inside the cable ("20AWG/2c" designation). Refer to Table 1 on page 11 for more information.

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[1] The amount of video memory on your system can be checked by running **dxdiag.exe** and checking the **Display** tab. Color resolution can be checked by clicking Windows **Start > Settings > Control Panel**, double-clicking on **Display**, and then clicking on the **Settings** tab. Factory settings for the USBCam4 are: 30 frames-per-second frame rate, fixed white balance, and auto exposure. More information about video settings can be found in Sections B-1 and B-2.

[2] Image Optimization is reported by pressing the Setup button when the Video capture window is open.

2. Installation

2.1. What You Will Need to Complete this Section

To expedite software installation, please have the following items available:

- USBCam4 Driver CD

- USBCam4

- USB 2.0 type A-B Cable (not supplied, but should not exceed a maximum length of 5 meters (5.5 yards) to comply with EMC and EMI standards) and should not have a cable gauge less than 20 AWG for power conductors inside the cable ("20AWG/2c" designation).   Refer to Table 1 on page 11 for more information.

2.2. Before You Start Installing Software

IMPORTANT! <u>CDR users</u> please do not connect the USBCam4 and cable to your computer until after you have installed the device driver and updated the DirectX files on your system. Procedures for installing these files can be found in this section.

The software for your USBCam4 consists of the following components:

- USBCam4 Device Driver Installation

- DirectX Update

You must install each of these components successfully to ensure proper operation of your USBCam4. Follow the procedures that refer to your particular Windows system in the sections that follow. If you're not sure which operating system is installed on your computer, right click on the **My Computer** icon on your desktop and select **Properties**.

To review USBCam4 system requirements, refer to Section 1.4 on page 3.

2.3. Setup with Windows 7

STEP 1

Exit CDR (or EagleSoft or Patterson Imaging) if it is running and verify that USBCam4 is NOT connected to the host computer.

STEP 2

A. Insert the USBCam4 Driver CD. If the setup doesn't start automatically, click **Start**, **Run**, and enter **d:\CDR USBCam4 Driver Setup** (if your drive letter is different, use that one instead).

B. At the start page, click the Install USBCam4 Driver button.

C. If prompted, install Microsoft's .NET framework.

D. At the Welcome screen, click **Next**.

STEP 3

A. Choose **Complete**. This is the recommended installation and is appropriate for most customers.

B. Click **Next**.

STEP 4

Click **Install**.

STEP 5

A. Setup will pre-install files to your workstation.

B. If prompted, install Microsoft's DirectX.

STEP 6

A. Click **Finish**.

B. Connect the USBCam4 camera to your computer. ((For details, refer to Section 2.6 on page 11.)

C. The message, "Your new hardware is installed and ready to use" will appear momentarily above the Windows System tray.
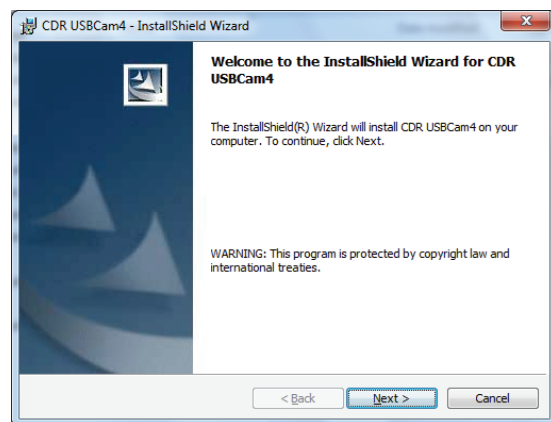
D. Remove USBCam4 Driver CD.

2.4. Setup with Windows Vista

STEP 1

Exit CDR (or EagleSoft or Patterson Imaging) if it is running and verify that USBCam4 is NOT connected to the host computer.
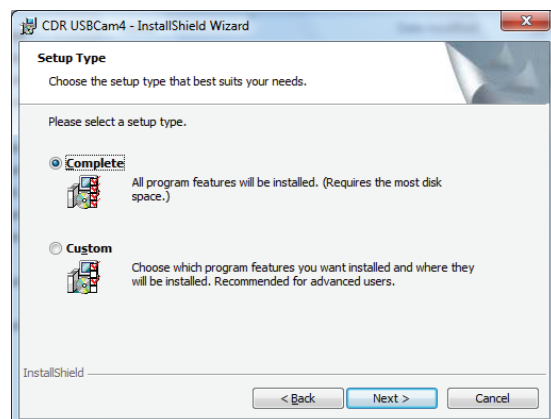
STEP 2

A. Insert the USBCam4 Driver CD. If the start page doesn't start automatically, click **Start**, **Run**, and enter **d:\CDR USBCam4 Driver Setup** (if your drive letter is different, use that one instead).

B. At the User Account Control window, select "Allow, I trust this program."

C. If prompted, install Microsoft's .NET framework.
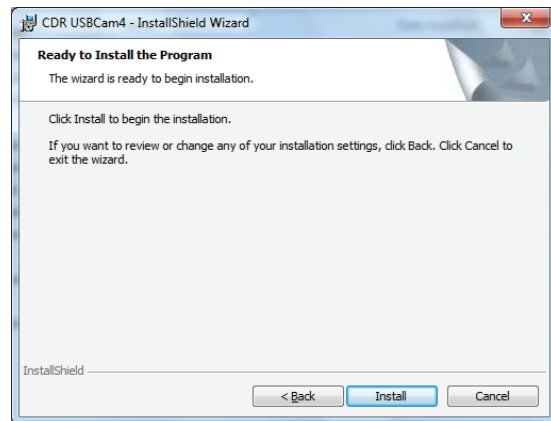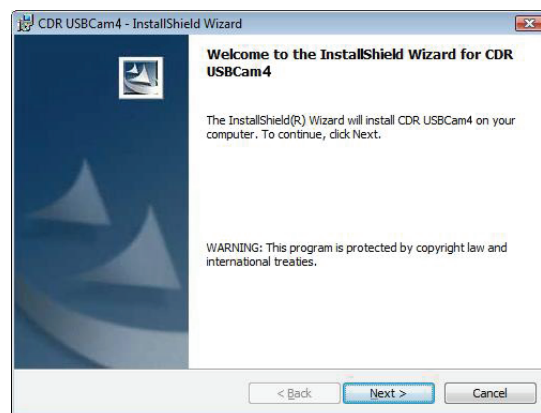
D. At the Welcome screen, click **Next**.

STEP 3

A. Choose **Complete**. This is the recommended installation and is appropriate for most customers.
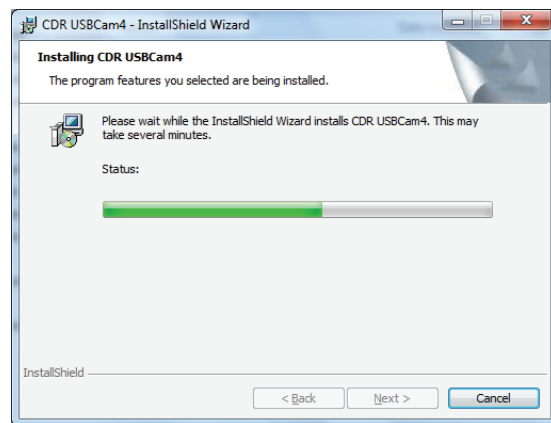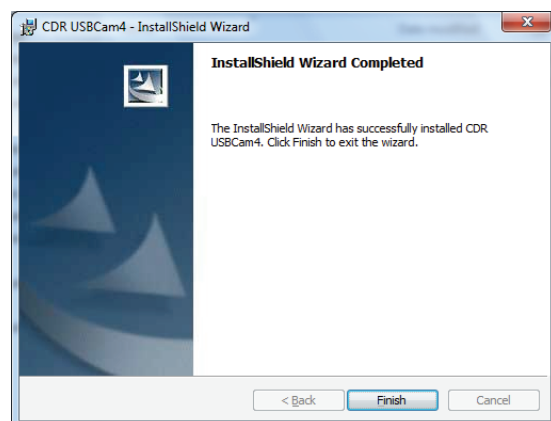
B. Click **Next**.
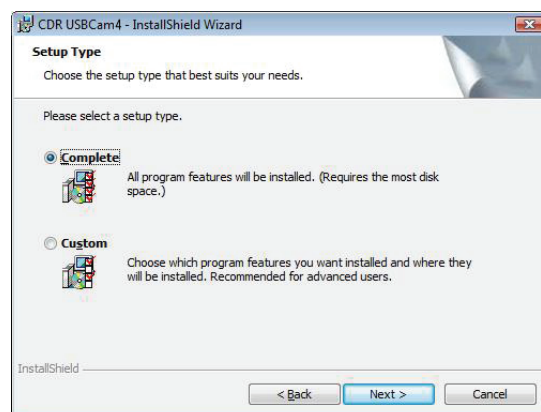
S TEP 4
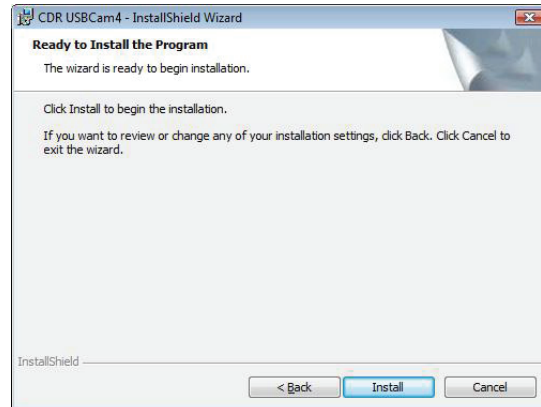
Click **Install**.

S TEP 5

A. Setup will copy the drivers to your workstation.
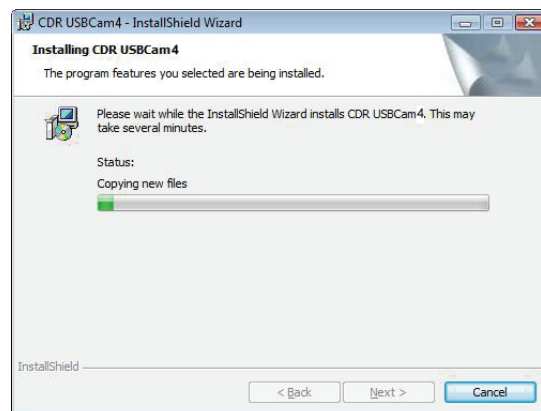
B. If prompted, install Microsoft's DirectX.

S TEP 6

A. Click **Finish**.

B. Connect the USBCam4 camera to your computer. ((For details, refer to Section 2.6 on page 11.)

C. After a few seconds the message "Device driver software installed successfully" will appear momentarily above the Windows System tray.

D. Remove USBCam4 Driver CD.
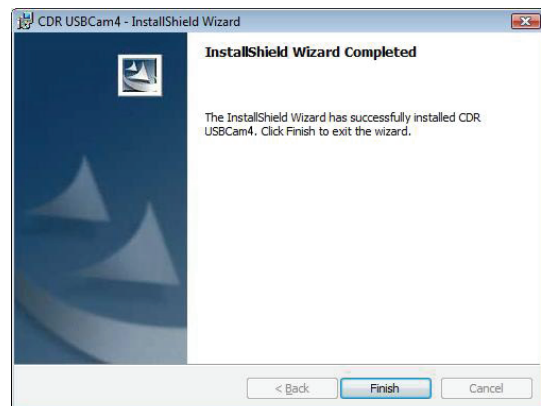
2.5. Setup with Windows XP

STEP 1

Exit CDR (or EagleSoft or Patterson Imaging) if it is running and verify that USBCam4 is NOT connected to the host computer.

STEP 2

A. Insert the USBCam4 Driver CD. If the setup doesn't start automatically, click **Start**, **Run**, and enter **d:\CDR USBCam4 Driver Setup** (if your drive letter is different, use that one instead).

B. At the start page, click the Install USBCam4 Driver button.

C. If prompted, install Microsoft's .NET framework.

D. At the Welcome screen, click **Next**.

STEP 3

A. Choose **Complete**. This is the recommended installation and is appropriate for most customers.

B. Click **Next**.

STEP 4

Click **Install**.

STEP 5

A. Setup will pre-install files to your workstation.

B. If prompted, install Microsoft's DirectX.

STEP 6

A. Click **Finish**.

B. Connect the USBCam4 camera to your computer. (For details, refer to Section 2.6 on page 11.)

C. The message, "Your new hardware is installed and ready to use" will appear momentarily above the Windows System tray.

D. Remove USBCam4 Driver CD.

2.6. Connecting the USBCam4

IMPORTANT! Do not connect the USBCam4 and cable to your computer until <u>after</u> you have successfully installed the USBCam4 driver, as described in previous sections.

The USB 2.0 cable used with the camera has a Series "A" USB connector on one side and a Series "B" USB connector on the other. The "A-type" connector fits any available USB port on the computer. The "B-type" connector fits the handpiece.

We strongly recommend the use of USB 2.0 cables with lengths not more than 5 meters (5.5 yards) with cable gauge not less than 20 AWG for power conductors inside the cable ("20AWG/2c" designation). For convenience, we have listed in the following table a USB cable that meets these requirements.

Table 1. USB Cable Description

USB Cable Connectors	Schick Part Number	Cable Length	Cable Gauge
"B-type" USB Connector (Connects to Handpiece) "A-type" USB Connector (Connects to Computer)	A1119100	5 meter (16.5 feet)	20 AWG/2c

As a final check that your USBCam4 is ready for use, open the Device Manager (Windows **Start** > **Control Panel** > **System** > **Device Manager**). (On Windows 7 systems, the steps to open the Device Manager are: **Start** > **Control Panel** > **Device Manager**.)

In Device Manager, expand the Imaging devices folder: Schick Technologies USBCam4 will be displayed there.
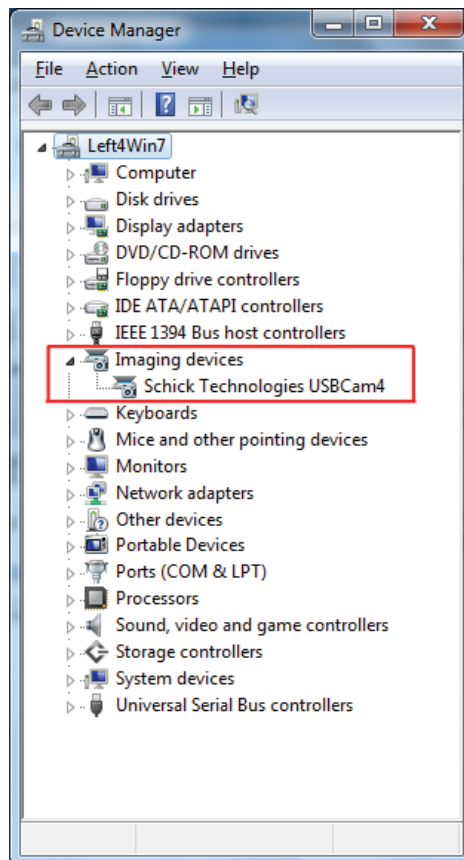
Figure 1. USBCam4 Listed in Device Manager

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2.7. Installing the USBCam4 Handpiece Holder

The USBCam4 Handpiece Holder turns off the camera when the handpiece is inserted and turns on the camera when the handpiece is removed. The holder is designed for several mounting options: (1) Mounted to a standard ½-inch dental instrument bar, or (2) Wall-mounted with fastening hardware.

PLEASE NOTE: When selecting the mounting option for your USBCam4, choose a location that offers easy access during patient exams and safe storage afterwards. In most practices, mounting the USBCam4 to the dental unit will provide the best all-around solution.

2.7.1. Dental Unit Option

To install the handpiece holder (Figure 2) to a standard ½-inch instrument bar, perform the following steps:

1. Remove the handpiece from its holder before performing this procedure.

2. Remove the cutout block from the holder by untightening and retaining 2 Phillips screws.

3. Attach the holder to the instrument rail mounting block by tightening 2 Phillips screws removed previously.

4. Position the holder on the instrument bar of your dental unit, using the cutout space on the back of the mounting block as a guide.

5. When the holder is in position, use an Allen key to tighten 2 set screws located at the bottom of the mounting block.
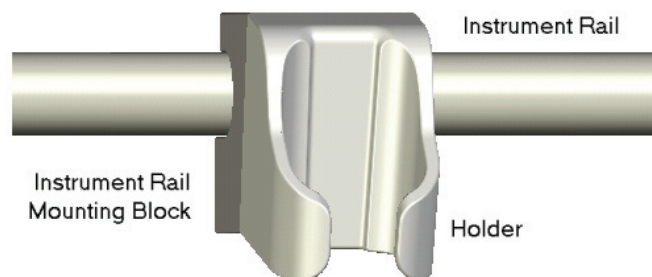
Figure 2. Handpiece Holder Instrument Rail Installation

2.7.2. Wall-Mounting Option (with Fasteners)

To install the handpiece to a wall or other vertical surface by its holder (Figure 3), perform the following steps:

1. Remove the handpiece from its holder before performing this procedure.

2. Position the holder on a smooth stable vertical surface.

3. Using the holes on the back of the holder as guides, fasten the holder securely to the wall using 2 (#6 x 3/4) dry wall screws (not supplied) or other hardware appropriate to the mounting surface.
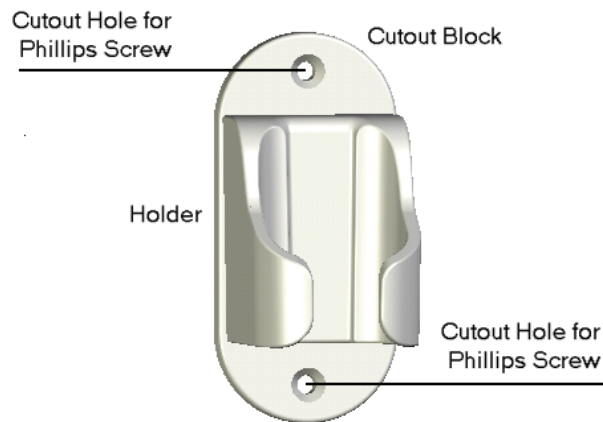
Figure 3. Handpiece Holder Wall Mounting Installation

3. Operation

3.1. Operating the Camera

Refer to the following sections for instructions on turning the USBCam4 on and off, taking still images from streaming live video ("freeze-frame" capture), and the use of the Auto Advance feature.

3.1.1. Turning the Camera On

Before turning on the camera make sure the cable connections are secured. Turn on the camera by pressing the Power On/Off button (Figure 6, item 2). Removing the handpiece from its holder also turns the camera on.

3.1.2. Turning the Camera Off

When the camera's light is on, pressing the camera's Power On/Off button (Figure 6, item 2) shuts power off to the camera. Pressing the Power On/Off button restores power to camera and turns the LEDs back on.

When not in use, store the camera in its holder to protect the device and for easy access. Placing the camera in its holder turns off the camera automatically.

NOTE: The camera turns off automatically after 5 minutes of continuous use.

3.1.3. Pausing and Capturing Images

NOTE: The following steps apply to the use of USBCam4 with CDR DICOM software.

The operation of the Capture button on the camera handpiece and the buttons on the Video Capture Window (Figure 4) are identical. To freeze or pause the streaming video and capture an image, perform the following:

1. Press the Capture button on the camera handpiece or click on the Capture button in the Video Capture window. The captured image is displayed in the small exam and the next available viewbox is selected automatically.

2. Press the Capture button on the camera handpiece again or click the Unfreeze button in the Video Capture window.

3. Repeat the previous steps to capture additional video images.
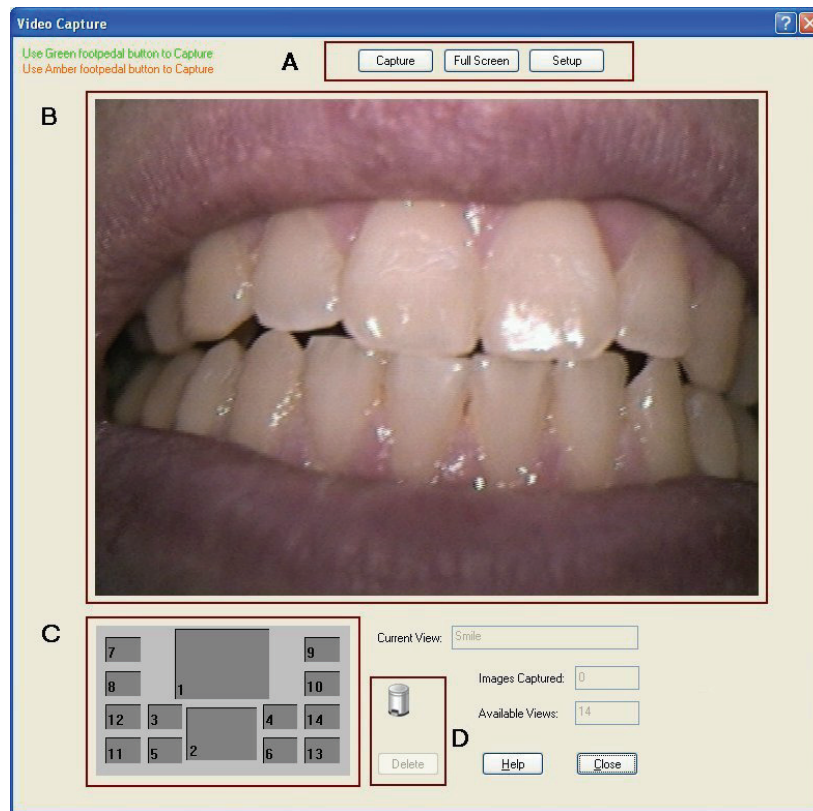
Figure 4. Video Capture Window

(A: Video Buttons; B: Streaming Video Window; C: Small Exam Area, and D: Delete Image: drag-and-drop or button)

3.1.4. Auto Advance

Auto Advance provides the capability of capturing multiple video images using only the camera's handpiece. The sequence for view boxes is pre-defined in the series itself or can be customized by the Order item in the Series menu.

For convenience, Auto Advance is always enabled, although you can always choose a different viewbox than the one highlighted by the Auto Advance operation.

When the Video Capture window is open, pressing the handpiece Capture button does the following:

- Freezes and captures the current video image

- Displays the image in the small exam (the image occupies the same view box that was selected in the main exam)

- Advances automatically to the next available view box in the series.

Clicking on a different view box makes it active and turns it to flashing green (default).

3.1.5. Delete

Images in the small exam window can be permanently deleted using one of several options, as described below.

3.1.5.1.   Drag and Drop (to trash icon)

Images can be deleted, one at a time, by dragging-and-dropping them into the trash icon located on the video window. To delete an image, perform the following steps:

1. In the small exam window, click on the image to select it.

2. While holding down the left mouse button, drag the image into the trash icon.

3. Release the mouse button.

4. A message will prompt you to confirm that you wish to delete the image. Click Yes to delete the image. (Clicking No cancels the delete operation.)

3.1.5.2. Delete (right-click on image)

1. In the small exam window, click on the image to select it.

2. Right-click on the image to open a short context menu.

3. Select Delete.

4. A message will prompt you to confirm that you wish to delete the image. Click Yes to delete the image. (Clicking No cancels the delete operation.)

3.1.5.3. Delete button

1. In the small exam window, click on the image to select it.

2. Click the Delete button.

3. A message will prompt you to confirm that you wish to delete the image. Click Yes to delete the image. (Clicking No cancels the delete operation.)

When an image is moved into trash or deleted (using the Delete button or by right-clicking on the image and selecting Delete), you <u>cannot</u> restore it using the CDR Data Administration Utility. You <u>cannot</u> drag-and-drop images from the trash bin and return them to the small exam window.

3.1.6. Image Optimization

Image Optimization is reported by pressing the Setup button when the Video capture window is open (Figure 5). It refers to the automatic correction of distortion created by the lens barrel of the camera. This distortion may skew the image slightly around the borders; there are no other effects on video quality.

Whether image optimization is enabled or not depends on the capabilities of the video card installed on your system. While most new systems have video cards that will support image optimization, some older systems may not. As image optimization is specific to hardware installed on your system, there are no controls or settings to change.

If your current system is not optimized and you need additional details, customers in the United States may contact the Patterson Technology Center at 877-498-6505. Outside the United States, please contact the authorized dealer for Schick Technologies products in your country or region.
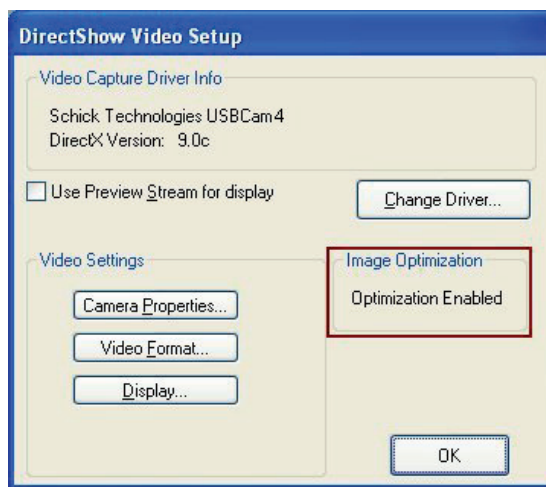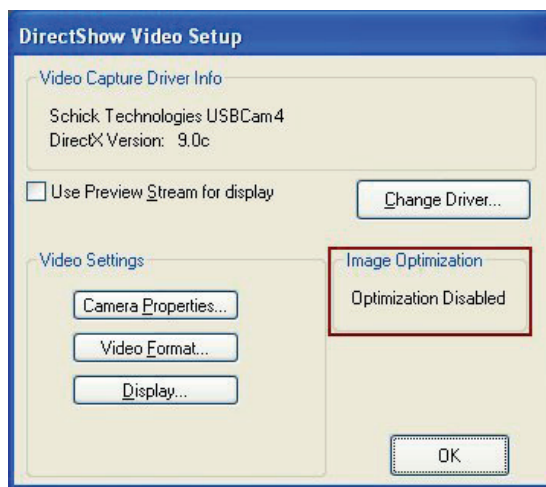
Figure 5. Image Optimization

(Top: Optimization Disabled; Bottom: Optimization Enabled)

3.2. Using Camera Sheaths

Disposable sheaths are provided with each USBCam4 kit as an effective measure for infection control. Use a new sheath for each intra-oral use, and then dispose it of properly.

When the sheath is inserted over the handpiece, notice that the upper part of the sheath (covering the lens) has both a clear and frosted side. Make sure the CLEAR side of the sheath is facing the camera lens.

3.3. Using the Camera with CDR DICOM

NOTE: Refer to the CDR DICOM User Guide, Schick P/N 1051047, for detailed information on the use and operation of CDR DICOM software.

STEP 1

Start CDR DICOM from the Windows **Start** button or by clicking the shortcut to CDR DICOM for Windows on your desktop.

STEP 2

When the CDR exam window appears, click on **New Exam** under the **File** menu or just click the **New Exam** button on the toolbar.

STEP 3

Enter the appropriate patient information and then click on **Video Series**. You may use a pre-defined video series or create a new one.

1) If you choose to create a new video series, click **Edit** under the **Series menu**, which opens the New Custom Video Series dialog box. The numbers in the text boxes correspond to how many view boxes are included in this series. You can edit the numbers in the text boxes, creating a series customized with the views you wish to include. Enter a name for this series. Click **OK** to finish.

2) You may also wish to customize the sequence of viewboxes, using the **Order** selection, which is also located under the **Series** menu. You define the sequence by clicking one viewbox at a time, in succession. Click **OK** to finish.

STEP 4

A. Place a new sheath over the camera.

B. Click the Power button on the handpiece to turn the camera LEDs on if they are not on already.

STEP 5

A. In the main exam window, click on an empty view box that matches the area you intend to image.

B. Once the view box is highlighted, click on it again to begin viewing live video or right-click on the selected view box and select Capture Video.
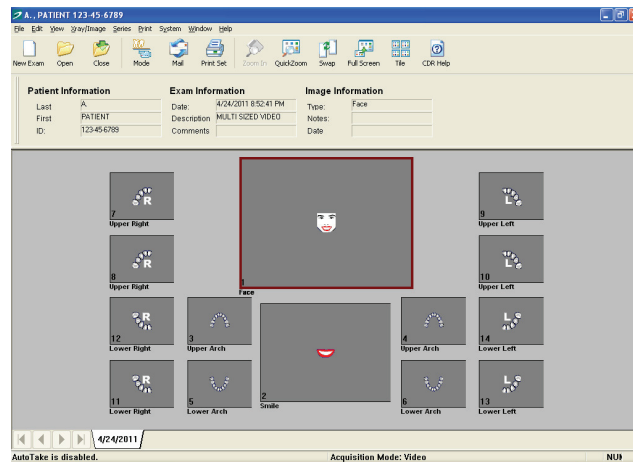
STEP 6

A. The video capture window displays live video. A smaller version of the exam window is also displayed.

B. The view box that was selected in the main exam flashes green in the small exam. Clicking on a different view box will make that one active instead.
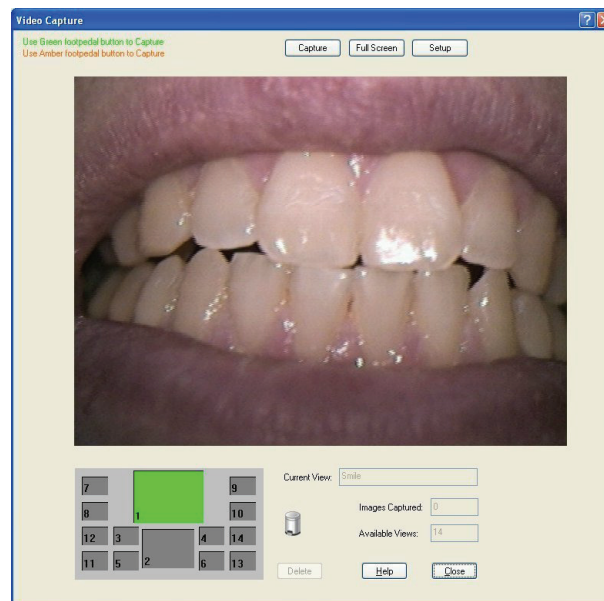
STEP 7

A. Position the camera for the desired image.

B. To capture a video image, do one of the following:

- Press the Capture button on the handpiece.

- Click on the Capture button in the Video capture window.

- Depress the Green or Amber side if you are using a footpedal (Section 3.4 on page 23).

- Press <ALT> and <C> keys at the same time.

STEP 8

A. The captured image appears in the smaller exam. The next available view box is selected automatically.

B. To unfreeze and return to streaming video, do one of the following:

- Press the Capture button on the handpiece.

- Click on the Unfreeze button in the Video capture window.

- Depress the Green or Amber side if you are using a footpedal (Section 3.4 on page 23).

- Press <ALT>and <U> keys at the same time

C. To capture another video image, repeat this procedure, starting at Step 7.
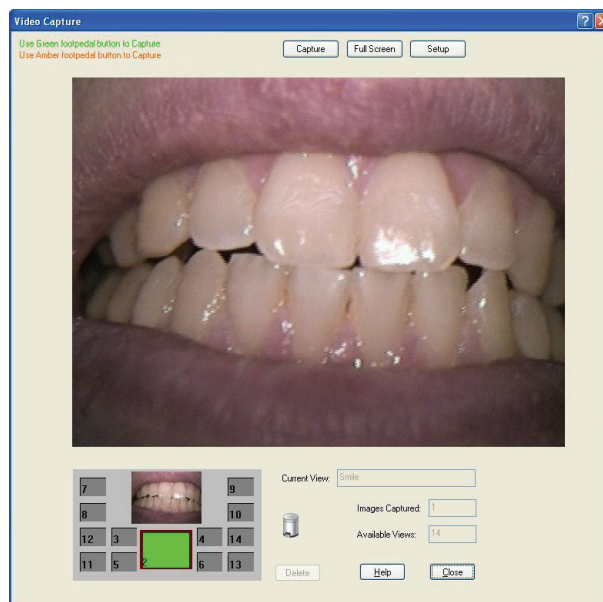
3.4. Acquiring Video Images with the Footpedal

Serial footpedals (Schick P/N B2501100; PDCO P/N 07-0410100) can be used to control the capture of video images. Refer to the following table for information on using this footpedal to capture video images.

Table 2. Footpedal Actions

Video	Desired Action	Use Pedal
Streaming	Freeze and Capture Image	Green or Amber
Still	Unfreeze Image	Green or Amber

3.5. Acquiring Video Images with Keyboard Shortcuts

Video image acquisition can be also accomplished though the use of shortcut keys. To use the following shortcuts, press and hold down the first key (always the Alt key) and then press the second key (shown after the plus sign) for the appropriate action.

Table 3. Keyboard Shortcuts

Video	Desired Action	Use Keys
Streaming	Freeze and Capture Image	Alt + C
Still	Unfreeze Image	Alt + U

4. Controls

4.1. Controls on the USBCam4

An illustration of the USBCam4 is shown below in Figure 6. For a description of user controls on the camera, refer to Table 4**.**

(1) Camera Lens and
Light Source (LEDs)

(3) Freeze Frame
Capture Button

(2) On / Off Button
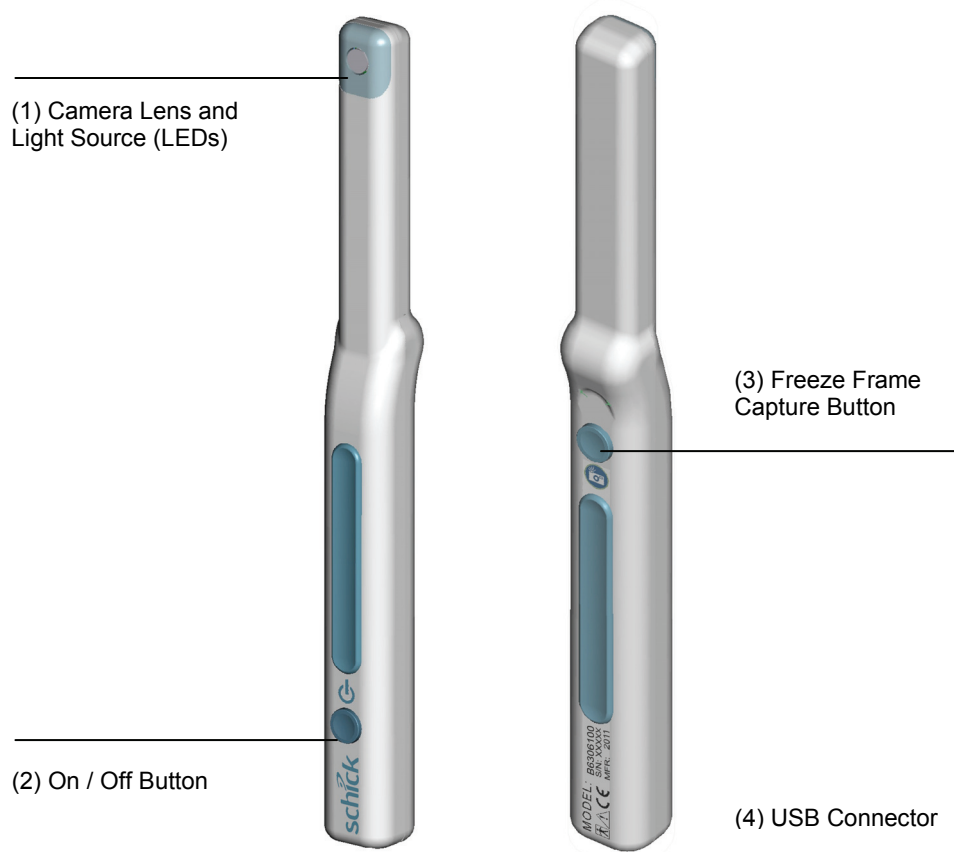
(4) USB Connector

Figure 6. USBCam4 Controls

Table 4. Description of Camera Controls		
Item	**Description**	
1	Camera lens and LED (light-emitting diode) source	
2	Power on/off button	(See Note A)
3	Freeze frame capture button	(See Note B)
4	USB cable connection	(See Note C)

NOTE A: Light source will automatically time out after 5 minutes of continuous operation.

NOTE B: Can be set to Capture / Unfreeze images. Refer to page 23 for details.

NOTE C: "B" connector end of USB cable connects here.

5. Protective Measures

5.1. Sheaths

The USBCam4 system uses disposable sheaths (Schick P/N 6310120) to ensure proper infection control. Sheaths are intended for single-use only. Do not use the camera for intraoral use until a new sheath has been properly fitted to the handpiece. After each intra-oral use, remove the sheath and dispose of it properly.

Disposable sheaths are provided with every USBCam4 system. In the U.S., additional sheaths can be ordered from Patterson Dental Supply, Inc. by calling 1-800-328-5536. International customers should contact the authorized international dealer for Schick Technologies products in their country or region.

5.2. Cleaning and Disinfecting the Handpiece

IMPORTANT! Be sure to disconnect the camera from its USB cable before performing the following steps. When the procedure is complete, make sure the camera is completely dry before reconnecting it.

In a clinical use environment, the health care provider should wear protective disposable gloves and cover the camera with a hygienic barrier. Before using the camera the first time, and before every new patient, the following protocol is recommended:

1. Remove and discard all protective hygienic barriers and / or sheaths from the camera prior to removing disposable gloves.

2. Place the camera on a tray covered by a disposable liner, or in a receptacle that can be thoroughly disinfected.

3. Remove and discard gloves.

4. Wash hands and put on a new pair of disposable gloves.

5. Disconnect the camera from the USB cable.

6. If the camera or cable are visibly soiled (e.g., with blood or saliva), each should be cleaned with a soapy cloth or paper towel, and then dried with a clean lint-free cloth or paper towel.

7. Thoroughly wipe the camera and cable (if applicable) with the disinfecting product recommended above and wait 30 seconds. Do not expose the camera cable connector to any amount of liquid.

8. Repeat step 7. When the camera has been wiped two times, continue with the following steps.

9. Remove potential chemical build-up from the camera by wiping it with a sterile lap sponge saturated with de-ionized water.

10. Use a sterile dry lap sponge to dry the camera or cable, as needed.

11. Place the camera in a clean environment, ready for next use.

12. Reconnect the camera.

13. Remove and discard gloves.

5.3. Recommended Disinfectant

The following surface disinfectant has been found to be effective in achieving a desired level of disinfection and is available from Patterson Dental and other suppliers.

- Cavi-Wipes (Metrex Research, Kerr) or equivalent

5.4. Cleaning the Lens Surface

IMPORTANT! Before cleaning the lens, make sure it is free of any abrasive contaminants as this will help prevent the formation of scratches during cleaning.

To clean the lens surface, moisten a soft cotton swab dipped in rubbing (isopropyl) alcohol. Gently wipe the lens surface end-to-end in straight lines without applying pressure; do not scrub. Allow the alcohol to evaporate from the lens surface. Repeat these steps, as needed, until the lens surface is clean.

5.5. Cleaning the Computer

To avoid cross contamination, follow the cleaning instructions provided by your computer manufacturer and implement them as part of your normal routine for ensuring proper sterilization and disinfectant of tools in your dental practice.

Appendix A. Reference Information

A-1. Removal and Replacement Procedures

There are no user-serviceable parts in the USBCam4 system. Should you experience problems with the USBCam4, customers in the United States may contact the Patterson Technology Center at 877-498-6505. Outside the United States, please contact the authorized dealer for Schick Technologies products in your country or region.

A-2. Summary of Specifications

USBCam4 is ETL-certified and complies with these standards.

Table 5. Specifications

Item	Value	
EMC/Safety	CAN/CSA C22.2 No.601.1-M90	Medical Electrical Equipment Part 1: General Requirements for Safety
	EC 93/42/EEC	Medical Device Directive
	IEC60601-1	Medical Electrical Equipment Part 1: General Requirements for Safety
	IEC60601-1-2	Medical Electrical Equipment Part 1: General Requirements for Safety 2.Collateral Standard: Electromagnetic Compatibility – Requirements and Tests
	UL60601-1	Medical Electrical Equipment: General Requirements for Safety
Input electrical rating	5VDC @ 440mA	
Transport and storage conditions	Ambient temperature range: 0° F (-18° C) to 150° F (66° C) Relative humidity range: less than 75% Atmospheric pressure range: 700 hPa to 1060 hPa	
Equipment type	Type BF equipment (on handpiece)	
Fuse	63VDC/VAC, 1A fast blow fuse	
Restricted service statement	Unless otherwise specified, this unit should be serviced only by the manufacturer. It contains no user-serviceable parts.	
Imager	CCD	
Video output	High Speed USB 2.0	
Focus range	5 - 45 mm (0.2 - 1.77 in)	
Focus type	Fixed	
External power supply	None (power supplied via USB)	
Maximum cable length	5 m (5.5 yds)	
Minimum cable gauge	20 AWG/2c	
Handpiece weight	42.5 g (1.5 oz)	
Special features	Integrated frame capture button	

A-3. Leakage Current Statement

USBCam4 complies with the leakage current requirements of IEC 60601-1-1 safety standard. Variations, however, may exist in the construction of computers to which the USBCam4 is connected. Users are advised to have a qualified electrician perform a leakage test on their equipment before using the USBCam4.

A-4. EMC Tables

The following tables provide USBCam4 compliance information to electromagnetic compatibility (EMC) and electromagnetic immunity (EMI) standards. To ensure conformance, the customer or user must use the USBCam4 in environments that are consistent with these standards.

The USB cable required with the USBCam4 camera must also comply with the same standards. To meet those specifications, the USB A-B type cable should not exceed a maximum length of 5 meters (5.5 yards). Cables longer than that distance may result in increased emissions or decreased immunity.

Table 6. Guidance and Manufacturer's Declaration - Electromagnetic Emissions

PLEASE NOTE: The USBCam4 is intended for use in the electromagnetic environment specified below. The customer or user of the USBCam4 must ensure that it is used in such an environment.

Emissions Test	Compliance	Guidance
RF emissions CISPR 11	Group 1	The USBCam4 uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class B	The USBCam4 is suitable for use in all establishments including domestic establishments and those directly connected to the public low-voltage supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class D	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Complies	

Table 7. Guidance and Manufacturer's Declaration - Electromagnetic Immunity

PLEASE NOTE: The USBCam4 is intended for use in the electromagnetic environment specified below. The customer or user of the USBCam4 must ensure that it is used in such an environment.

Immunity Test	IEC 60601 Test Level	Compliance Level	Guidance
Electrostatic discharge (ESD) IEC 61000-4-2	±6 kV contact ±8 kV air	±6 kV contact ±8 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 610004-4	±2 kV for power supply lines ±1 kV for input/output lines	±2 kV for power supply lines ±1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2kV common mode	± 1 kV differential mode ± 2kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	< 5% U_T (>95% dip in U_T) for 0.5 cycle < 40% U_T (>60% dip in U_T) for 5 cycles < 70% U_T (>30% dip in U_T) for 25 cycles < 5% U_T (>95% dip in U_T) for 5 sec	< 5% U_T (>95% dip in U_T) for 0.5 cycle < 40% U_T (>60% dip in U_T) for 5 cycles < 70% U_T (>30% dip in U_T) for 25 cycles < 5% U_T (>95% dip in U_T) for 5 sec	Mains power quality should be that of a typical commercial or hospital environment. If the user of the USBCam4 requires continued operation during mains interruptions, it is recommended that the PC workstation to which the USBCam4 is connected be powered from an uninterruptible power supply or battery. NOTE: U_T is the AC mains voltage prior to application of the test level.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3A/m	3A/m	
			Portable and mobile RF communication equipment should be used no closer to any part of the USBCam4, including its cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 Vrms	Recommended separation distance: d= 1.2 $\sqrt{P}$
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2.5 GHz	3 V/m	d= 1.2 $\sqrt{P}$ for 80 MHz to 800Mhz d= 2.3 $\sqrt{P}$ for 800 MHz to 2.5Ghz Where P is the maximum output rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation in meters (m).

Immunity Test	IEC 60601 Test Level	Compliance Level	Guidance
			Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,[a] should be less than the compliance level in each frequency range. [b]
			Interference may occur in the vicinity of equipment marked with the following symbol.

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people

a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM radio broadcast and TV broadcast cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the USBCam4 is used exceeds the applicable RF compliance above, the USBCam4 should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the USBCam4.

b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m

Table 8. Recommended Separation Distance Between Portable and Mobile RF Communications Equipment and the USBCam4

PLEASE NOTE: The USBCam4 is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the USBCam4 can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the USBCam4 as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of the transmitter (W)	Separation distance according to the frequency of the transmitter (m)	
	150 kHz to 800 MHz $d = 1.2 \times \sqrt{P}$	800 MHz to 2.5 GHz $d = 2.3 \times \sqrt{P}$
0.01	0.12	0.23
0.1	0.38	0.73
1	1.2	2.30
10	3.8	7.3
100	12.0	23.00

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

NOTE 1: At 800 MHz, the separation distance for the higher frequency range applies.
NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.

Appendix B. Additional Information

B-1. Checking DirectX Version and Video Information

When installing your USBCam4, you will be prompted to install the latest version of Microsoft's DirectX files on your system. We strongly recommend that you install these files as earlier versions of DirectX prior to DirectX 8.1 are not compatible with USBCam4. In the event you experience video problems with USBCam4, please verify that your system has properly installed DirectX version 8.1 or later by performing the steps below.

Video quality and performance is also affected by the amount of video memory available. By running **dxdiag.exe**, as documented below, and checking the **Display** tab, you can verify the amount of video memory available on your graphics card.

STEP 1

A. At the Windows desktop, click **Start**, **Run,** and then type **dxdiag.exe**.

B. The "DirectX Diagnostic Tool" dialog box is displayed.

C. Under the System tab, verify that your current DirectX version is 8.1 or higher.

STEP 2

A. If your DirectX version is 8.1 or higher, you have the correct version for USBCam4 operation. Click **Exit** to close this dialog box.

B. If your DirectX version is less than 8.1, repeat the installation steps found in Section 2 on page 4 of this manual.

B-2. Checking Your Video Settings

Video settings can affect the display and capture of video images using USBCam4. To help ensure your video images are consistently high quality, some USBCam4 settings are factory set by default. In the event, however, that some settings need to be adjusted, that can be done using options found on the video setting dialog boxes. Refer to the following tables for more information.
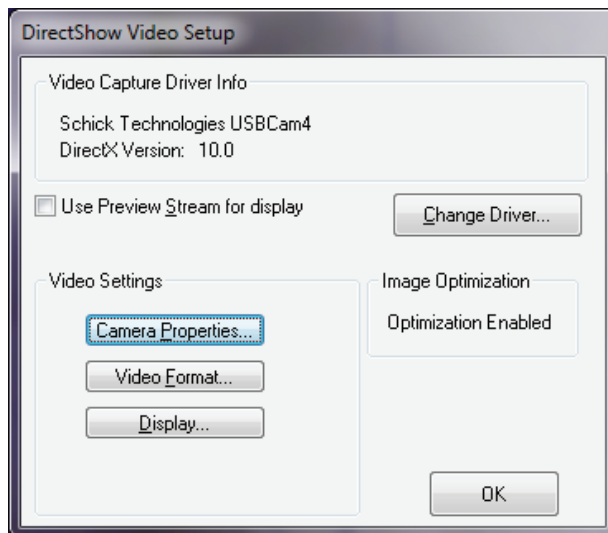
Figure 7. Video Setup Dialog Box

Table 9. Video Setup Dialog Box Description	
Item	**Description**
Use Preview Stream for Display	May improve video performance for slower Pentium processors. Not checked (factory setting)
Change Driver	If you have installed other video drivers (with a video capture card, for example), they can be selected from this drop-down box
Video Settings	More camera operation and video displays options are available here (Customizable settings for **Camera Properties** and **Video Format** are provided on the pages that follow. *(There are no user-selectable settings on the **Display** dialog, which has been omitted.)*
Image Optimization	Indicates whether camera lens barrel correction is enabled. Refer to Section 3.1.6 on page 18 for details
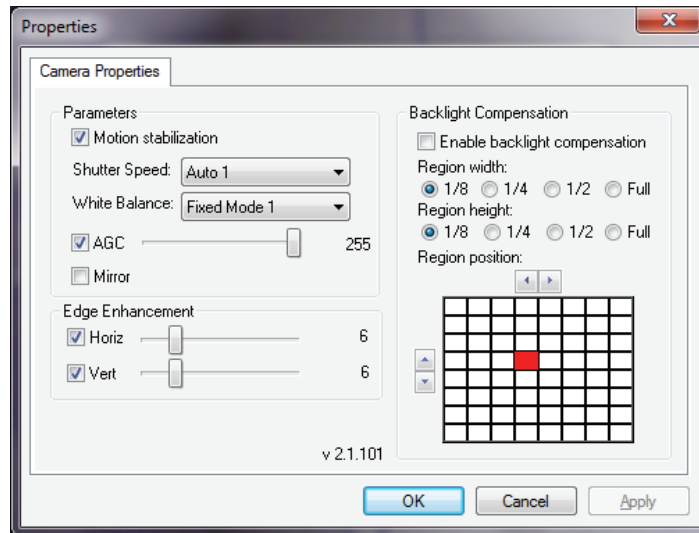
Figure 8. Camera Properties Dialog Box

Table 10. Camera Properties Dialog Box Description

Property	Description
Parameters	Motion Stabilization: checked (factory setting)
	Shutter Speed: Auto 1 (factory setting)
	White Balance: Fixed Mode 1 (factory setting)
	AGC: checked (factory setting)
	Mirror: unchecked (factory setting)
Edge Enhancement	Horiz: checked (factory setting)
	Vert: checked (factory setting)
Backlight Compensation	Enable backlight compensation: unchecked (factory setting)
	Region width: 1/8 (factory setting)
	Region height: 1/8 (factory setting)
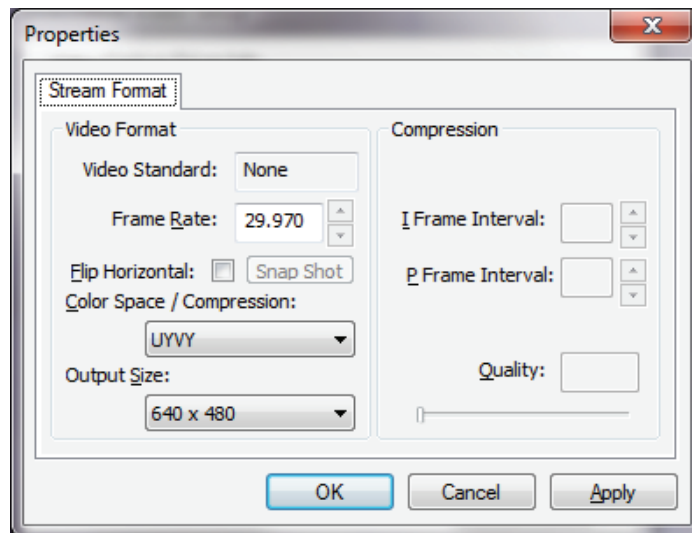
Figure 9. Stream Format Dialog Box

Table 11. Stream Format Dialog Box Description	
Item	**Description**
Video Format	Video Standard: None
	Frame Rate: 29.970 (may vary)
	Flip Horizontal: unchecked
	Color Space / Compression: UYVY
	Output Size: 640 x 480
Compression	(no data)

Appendix C.Troubleshooting Tips

C-1. Introduction

In the event you experience a problem with the USBCam4, refer to the table of troubleshooting tips found on this page. If the problem persists, please contact your local distributor of Schick Technologies products.

In the United States, customers can contact the Patterson Technology Center at 877-498-6505. Outside the United States, please contact the authorized dealer for Schick Technologies products in your country or region.

C-2. Troubleshooting Table

Item	Description	Corrective Action
1	Camera LEDs illuminate and remain on immediately after connecting USB cable, whether software is running or not.	This is normal camera operation. To turn off LEDs, press the Power button on the camera, or place the camera in its handpiece.
2	Camera turns on and off intermittently.	Check USB cable connection at camera and at PC connectors.
3	Camera does not turn on at all.	Make sure you are using an appropriate USB cable (lengths not more than 5 meters (5.5 yards) and cable gauge sizes not less than 20 AWG/2c. If you have connected the USBCam4 to an external powered hub, this may also affect normal operation. If you have connected the USBCam4 to a USB port located at the front of the PC, try connecting the camera to one of the back USB ports, as these plug directly to the motherboard.
4	Cannot select 640 x 480 output size in Video Format dialog box.	Camera is not connected to High-Speed USB 2.0 port. Reconnect camera to appropriate port.
5	Spots are visible on video image.	Check camera lens for spots and follow the instructions in the Handpiece and Lens cleaning section of this document (Section 5.4 on page 26). Also check the "fit" of the camera sheath over the lens. A camera sheath should be on tight enough so that there are no wrinkles across the lens section.
6	Extraoral images appear grainy or blurry.	Camera is strictly intended for intraoral use.
7	Camera options are missing from the DirectShow Video dialog box.	Camera driver was not installed correctly. Disconnect camera from USB cable, uninstall USBCam4 driver, and follow the instructions in Section 2 on page 4.
8	Corrupted video image is displayed when using the camera with an Ultra Port USB 2.0 PCI card, ALI chipset.	Replace the USB card with one that is compatible with the camera.
9	Momentary blip occurs recurrently during video exam.	Change to a different USB port.
10	Image appears nearly completely red during video exam.	Toggle between Fixed Balance/Auto White Balance options in the Camera properties dialog box.

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