PixeLINK

MAKING DIGITAL IMAGING SIMPLE

Megapixel FireWire Camera User's Manual

Release 3.2

PixeLINK™ Megapixel FireWire Camera
User's Manual

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The Purchaser shall hereby recognize the following definitions set herein, as can be found throughout this User's Manual: *Camera* shall henceforth refer to a PixeLINK Megapixel FireWire Camera or Imaging Module; *Kit* shall henceforth refer to a PixeLINK Camera Kit; *API* shall henceforth refer to a PixeLINK Camera Application Programming Interface; *FireWire* and *1394* shall henceforth refer to the IEEE 1394a interface specification; *DirectShow* shall henceforth refer to the Microsoft DirectShow multimedia software; *Pentium* shall henceforth refer to an Intel Pentium microprocessor; *Windows* shall henceforth refer to a Microsoft Windows operating system.

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Federal Communications Commission (FCC) Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Properly shielded and grounded cables and connectors must be used to meet FCC emission limits. PixeLINK is not responsible for any radio or television interference caused by using other than recommended cables or connectors.

Unauthorized changes or modifications to the equipment could void the user's authority to operate the equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

European Community (CE) Statement

Directives:	2001/95/EC (General Product Safety Directive)—Self-declared
	89/336/EEC (EMC Directive)

Standards to which conformity is declared:

	EN55024: 1998
	EN55022: 1998 For Class B
	EN61000-3-2: 1995
	EN61000-3-3: 1995

Manufacturer's Name and Address:	PixeLINK
	3030 Conroy Road, Ottawa, Ontario, K1G 6C2, Canada
Type of Equipment:	PixeLINK Megapixel FireWire Camera
Model Number:	Originally tested on PL-A642; also applies to models with no material difference, that is, PL-A641, PL-A661, PL-A662
First Year of CE Conformity:	2001 (PL-A642)

This is to certify that the PixeLINK Megapixel FireWire Camera meets or exceeds the standards for CE compliance per the Council Directives noted above. Pertinent testing documentation is available for verification.

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Introduction

1.1   The PixeLINK Megapixel FireWire Camera

PixeLINK 1.3 Megapixel FireWire (IEEE 1394) Cameras offer a fast and affordable means of viewing and capturing high quality color or monochrome images on a desktop or laptop computer. With a single FireWire cable, the camera receives power and communicates with the computer, providing real ease of use.

Included with each camera is *PixeLINK Capture*, a software package that provides snapshot image capture and video capture button along with easy-to-use graphical controls for adjusting the camera's imaging parameters, such as exposure, white balance and Region of Interest (ROI).

Images can also be captured directly into popular third-party software packages that use TWAIN—applications such as *Microsoft Word*, *Adobe Photoshop* and *CorelDRAW*—as well as packages that have been customized specifically for PixeLINK cameras.

Table 1.1 PixeLINK Megapixel FireWire Camera Models

Cameras	Camera Type	
	Color	**Monochrome**
PL-A661		✓
PL-A662	✓	
PL-A641		✓
PL-A642	✓	
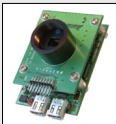
PixeLINK Imaging Modules

Most sections of this User's Guide also apply to PixeLINK Megapixel Imaging Modules (Board-Level Cameras). See Appendix D (page 44) for more information.

1.2   Topics Covered in this Manual

This manual describes the functionality of the PixeLINK Megapixel FireWire Camera hardware and the *PixeLINK Capture* software application.

Users should consult this manual

… before installing the Camera hardware or software

… as a guide when using *PixeLINK Capture*

… for tips on using the camera with TWAIN-enabled third-party software

Sections include:

- Installation of the camera hardware and software—Section 2
- Features of the camera hardware—Section 3
- Features and operation of *PixeLINK Capture*—Section 4
- An overview of *PixeLINK Capture* TWAIN compatibility—Section 5

References in the PDF version of this manual are hyperlinked for easy navigation and access.

1.3   System Requirements

One of the following Microsoft Windows operating systems must be installed:

- Windows 98 Second Edition (SE)
- Windows 2000, with Service Pack 1 (SP1) installed
- Windows XP, with Service Pack 1 (SP1) installed

Service Packs are available for download from the Microsoft Web Site, http://www.microsoft.com/

Hardware requirements:

- Microprocessor:
    Recommended—Pentium® 4 or equivalent, 1.5 GHz
    Minimum—Pentium® III or equivalent, 450 MHz

- Memory:
    Recommended—128 MB RAM
    Minimum—64 MB RAM

- Desktop resolution:
    Recommended—1280 × 1024
    Minimum—VGA (640 × 480)

- 30 MB of hard drive space

- A video card with 24-bit or 32-bit True Color graphics capability, at least 8 MB of video memory and the latest vendor driver installed

- An installed FireWire OHCI compatible interface or one empty PCI slot.

<u>**Laptop Computers Only**</u>

Because of the specialized hardware configurations of laptop computers, they require additional installation considerations:

- **A preinstalled FireWire Cardbus card or a built-in FireWire port**
- **An external 12 V DC power supply**—Check the connectors on the FireWire Cardbus card or built-in FireWire port. If the connectors have six pins, the FireWire cable *may* be able to supply the necessary power to the camera (refer to the computer's documentation for confirmation). If the connectors have four pins, the Camera will need an external power supply.

PixeLINK provides accessory kits for both FireWire enabled laptops (product number PL-1394-LAPTOP-ACC) and laptops without FireWire ports (product number PL-LAPTOP-ACC). Please contact your local PixeLINK dealer for more information.

1.4   OEM Customizability

Custom applications can be created for the camera by using the PixeLINK Camera Application Programming Interface (API). This API is available in all PixeLINK Megapixel FireWire Camera Developer's Kits and as a standalone Software Development Kit (SDK). Please contact your local PixeLINK product vendor for more information on pricing and availability of PixeLINK Developer's Kits and SDKs.

The camera can also be controlled by some Microsoft DirectShow applications.

1.5   Third-Party Applications

PixeLINK Cameras can be used with a variety of third-party applications.

- **Specialized Applications:** Several manufacturers have designed their software specifically to work with the unique features of PixeLINK cameras. For a current list of these applications, visit the PixeLINK Web site at http://www.pixelink.com/.

- **Home and Office Applications:** Many popular programs, such as Microsoft Word, Adobe Photoshop and CorelDRAW, use a TWAIN interface to allow basic camera control and image capture from within the application software. For more information, See Section 5 (on page 37).

- **Multimedia Applications:** PixeLINK cameras can be controlled by some custom applications using Microsoft DirectShow.

1.6   Camera Accessories

Accessories such as tripod mounts, lenses, laptop accessory kits and foot-switches are available from PixeLINK. For a current list of accessories, visit the PixeLINK Web site at http://www.pixelink.com/ or contact your PixeLINK vendor.

1.7   Related PixeLINK Documentation

- **PixeLINK Megapixel FireWire Camera System Guide**

    This Guide provides a reference for the hardware and system properties of the PL-A661 and PL-A662 cameras and related imaging modules (PL-A653 and PL-A654).

    Users should consult this Guide …

    > … when mounting a camera within a system or enclosure
    >
    > … before using the enhanced features of an imaging module, such as a flash or trigger
    >
    > … to gain a basic understanding of the relationship between the camera and the operating system

    Sections include:

    - A description of the camera (and imaging module) hardware
    - An overview of selected host software and architecture
    - An explanation of Video and Still Modes

- **PixeLINK Camera API Reference, Release 3.2**

    This manual provides a reference for the PixeLINK Camera API and related software.

    Sections include:

    - Basics principles of using the PixeLINK Camera API
    - A summary of the PixeLINK Camera API functions
    - Descriptions of individual API functions

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2

Installation

2.1   Notes on Connecting the PixeLINK Camera

If you have never installed a FireWire device, read these guidelines before connecting the PixeLINK Megapixel FireWire Camera.

- Install the software before connecting the camera for the first time.

- You do not need to power down the computer to connect or disconnect a FireWire device, nor do you need to reboot after this is done.

- Do not make more than one connection between the camera and the computer. If you duplicate a connection, the equipment will not be able to communicate properly and the system may crash.

- If you connect more than two FireWire devices, make sure that you do not create a functional loop. This will have the same consequences as making a duplicate connection between a single camera and the computer. For example, if you connect device A to device B and device B to device C, you should not connect device A directly to device C. [Note that *PixeLINK Capture* will not control multiple cameras through a single control window. Other FireWire devices can be used at the same time as the camera, up to the capacity of the FireWire bus.]

- The computer's FireWire bus can supply power to the camera if the computer has a six-pin FireWire connector and the total power demand on the bus does not exceed the bus capacity. Note that some laptops have four-pin FireWire connectors; these do not provide power to the camera from the computer. An external power supply can be connected to the FireWire bus.

Note:

Do not connect the camera before the camera software is installed, or the software will not install correctly.

2.2   Installation Procedure

The Kit is installed in this order:

1. **FireWire Adapter Card (if required)—page 6**
2. **PixeLINK Camera Software—page 7**
3. **PixeLINK Megapixel FireWire Camera—page 8**

The entire procedure should take only a few minutes. To avoid problems, please read all instructions before you start.

2.2.1   Installing the FireWire Adapter Card (Desktop Computers)

> **Note:**
>
> **For Laptops that do not have FireWire capability,** use the PixeLINK Accessory PL-LAPTOP-ACC.

An OHCI PCI FireWire (IEEE 1394) adapter card is included in each PixeLINK Megapixel FireWire Camera Kit. If your desktop computer already has a FireWire connector, proceed to Section 2.2.2 (on page 7); otherwise, follow the directions below.

1) Shut down Windows: Click the Windows **Start** button, then select **Shut Down**. From the list of options, select "Shut Down".

2) When the computer has powered down, disconnect the power cord, keyboard, mouse and monitor.

3) Ground yourself by touching some grounded metal, using an antistatic mat, grounding cord or other grounding device, then open the cover of the computer.

4) Locate an available PCI slot and remove the corresponding slot cover (if present) located at the back of the chassis.

5) Insert the card into the selected PCI slot. Make sure that the card is fitted securely. Replace the cover screw to ground the card firmly to the PC chassis.

6) Replace the cover.   Reconnect the keyboard, mouse, monitor and power cord. Plug in the power and switch on the computer

7) **Windows 2000 and XP only**: Login to the computer, using an account with administrator privileges.

8) Windows will automatically detect the card and run the "Add New Hardware Wizard". This wizard will search for a "Texas Instruments OHCI Compliant IEEE 1394 Host Controller". Click **Next**.
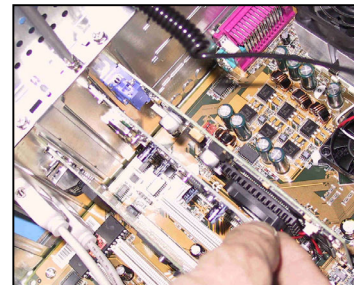
9) Select **Search for the best driver for your device**. Click **Next**.

10) The wizard will then ask for locations to search for the drivers. Clear all of the check boxes and click **Next**.

11) When asked "What do you want to install?" select **The updated driver**. Click **Next**.

12) When the wizard finds the driver, check that the driver location is <Windows path>\inf\1394.inf, where <Windows path> is the location of your Windows program files. Click **Next**.

    If the wizard does not find the driver, it will need to be installed from your Windows CD. When prompted, insert the Windows CD and click **OK**. Note that if you click too quickly, Windows will not be able to find the driver and it will ask you to browse to find it.   Find the driver, select it and continue with the installation.

13) Click **Finish** to complete the installation of the card.

14) Proceed to Section 2.2.2 (below) to complete the installation of the Kit.

2.2.2   Installing the PixeLINK Camera Software

Windows 2000 and XP only: To install or uninstall a PixeLINK Camera Kit, you must be logged in to an account with administrator privileges. This is not required for usage of the camera. Contact your system administrator for details.

1) Exit all applications.

2) Load the PixeLINK software. Either:
    • Insert the PixeLINK CD, or
    • Download the PixeLINK camera software from http://support.pixelink.com/.

3) The interactive installation program will run automatically (see Figure 2.1, on page 8). Click **Install This Product** to install the software.

4) Follow the instructions as they appear.

Note:

If you receive a message that the Microsoft digital signature was not found (see Figure 2.2, on page 8), click *Yes*.   This will not affect the performance of the software or camera.

Figure 2.1 Installation Screen
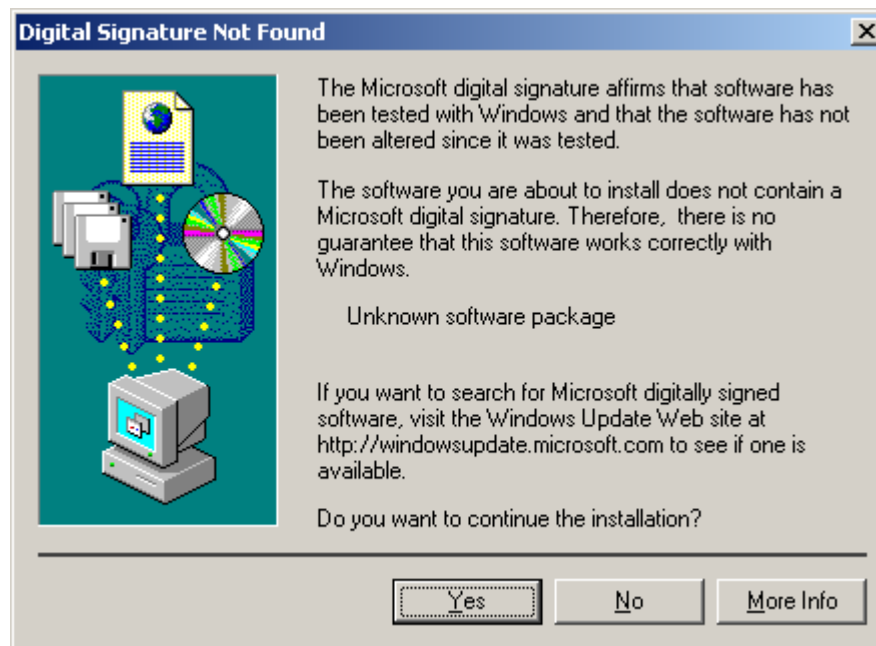
Figure 2.2 Digital Signature Not Found

2.2.3 Installing the PixeLINK Megapixel FireWire Camera

Because the camera uses a FireWire bus, the computer does not need to be switched off during camera connection or disconnection.

1) Login to the computer, if necessary. (**Windows 2000 and XP only:** Administrator privileges are required for the first connection of a camera ("initialization").)

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2) Connect the FireWire cable to the camera and the computer's FireWire port. You may use any available FireWire port on the computer or on the camera for the installation. The operating system will detect the connection automatically.

Note:

- **If Windows runs the "Add New Hardware Wizard" after you plug in the Camera,** you are probably running Windows 98 First Edition. Cancel the current installation and install one of the supported Windows operating systems listed in Section 1.3 (on page 2).

- **If you receive a message that the Microsoft digital signature was not found (see Figure 2.2, on page 8), click** *Yes*.

3) Windows will load the driver for the camera. (This driver was installed at the same time as the PixeLINK camera software.) You might need to wait a few seconds while Windows builds a driver information database.

Windows 2000 and XP only:

4) Run the PixeLINK applications (*PixeLINK Capture* and *PL-A6xx Application* (Developer's Kits only)) briefly before logging out. This will ensure initialization of the programs. It is not necessary to run them under administrator privileges during subsequent sessions. For more information, see Section 3.5 (on page 13).

5) If you have more than one camera, initialize all of them while still using Administrator privileges. Detach the FireWire cable from the current camera and connect it to an uninitialized one. Repeat as required. Administrator privileges are not required for subsequent use of a camera.

2.3 Uninstallation of the PixeLINK Camera Software

1) **Exit all applications.**

2) In Windows: Click **Start**, then select **Programs → PixeLINK → PL-A6xx** (or the path selected in the installation procedure, if it is different).

3) Select the Uninstallation option for the software and follow the instructions given.

3

Camera Hardware

3.1   PixeLINK Camera Hardware Overview

Figure 3.1 The PixeLINK Camera

Camera Features:

- 1.3 Megapixel imager resolution (1280 × 1024)
- 8/10-bit RGB (color) or monochrome pixels
- Integrated infra-red (IR) filter over the image sensor
- Two FireWire connectors
- Lens mount for a standard C-mount lens (1" × 32 tpi) [*lens not included*]
- Mounting holes for a tripod or other mounting fixture (4–40 screws)

See Figure 3.2 and Figure 3.3 (on page 11) for locations of hardware features. Note that outlines of the PL-A661 and PL-A662 cameras are shown in these figures; PL-A641 and PL-A642 cameras differ in the configuration of the C-mount and infra-red (IR) filter.

Detailed drawings including dimensions are provided in the *PixeLINK Megapixel FireWire Camera Systems Guide: PL-A630 to PL-A660 Series Cameras*.
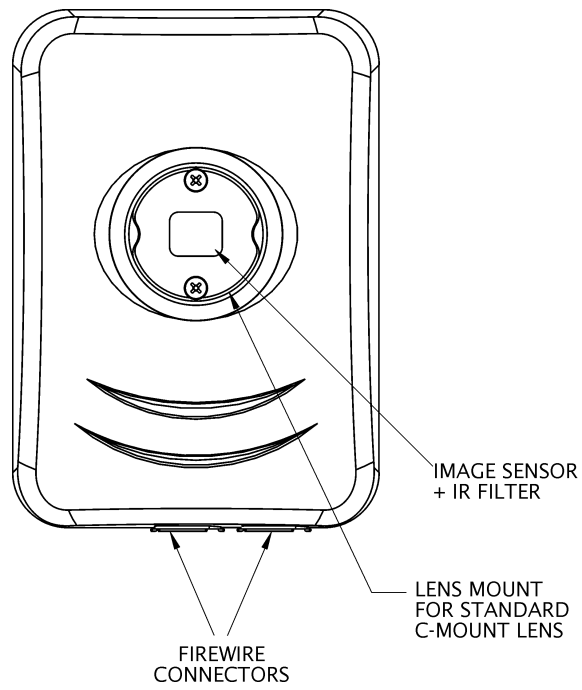
Figure 3.2 Camera Features, Top View
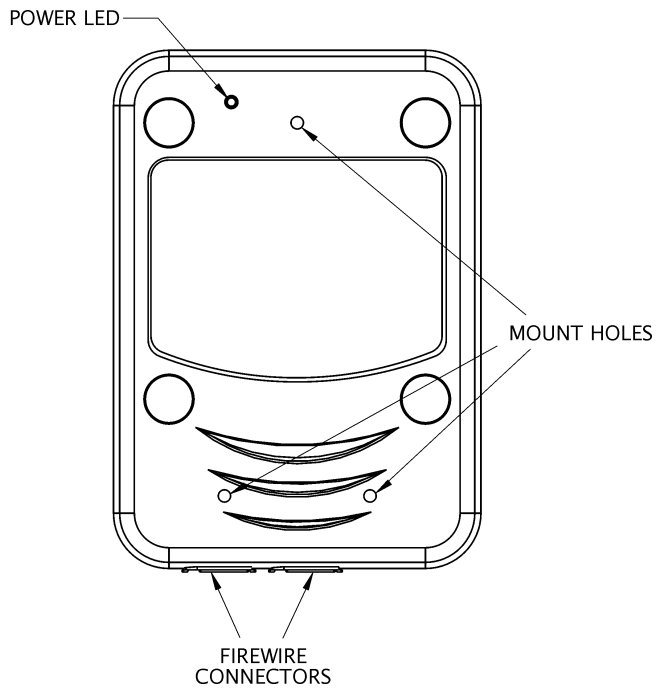
Figure 3.3 Camera Features, Bottom View

3.2   FireWire Connectors

Each PixeLINK camera has two FireWire connectors (ports), allowing several FireWire devices to be daisy-chained.   The number of devices that may be managed simultaneously depends on the total bandwidth and may be limited by the processing capabilities of the host computer.   [Note that *PixeLINK Capture* will control only one camera at once.]

3.3   Power

The computer's FireWire bus can supply power to the camera if the computer has a six-pin FireWire connector and the total power demand on the bus does not exceed the bus capacity.   Some systems—such as laptop computers or those with several FireWire devices daisy-chained—require an external 12 V supply to power the camera.

An external power supply can be connected to the FireWire bus. (Imaging modules are also capable of having an external power supply attached directly to a power header.)

3.4   Attaching Lenses and Tripods

The camera can be fitted with a standard C-mount lens or attached to a microscope with a suitable coupler.   Simply attach the lens or connect to the microscope using the threaded lens mount indicated in Figure 3.2 on page 11.

The back of the camera has three 4–40 screw holes for the attachment of a mounting fixture such as a tripod.

PixeLINK offers custom mounting fixtures for attaching a tripod with a standard ¼–20 screw threading at a 90° angle to the Camera. The tripod mounts are specific to the type of camera.

Table 3.1 Tripod Mount Selection Table.

For this camera …	Use this tripod mount:
PL-A641, PL-642 PL-A661, PL-662	PL-640/660-CAMERA 1/4-20 MOUNT
PL-A633, PL-634 PL-A653, PL-654	PL-MODULE 1/4-20 MOUNT

For more information, contact your PixeLINK vendor or visit the PixeLINK Web site at http://www.pixelink.com/.

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3.5   IR Filter

The camera is fitted with an integrated IR filter.

Minor Cleaning of the IR Filter

1. Carefully apply puffs of dry, compressed air to move particles off the center of the glass.

2. Remove oils with a swab moistened with reagent-grade isopropyl alcohol. The swab should be damp but not dripping.

> **Caution:**
>
> **<u>Do not</u> use acetone to clean the IR filter.**

4

PixeLINK Capture

4.1   Introduction

PixeLINK Capture is a real-time, interactive application for the PixeLINK Megapixel FireWire Camera. Functions include:

- Viewing a video image
- Adjusting and setting imaging parameters
- Capturing images and storing them as bitmap, TIFF, JPEG or raw image data files
- Capturing AVI video clips

"What You See Is What You Get"

PixeLINK Capture works by streaming real-time, high-quality video to a **preview window** in which the image size, color and exposure can be adjusted interactively through an easy-to-use control window prior to image capture.

For the advanced user, *PixeLINK Capture* also offers options of more complex image enhancements as the picture is being captured to disk, such as calculations that involve several sequential frames.

4.2   Camera Models

Because *PixeLINK Capture* is backward-compatible, it works with all PixeLINK Megapixel FireWire camera models PL-A631 though PL-A662. Options applicable to specific camera types or models are noted.

4.3   Starting *PixeLINK Capture*

To launch *PixeLINK Capture* from Windows:

Click **Start**, then select **Programs → PixeLINK → PL-A6xx → PL-A6xx Capture** (or the path selected in the installation procedure).

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If only one camera is connected, *PixeLINK Capture* will select it automatically.   If more than one is connected, the program offers a list of available cameras (see Figure 4.1, below). Select a camera from the list.

(Because a camera can be controlled by only one application at a time, any cameras that are already in use by other applications are ignored.)
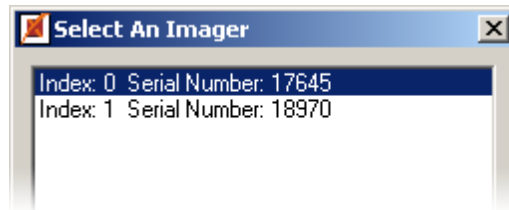
Figure 4.1 Selecting a Camera

When you first start *PixeLINK Capture*, the application opens a control window and a preview window showing a 640 × 480 image.

Note:

PixeLINK Capture launches with the control settings that were in use when it (or the *PixeLINK Capture* TWAIN interface) was last closed.

4.4   Using *PixeLINK Capture*

PixeLINK Capture allows the quick and easy adjustment and capture of digital images.

The most frequently used functions are easily accessible in the *PixeLINK Capture* control window. These functions perform three major tasks:

Viewing the image (turning the preview image on and off)
- See Section 4.5 on page 17

Adjusting the image properties, including applying and managing settings and presets
- See Section 4.6 on page 17

Capturing a still image or video clip
- Still images—See Section 4.7 on page 23
- Video clips—See Section 4.8 on page 27

Figure 4.2 (on page 16) provides a quick reference for the functions in the control window. Additional functions and options are available through the menu bar (see Section 4.10 on page 29).

Basic Procedure for Adjusting and Capturing a Still Image:

1) Adjust the exposure (near the top of the control window)

2) Correct the white balance or gain (middle of the window)

3) Capture the image (buttons on the bottom of the window)
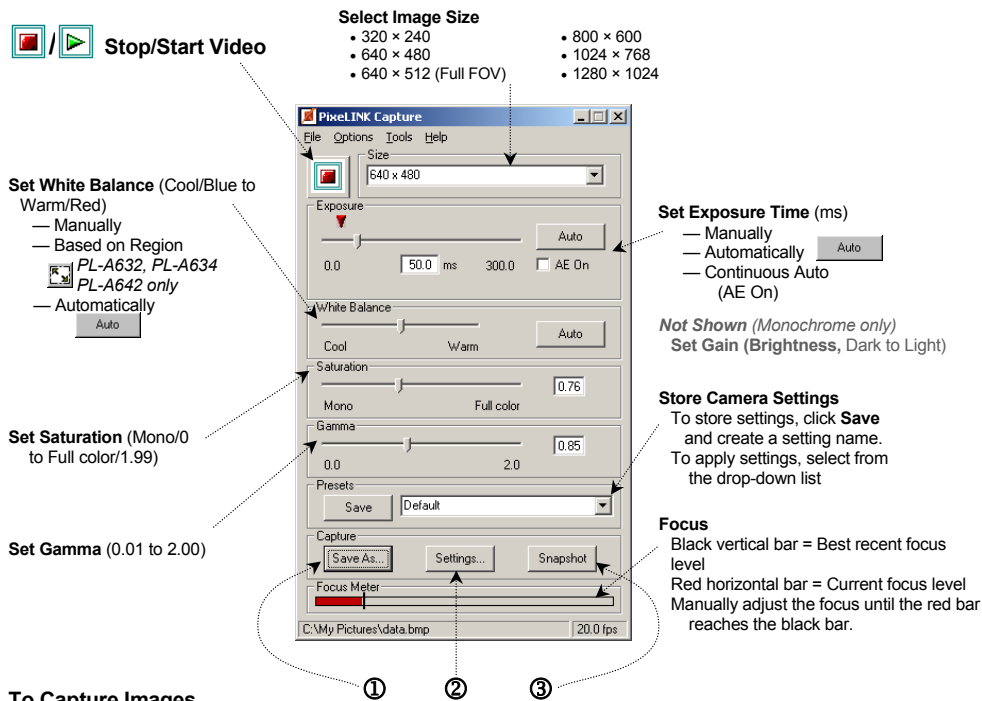
To Capture Images

① **"Save As …"**—Specify a name, location and type for the image file.

② **"Settings …"**—Select the Capture Settings Options.

③ **"Snapshot"/"Start"**—Capture single/multiple image(s).

Figure 4.2 *PixeLINK Capture* Quick Reference (PL-A662 options shown)

Note:

- *Not all options are available on all cameras.* Figures show options for the PL-A662 color camera/PL-A654 color imaging module.
- A camera can be controlled by only one application at a time
- *PixeLINK Capture* can control only one camera at a time.
- Other FireWire devices can be used at the same time as the camera, up to the capacity of the FireWire bus. If you need to make multiple FireWire connections, refer to Section 2.1 (on page 5) for guidelines.

4.5   Viewing the Image

■ / ▶ *Stop/Start Video (Toggle Button)*

Click to Stop or Start the video display in the preview window.

The preview window opens when the video display is started and closes when the video display is stopped. By default, the preview window is the same size as the image.

4.6   Adjusting the Image

4.6.1   Selecting the Image Size

The full field of view (FFOV) of the camera is 1280 × 1024 pixels. The image can be all of this area or a selected portion of it, as shown in Figure 4.3, below.
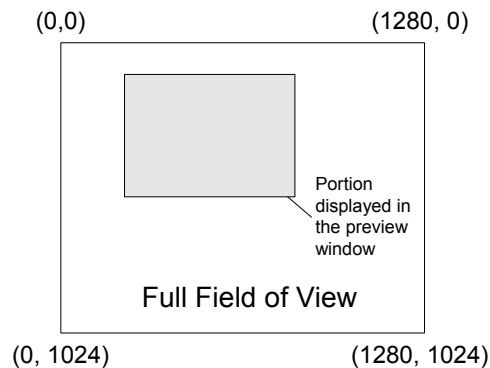
Figure 4.3 The Full Field of View and the Displayed Image

To select the image size: From the Size drop-down list, select the desired image size, in pixels:

- 320 × 240
- 640 × 480
- 640 × 512 (Full FOV)

- 800 × 600
- 1024 × 768
- 1280 × 1024

To display the full field of view (FFOV), select:
- 640 × 512 (FFOV)—Display at quarter resolution (and a higher frame rate)
- 1280 × 1024—Display at normal resolution

All other settings represent a portion of the full field of view (see Figure 4.3, above). Default: 640 × 480.

To reposition the image in the full field of view: Go to the Options menu and select **Set Subwindow Position** (see page 29). The current image location appears as a red frame superimposed on the full field of view. Drag the frame to reposition the image (subwindow), then click to set the new location. This simulates a digital pan-tilt function.

This option is not available when the image size is 640 × 512 (Full FOV) or 1280 × 1024, since these resolutions represent the full field of view.

Image size versus preview window size: By default, the preview window is the same size as the image. However, the preview window can be resized using the usual Microsoft window handles or by clicking its Maximize icon. This does not affect the dimensions of the image generated by the camera, so resizing the preview window can distort the appearance of the image or make it look pixilated (that is, it can look boxy, chunky or jagged). It can also slow down the performance of the system. Resizing the window has no effect on captured images.

To reset the preview window to the same size as the image, go to the Options menu and select **Reset Preview Window**.

4.6.2   Adjusting the Control Settings

Table 4.1 Image Controls

Parameter	Camera Type		Range	
	Mono.	**Color**	**Min**	**Max**
Exposure	✓	✓	0 ms	PL-A661/PL-A662: 300 ms PL-A641/PL-A642: See Section 4.6.2.1 (p. 18)
AE On	✓	✓	Darker (1% sat.)	Lighter (20% sat.)
White Balance		✓	Cool (blue)	Warm (red)
Gain (not shown)	✓		0.69	2.74
Saturation		✓	PL-A662: Mono (0) PL-A642: Less color (0)	PL-A662: Full color (1.99) PL-A642: Full color (1.99)
Gamma	✓	✓	0.01	2.00

4.6.2.1   Exposure

(Refer to Figure 4.4 on page 19.) Increase or decrease the exposure time (in milliseconds) by moving the Exposure slider or by entering the exposure time in the box below the slider. (Default: PL-A661 and PL-A662 —50 ms; PL-A641 and PL-A642—25 ms). Valid values range from 0 ms to 300 ms for PL-A661 and PL-A662 cameras. The maximum exposure time for PL-A641 and PL-A642 cameras depends on the size of the image and the acceleration setting applied (see "Set Video Preview Acceleration to", on page 31). For these cameras, the maximum exposure time increases when the image size is increased and acceleration is not applied (see Table 4.2, below).

A red triangle above the slider (shown in Figure 4.4, on page 19) appears for PL-A661 and PL-A662 Cameras only. It indicates the maximum exposure time that can be used without reducing the frame rate under the current settings.

Table 4.2 Examples of Maximum Exposure Time, PL-A641 and PL-A642 Cameras only

	Video Preview Acceleration Setting		
Image Size	Accelerated (24 MHz)	Standard (16 MHz)	Moderate (12 MHz)
640 × 480	33.3 ms	50.0 ms	66.6 ms
1280 × 1024	71.0 ms	106.5 ms	142.0 ms
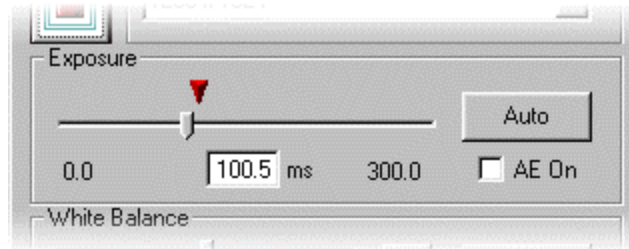
Figure 4.4 Exposure Controls

Auto Exposure: Click **Auto** to set the exposure time automatically. *PixeLINK Capture* adjusts the exposure time to improve the image intensity for viewing. *This option is available only while the video display is running.*

AE On (Continuous Auto Exposure): Select **AE On** to adjust the exposure time automatically to accommodate continuous changes in the video stream. This control is similar to automatic gain control in analog cameras. *This option is not available for PL-A641 and PL-A642 Cameras.*

Figure 4.5 Exposure Controls with "AE On"

As shown in Figure 4.5 (above), when AE On is selected, the exposure slider changes from a time scale to an indicator of light intensity ranging from Darker to Lighter, and the box below the slider indicates the percentage of saturation to be applied (valid values range from 1 to 20%). Default: Off. *This option is available only while the video display is running.*

Occasionally, due to certain lighting conditions and subject size compared with the amount of background illumination, the exposure may cycle from too bright to too dark. If this occurs, reduce the amount of background in the image by moving the subject,

adjust the exposure slider to another value, or adjust the lens iris or microscope light levels (if applicable).

> **Of special interest to microscopists:** Continuous Auto Exposure is particularly useful when viewing and capturing images with a variety of microscope objectives.

- Setting the exposure slider to Darker (or 1%) typically gives good results for bright field microscopy.

- The exposure control ignores rapid changes in intensity (from bright to very dark) for approximately three seconds, allowing the microscope operator plenty of time to switch objectives.

- When the light intensity is detectable again, the exposure control function resumes. Typically, the correct exposure should be attained in less than one second after the objective has been changed.

- If the objective is covered or the illumination is turned off for more than three seconds, the camera will attempt to use a longer exposure time. When the light is turned back on, it can take up to four seconds for the camera to reset the exposure.

4.6.2.2   *White Balance (Color Cameras only)*

About White Balance

> **White Balance** is the ability of the camera to interpret the color of an object that is illuminated with a particular type of light. Some light sources, such as sunlight or florescent light, cast slightly colored hues

> *Recommendation: Adjust the image exposure and correctly set the light source type (*page 30) *before performing a white balance.*

Manual White Balance: Adjust the color levels of the image toward the Cool (more blue) or Warm (more red) ends of the spectrum by moving the White Balance slider. Default: Midpoint.

Automatic White Balance: Click **Auto** to calculate and set the white balance based on the color content of the current image. This function detects portions of the image that should be white (or light gray) but might be slightly off-colored. It then adjusts the color balance of the entire image to optimize the colours of the image compared to those seen by the human eye.. *This option is available only while the video display is running.*

For the PL-A662 camera, the Automatic White Balance function adjusts the colors based on portions of the scene that are near-white. This gives a more accurate color balance. To ensure that the colors can be balanced correctly, a small portion of the image should be near-white.

For the PL-A642 camera, the Automatic White Balance function adjusts the colors based on the average color of the entire scene. To ensure that the colors can be balanced correctly, the entire image should be near-white when performing a white balance.

Of special interest to microscopists:

- In brightfield microscopy using transmitted light, if the background illumination is visible, there is often enough of this illumination for an accurate color balance. If the sample completely fills the image, move the sample to allow a small amount of background illumination to show in the image.   Otherwise, the automatic white balance will not yield accurate results.

- In reflected light microscopy, a small portion of the scene must be white for the automatic white balance to be accurate. Place a piece of white paper in the field of view when performing the white balance if there is no white present.

Manual White Point Selection: The "white point" is the off-white color that appears where the image should be white. This color can be imparted for a number of reasons. If this color can be readily identified visually, it can be selected manually for the white balance function: Go to the Options menu and select **Set White Point**. (See page 30 for more information.)

Area White Balance: For the PL-A641 camera only: To calculate and set the color

levels of the entire image according the levels present in a small area, click the "Area White Balance" button (shown at left) then click and drag the mouse in the preview window to define the area. Recommended areas have an even coloration consisting of light or gray pixels. *This option is available only while the video display is running.*

4.6.2.3   *Gain (Monochrome Cameras only)*

Make the video stream appear darker or lighter by moving the Gain slider or entering a value in the box at the end of the slider bar. Valid values range from 0.69 (dark) to 2.74 (light). Default: PL-A661 camera—1.0; PL-A641 camera—2.0

For monochrome cameras, this slider appears in place of the White Balance controls shown in Figure 4.2 (on page 16).

4.6.2.4   *Saturation (Color Cameras only)*

Increase or decrease the saturation value by moving the Saturation slider or entering a value in the box at the end of the slider bar. Valid values range from Mono/Less color (PL-A662/PL-A642 cameras, respectively) (0) to Full color (1.99). Default: PL-A662 camera—0.76; PL-A642 camera —0.55.

Tip: To view a fully monochrome preview image with a PL-A642 camera, go to the Options menu and select **Set Preview Window**, then choose **Monochrome** (see page 31).

4.6.2.5   *Gamma*

Increase or decrease the gamma correction value by moving the Gamma slider or entering a value in the box at the end of the slider bar. Valid values range from 0.01 to 2.00. To turn off gamma correction, enter a value of 1. Default: 0.85.

4.6.2.6   Presets

"Presets" are custom configurations of *PixeLINK Capture* settings. When a preset is applied, the *PixeLINK Capture* controls change to the values stored in that preset. See Figure 4.6, below.
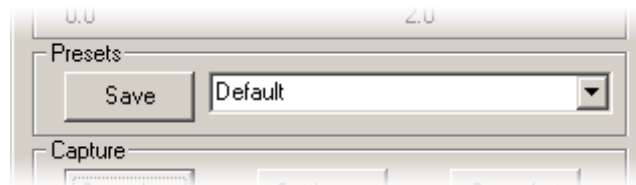
Figure 4.6 Presets

Create a preset: With *PixeLINK Capture* settings adjusted as desired, click **Save**. Specify a name for the preset and click **OK**.

Apply a preset: Select the desired preset from the drop-down list. The factory default settings can be applied by selecting **Default**.

Delete a preset: Go to the File menu and select **Delete Presets**. Choose the preset to be deleted and click **Delete**.

Presets are shared with the *PixeLINK Capture* TWAIN interface (see Section 5, on page 37).

PixeLINK Capture launches with the control settings that were in use when it (or the *PixeLINK Capture* TWAIN interface) was last closed.

4.6.2.7   Focus Meter

Of special interest to microscopists:

 For scenes that have a shallow depth of field, such as microscope slides, the Focus Meter located at the bottom of the *PixeLINK Capture* control window gives a general indication of the quality of the current image focus level as compared to the focus level of previous images. Use the Focus Meter to assist in manual focusing of the image.

As shown in Figure 4.7 (below), the black vertical bar shows the best focus achieved in recent images. The red horizontal bar shows the current focus level. To use the Focus Meter for manual focus, slowly sweep the focal plane of the image from too close to too far, and then adjust the focus until the red bar reaches the black bar.
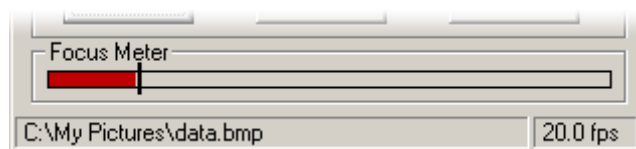
Figure 4.7 Focus Meter and Status Bar

To minimize the impact of the focus meter on the host processor, the focus meter only measures differences in the contrast of vertical lines in the image. Images with only horizontal lines or features may cause the focus meter to show erroneous indications.

Switching off the Focus Meter: To reduce the demand on the computer's processor, switch off the Focus Meter: Go to the Tools menu and deselect **Enable Focus Meter**.

4.7   Capturing an Image

Near the bottom of the *PixeLINK Capture* control window are the three buttons needed to capture an image (see Figure 4.8, page below). Apply them in this order:

1. **"Save As"**—Specify a name, location and type for the image file (page 23).

2. **"Settings"**—Select the Capture Settings Options (page 23)

3. **"Snapshot" / "Start"**—Capture single/multiple image(s) (page 27).
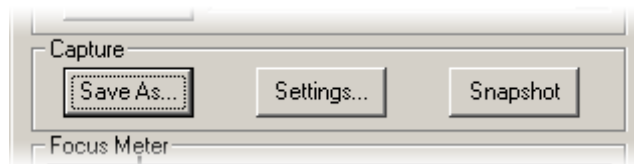
Figure 4.8 Image Capture Controls

4.7.1   "Save As"

Click **Save As**, then specify a name, location and type for the image file (see Figure 4.9, on page 24).

Four file types are available:

- Windows Bitmaps (*.bmp) [default]
- Tagged Image File Format (*.tif)
- Raw data (*.raw)
- JPEG File Format (*.jpg)

Click **Save**.

4.7.2   "Settings"

Click **Settings** to display the Capture Settings options shown in Figure 4.10 (on page 25). Select the desired options, described below. When finished, click **Close**.

Options:

- *Auto Increment File Name*

  Add a four-digit suffix to the file name and automatically increment the suffix each time an image is captured (single or multiple frame capture).
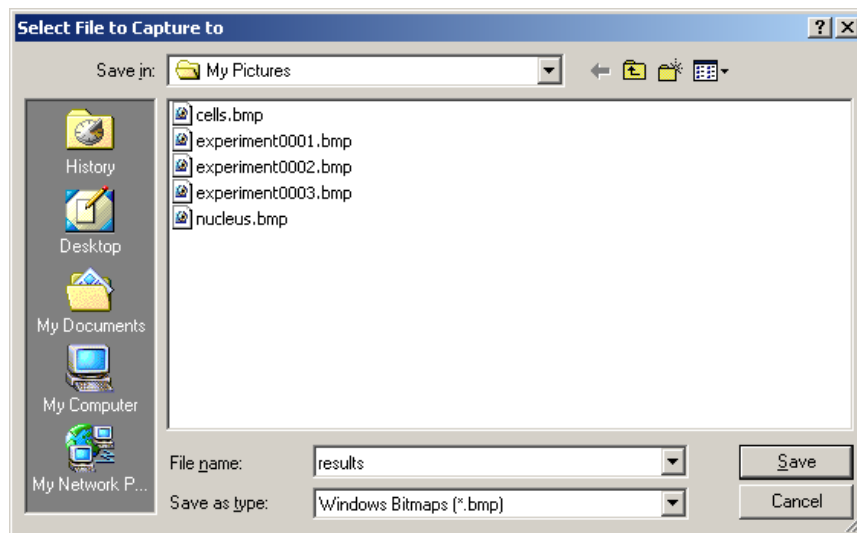
Figure 4.9 Select File to Capture to

- *Preview Image After Capture*

  Automatically display a captured image in a new, static window immediately after capture.

- *Capture Full Frame (1280 × 1024)*

  Capture a full-frame image, regardless of the size of the preview image or the location of the preview image in the full field of view.

- *Apply Overlay On Captured Images*

  Add a bitmap, such as a company logo or a timestamp, to the captured images. To specify the bitmap location, go to the Tools menu and select **Set Bitmap Overlay** (see page 32).

  Selecting this option does <u>not</u> superimpose the bitmap overlay on the preview window. To do this, go to the Tools menu and select **Apply Overlay to Image Preview** (see page 31).

  *This option does **not** apply to images captured in JPEG (.jpg) format.*
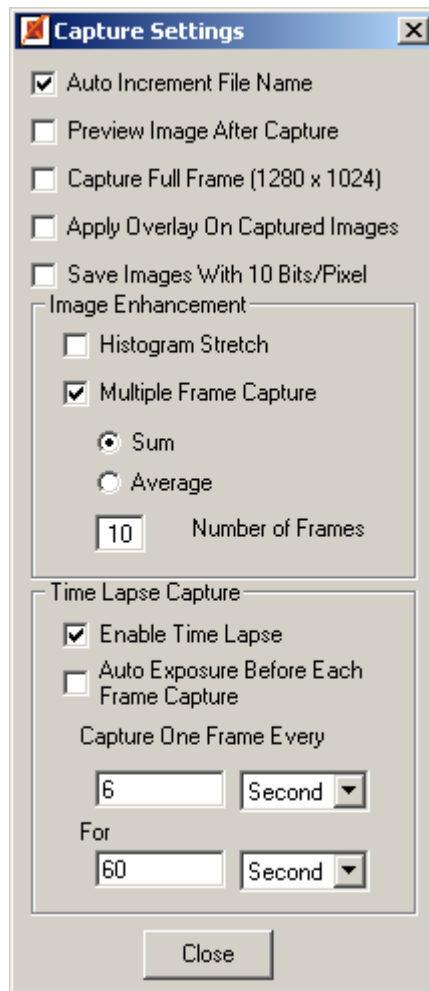
Figure 4.10 Capture Settings

About Bitmap Overlay Images:

- The bitmap must be a .bmp file in 24-bit RGB format.

- The overlay image is placed in the upper left corner of the frame.

- Any white areas (RGB 255,255,255) in the overlay image are treated as transparent; that is, the preview image will show through them.

- An overlay image will not be resized if the size of the preview image is changed. However, if the PixeLINK logo supplied with *PixeLINK Capture* is used as the overlay image, the application will replace the current overlay image with one that is appropriately sized for the new preview image. User-defined overlay images can be customized for each preview image size by using the same file naming conventions as indicated in Figure 4.13 (on page 32).

- *Save Images With 10 Bits/Pixel*

  If the "Save As" file type is .tif or .raw, select this option to save the image in a 10-bits-per-pixel format. Otherwise, it will be saved in an 8-bits-per-pixel format.

- *Image Enhancement*

Histogram Stretch—This option improves the contrast of "muddy" images by:

1. Detecting the minimum and maximum pixel values in the input image,

2. Calculating a linear conversion that maps the minimum intensity value to full black and the maximum intensity value to full white, and

3. Creating an enhanced image by converting all of the pixels of the input image accordingly.

This has the effect of stretching out the pixel values to the widest possible range, thereby increasing contrast in the image.

Multiple Frame Capture—This option allows the image to be enhanced by using data from several sequential images. To be effective, image enhancements involving multiple frame capture require that the subject be as still as possible for the duration of the image capture.

If **Multiple Frame Capture** is selected, choose **Sum** or **Average** and the number of frames to process.

Sum—Brighten and enhance contrast in an image taken in a dark environment by adding the pixel values in several frames.

Average—Reduce the effects of noise in the image by averaging the pixel values over several frames.

Number of Frames—Enter the number of frames to Sum or Average. Valid values range from 1 to 99 frames.

Note:

Unlike other *PixeLINK Capture* settings, the effects of Image Enhancement options are not viewable in the preview window. The calculations required for these advanced functions would slow down a real-time video preview. Instead, they are performed as the image is captured to disk.

- *Time Lapse Capture*

Enable Time Lapse—Select to capture a series of still frames.

When this option is selected, **Auto Increment File Name** is selected automatically, allowing captured images to be stored in sequentially numbered files.

To allow new time-lapse image to overwrite the previous image, deselect **Auto Increment File Name** before capture. This feature may be useful with a program that repeatedly polls a specific image file, such as a webcam script.

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Auto Exposure Before Each Frame Capture—Select to apply Auto Exposure to each frame individually in a time-lapse capture. This is useful when lighting conditions will change during the period of time-lapse capture.

Capture One Frame Every—Enter the time period between captured frames (minimum of 1 second, maximum of 1000 hours) and select a unit of time (seconds, minutes or hours).

For—Enter the total time to run the capture (minimum of 1 second, maximum of 1000 hours) and select a unit of time (seconds, minutes or hours).

Note:

Latencies (delays) inherent in the computer system can cause variations in the time periods between time-lapse captured frames.

4.7.3 "Snapshot" / "Start"

The button located at the bottom right of the control window is context-sensitive depending on whether a single frame or a multiple frame image capture has been specified.

"Snapshot"—Single Frame Capture

Click to save an image in the location specified in "Save As" (on page 23). If **Auto Increment File Name** was selected in "Settings" (on page 23), the file suffix will increment by one.

"Start"—Multiple Frame Capture

Click to save multiple images (or a repeatedly refreshed single image) in the location specified in "Save As" (on page 23), according to the time options specified in "Settings" (on page 23).

To switch the Snapshot sound on or off, go to the Options menu and select or deselect **Sounds**.

4.8   Capturing a Video Clip

In addition to capturing still images as snapshots of the preview window, *PixeLINK Capture* can capture AVI-format clips from the preview window video stream.

To capture a video clip:

1. Go to the File menu and select **Capture AVI**. This opens the Video Clip Capture box (Figure 4.11, on page 28).

2. Specify the AVI filename, and either specify the number of frames to capture or select **Capture frames until told to stop**. Note that the video data is not compressed, so, depending on the number of frames captured, the AVI file could be large.

3. Click **Start Clip Capture**.

To stop a video clip capture already in progress:

Click **Stop Clip Capture**.
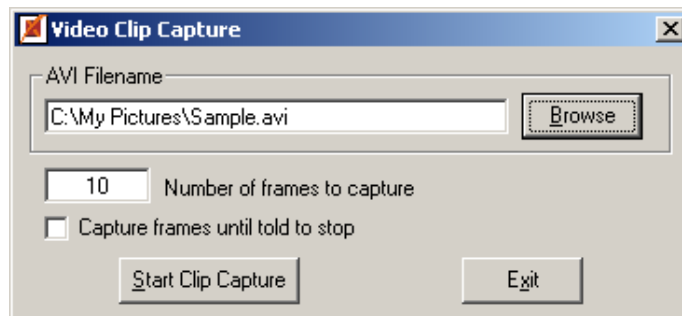
Figure 4.11 Video Clip Capture

About Video Clip Capture:

- The capture process is performed in two stages:
  - In the first stage, raw video data is stored to disk in a temporary file as it arrives from the camera.
  - Once the capture is complete, the temporary file is converted to AVI format.
- No compression is performed in this process so image file sizes can be large.
- The capture process will not start if there is insufficient disk space on the computer to store the final results.
- There is no capability within PixeLINK Capture to play back the AVI file. A third-party application will be required to do this.

4.9   Status Bar

The status bar runs along the bottom of the *PixeLINK Capture* control window (as shown in Figure 4.7, on page 22). The name of the current capture file is shown on the left, and the actual acquisition frame rate is reported on the right (provided that the preview window is running). The frame rate is given in frames per second (fps). Note that the actual frame rate displayed by the preview window depends on the system capabilities, so for slower computers, the actual (displayed) frame rate may be less than the theoretical maximum.

4.10   Menu Bar

4.10.1   File Menu

- *Save Capture File As*

    Set the name, location and type of the image capture file. This is the same as clicking **Save As** in the control window. For more information, refer to page 23.

- *Capture Settings*

    Change the image capture settings. This is the same as clicking **Settings** in the control window. For more information, refer to page 23.

- *Capture*

    Capture a still image or images. This is the same as clicking **Snapshot** or **Start** in the control window. For more information, refer to page 27.

- *Capture AVI …*

    Capture a video clip in AVI format. Select this option to specify the name of the AVI file and the number of frames to be captured in the clip, and start the clip capture. For more information, see Section 4.8 on page 27.

- *Delete Presets*

    Remove old or unused presets from list of available presets. For more information about creating, applying and deleting presets, refer to page 22.

- *Exit*

    Shut down *PixeLINK Capture*.

4.10.2   Options Menu

- *Set Subwindow Position*

    Reposition the image within the full field of view. The current image location (that is, the subwindow) appears as a red frame superimposed on the full field of view from the camera. Drag the frame to reposition the image, then release the mouse button to set the new location. (See Figure 4.3 on page 17.) Default: Center.

    Moving the image in this fashion simulates a digital pan-tilt function.

    This option is not available when the selected image size is 640 × 512 (Full FOV) or 1280 × 1024, since these resolutions represent the full field of view.

■ *Set Light Source (Color Cameras only)*

Correct image color according to the lighting conditions. Select the option that most closely approximates the lighting conditions. Options are: Incandescent, Fluorescent 1, Fluorescent 2, Outdoors. Default: Incandescent.

"Set Light Source" is independent of white balance correction. The light source option is applied to the raw image data during translation of the data to the correct format for display and capture (that is, RGB format). White balance is applied after this translation.

■ *Set Flip Mode*

Reverse the image horizontally ("Horizontal Flip"), vertically ("Vertical Flip") or both. Default: Both off.

To rotate the image by 180 degrees, select both horizontal and vertical flip.

■ *Set White Point (Color Cameras only)*

Select an off-white shade to be corrected to white in the White Balance.

In "true" white, the colors red, green and blue are present in equal intensities and at their maximum values. In an off-white shade, the intensities of these colors are not equal, or are equal but not at maximum (that is, gray). Manually selecting an off-white shade for the white point allows the red, green and blue intensities to be specified with greater precision for the White Balance color correction. (For more information about White Balance, refer to Section 4.6.2.2 on page 20.)

On the displayed color bar (see Figure 4.12, below), the current white point color is indicated by a red rectangle. The rectangle with the "W" has a light-gray background color with all three RGB components of equal intensity. Default: Light Gray (RGB 242,242,242).

To select a new white point, click one of the color swatch boxes. Click **Okay** to save the selection.
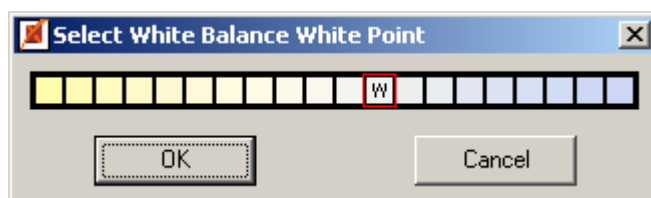

Figure 4.12 Select White Point Color

■ *Restore Camera Defaults*

Restore *PixeLINK Capture* to its default settings. See Appendix B (on page 40) for more information.

■ *Set Preview Window to (PL-A642 Cameras only)*

Select a **Color** or **Monochrome** display for the video preview. Since the Saturation function in the control window does not remove all color for the PL-A642 camera, use this option to view a fully monochrome preview image with this model (see Section 4.6.2.4, on page 21). Default: Color.

■ *Set Video Preview Acceleration to*

Adjust the frame rate of the video preview by increasing or decreasing the camera's clock speed according to the settings shown in Table 4.3 (below). On older computers, color bands may appear in the preview image due to data lost as the computer tries to keep up with the higher speed of the camera. To remove these bands, reduce the video preview acceleration rate.

Table 4.3 Video Preview Acceleration Settings

	Clock Speed	
Setting	**PL-A661 and PL-A662 Cameras**	**PL-A641 and PL-A642 Cameras**
Accelerated	16 MHz	24 MHz
Standard	12 MHz	16 MHz
Moderate	8 MHz	12 MHz

■ *Reset Preview Window*

Restore the preview window to its default location and reset the preview window dimensions to correspond to the image size.

By default, the preview window is the same size as the image. However, the preview window can be resized using the usual Microsoft window handles or by clicking its Maximize icon. This does not affect the dimensions of the image generated by the camera, so resizing the preview window can distort the appearance of the image or make it look pixilated (that is, it can look boxy, chunky or jagged). It can also slow down the performance of the system. Resizing the window has no effect on captured images.

For more information about default values, see Appendix B (on page 40).

■ *Sounds*

Switch the Snapshot sound on or off. Default: On

■ *Always On Top*

Change the float setting of the control window. When this is switched on, the control window remains on top of other windows on the computer desktop; otherwise, other windows can overlap it. Default: Off.

4.10.3   Tools Menu

■ *Apply Overlay to Image Preview*

Superimpose a bitmap, such as a company logo or a timestamp, on the preview window. To specify the filename and location of the bitmap, use "Set Bitmap Overlay" (also in the Tools menu—see below).

Selecting this option does **not** superimpose the bitmap overlay on captured images. To do this, in the control window click "**Settings**", then select **Apply Overlay On Captured Images** (see page 23).

■ *Set Bitmap Overlay*

Specify the name and location of the bitmap overlay file (see Figure 4.13, below).

About Bitmap Overlay Images:

- The bitmap must be a .bmp file in 24-bit RGB format.
- The overlay image is placed in the upper left corner of the frame.
- Any white areas (RGB 255,255,255) in the overlay image are treated as transparent; that is, the preview image will show through them.
- An overlay image will not be resized if the size of the preview image is changed. However, if the PixeLINK logo supplied with *PixeLINK Capture* is used as the overlay image, the application will replace the current overlay image with one that is appropriately sized for the new preview image. User-defined overlay images can be customized for each preview image size by using the same file naming conventions as indicated in Figure 4.13 (below).
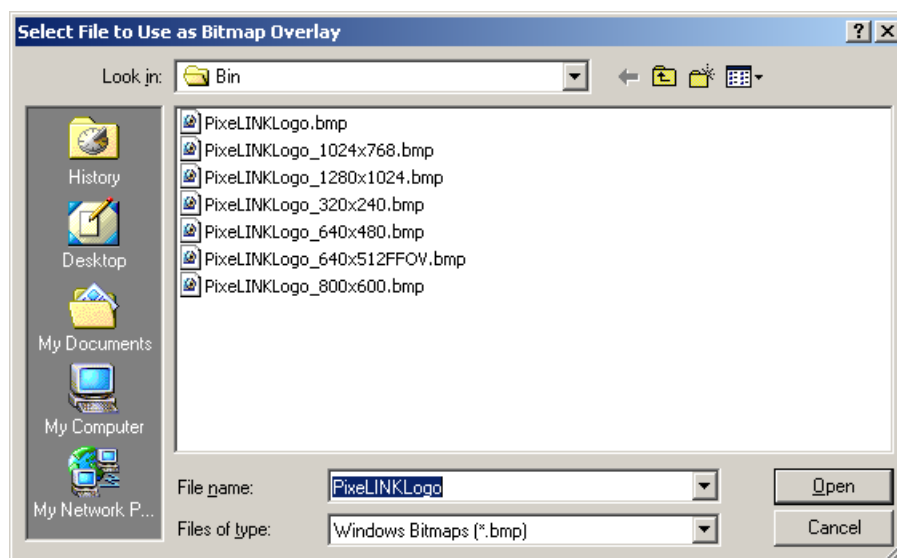

Figure 4.13 Select File to Use as Bitmap Overlay

■ *Create/Apply Flat Field Correction*

Flat Field correction is used to correct for non-uniform lighting, optics, fixed pattern noise and pixel response non-uniformity. The calibration process

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involves two steps: capturing a dark image at the desired exposure time and then capturing a bright image under the lighting conditions to be used but where the sample has been removed and the image made as consistent as possible.

To use flat field correction (FFC):

Create FFC: Select **Create/Apply Flat Field Correction** and follow the on-screen instructions. (You will be asked to turn the illumination source off and on while sample images of the background are being captured.) *When finished, the flat field correction will be* **on**.

Turn off FFC: Suspend the use of FFC by selecting **Turn Off Flat Field Correction** (also in the Tools menu—see below). The FFC is not destroyed and can be turned on again.

Turn on FFC: Resume the use of FFC by selecting **Turn On Flat Field Correction** (also in the Tools menu—see below).

Delete FFC: Permanently disable the current FFC by reselecting **Create/Apply Flat Field Correction**.

- *Turn Off (or Turn On) Flat Field Correction*

  Suspend or resume the current Flat Field Correction (FFC).

Note:

Flat Field Correction can cause artifacts in the image <u>if</u>:
- the background image is highly non-uniform, or
- the camera detects illumination while the dark frame is being captured.

- *Enable Focus Meter*

  Switch the Focus Meter on or off. For more information about the Focus Meter, see Section 4.6.2.7 (on page 22).

4.10.4   Help Menu

- *View User's Manual*

  Open this document in Adobe Acrobat Reader.

- *Flat Field Correction Procedure*

  Display the instructions for applying Flat Field Correction. This option is available in the Tools menu (see Section 4.10.3, on page 31).

■ *About PixeLINK Capture …*

Display information about the camera and the software, as shown in Figure 4.14 (on page 35). For technical support or servicing queries, have this information available.

Imager Type— The type of imager e.g. PixeLINK 1394 Camera (Color)

Serial Number—The serial number of the camera.

FPGA Version—The version of the FPGA hardware in the camera.

Firmware Version—The version of the firmware in the camera.

Driver Version—The version of the camera driver.

API Version—The version of the application programming interface (API) used to create *PixeLINK Capture*.

GUI Version—The version of *PixeLINK Capture*.

GUI DLL—The version of the *PixeLINK Capture* DLL software

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Figure 4.14 About *PixeLINK Capture*

Note:

PixeLINK Capture can control one camera at a time. However, multiple cameras can be controlled simultaneously by other methods, such as opening *PixeLINK Capture* once for each camera or by using custom applications created with the PixeLINK Camera API (included in the PixeLINK Megapixel FireWire Camera Developer's Kits).

If several *PixeLINK Capture* control windows are open in a single session, the values saved for the next session are those from the last *PixeLINK Capture* control window to be closed in the current session.

<div style="background:red;color:white;">**4.11   Keyboard Shortcuts**</div>

Save time by using these Keyboard Shortcuts.

Action	Shortcut
Capture image	CTRL-C or <space>
Auto exposure	CTRL-E
Auto white balance	CTRL-W

The shortcuts are enabled when the control window is the active window.

5

Using the Camera with TWAIN

5.1   Introduction

Images can be captured directly from the camera into popular programs such as Microsoft Word, Adobe Photoshop and CorelDRAW using the PixeLINK TWAIN Interface.

The image capture process with the PixeLINK TWAIN interface is simple, but the exact steps necessary to open a TWAIN interface are specific to each application. Consult the application manuals and help files for instructions. Often, applications regard TWAIN-enabled devices (such as PixeLINK cameras) as being distinct from digital cameras, sometimes categorizing them as "scanners."

5.2   Using the Camera

Make sure that the PixeLINK camera software is installed (see Section 2 on page 5), then follow the three steps listed below.

1. **Set up**

    Connect the camera and open your application. Ensure no other program is accessing the camera.

2. **Open the PixeLINK TWAIN interface**

    This is specific to each application. Refer to the documentation and help for your application.

3. **Capture the image**

    Adjust image settings and capture the image (see page 37).

5.3   Capturing an Image

The TWAIN preview and settings windows open by default when the TWAIN interface is activated (as shown in Figure 5.1, on page 38).

1. **Adjut the image settings:** The functions accessible through the settings window perform in the same way as those in *PixeLINK Capture,* with the following exceptions:

   - No video clip (AVI) capture

   - Limited still image capture settings, with no time-lapse capture or image enhancement

   - No overlays or flat-field correction

   For a description of the functions, see Section 4 (on page 14). Note that presets and the last-used configuration of settings are shared with *PixeLINK Capture*. The keyboard shortcuts also work with the PixeLINK TWAIN interface.

   To close the settings window, click **Close**. The settings window can be reopened from the preview window by clicking **Settings**.

2. **Click Capture** to acquire the image.

In some applications (including Microsoft Word and CorelDRAW), the PixeLINK TWAIN preview window closes automatically. In others (including Adobe Photoshop), the PixeLINK TWAIN preview window remains open for further image captures and must be closed manually by clicking **Close**.

Disable automatic display of settings panel: Select this option to prevent the settings window from opening automatically each time the PixeLINK TWAIN interface is activated. This is useful if many images are being captured with the same settings.
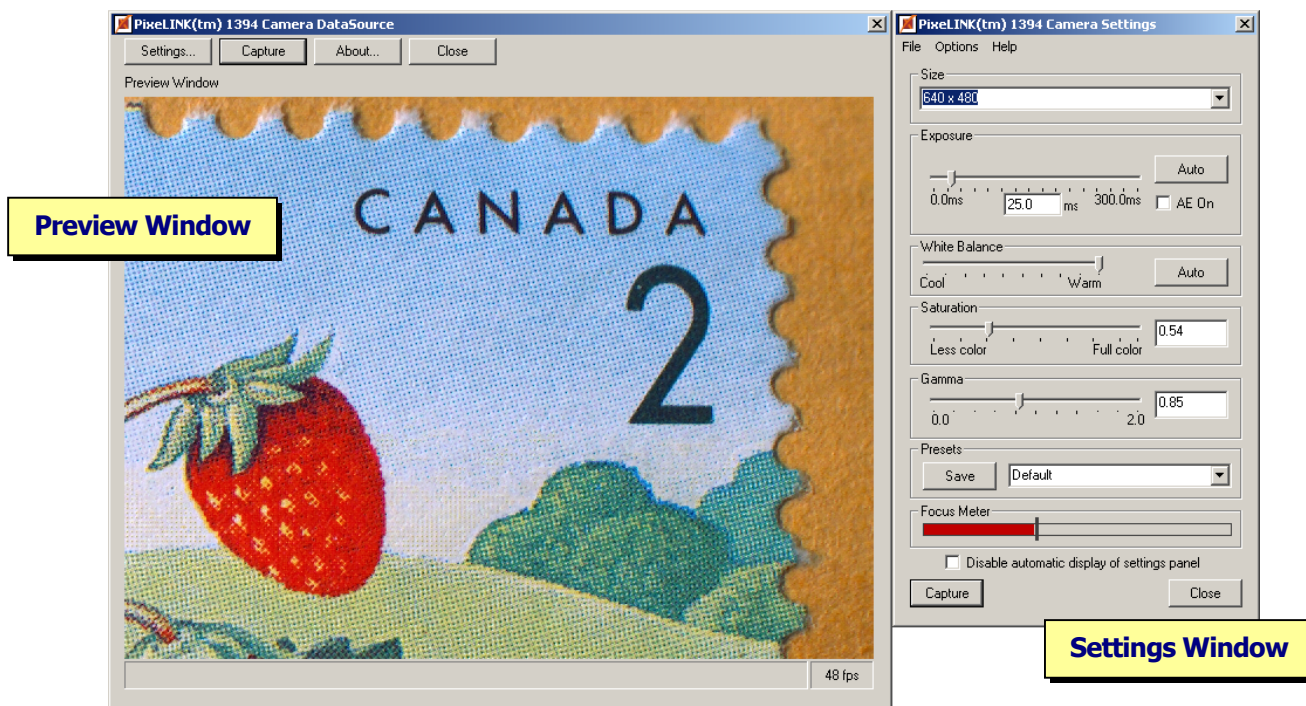

Figure 5.1 PixeLINK TWAIN Preview and Settings Windows

Appendix A. Glossary

1394	Short for the IEEE 1394 digital bus protocol (also known as FireWire, a trademark of Apple Computer, Inc.)
.avi, AVI	Microsoft Windows video file format (Audio Video Interleaved)
.bmp, BMP	Bitmap file
CD	Compact Disc
Enhanced Control	A set of features of PixeLINK Imaging Modules related to electrical control of the camera through a special connector
FireWire	Apple Computer's trademark for the IEEE 1394 digital bus protocol
FOV	Field of View (**FFOV**—Full Field of View)
fps	Frames Per Second
GUI	Graphical User Interface
IEEE	Institute of Electrical and Electronics Engineers
IR	Infra-red
.jpg, JPEG	Graphics file type/extension (lossy compressed 24-bit color image storage format developed by the Joint Photographic Experts Group)
MB	Megabyte
MHz	Megahertz
OHCI	Open Host Controller Interface
PC	Personal Computer
PCI	Peripheral Component Interconnect
preview window	The window used to display images on the screen. The default size is the same number of rows and columns as in the image.
RAM	Random Access Memory
RGB	Standard for encoding color images (Red, Green, Blue)
ROI	Region of Interest. The subwindow on the image sensor where data will be collected.
ROM	Read-Only Memory
sensor	The Camera's image sensing chip
subwindow	The area exposed on the imager (not a window defined for viewing the image on the screen)
.tif, TIFF	Tagged Image File Format
TWAIN	An image capture standard typically used as an interface between image processing software and a camera or scanner

Appendix B. PixeLINK Capture Presets and Defaults

Property: All of the Camera properties listed below are stored when a preset is created (see Section 4.6.2.6, page 22) and applied when a preset is used.

Default Value: The value of the property when the camera is first installed, the preset has not been set or the registry has been cleared.

Restore Camera Defaults: Selecting **Options → Restore Camera Defaults** will restore the checkmarked properties to the default values, sometimes based on sensor type. (See Section 4.10.2, page 29).

Reset Preview Window : Selecting **Options → Reset Preview Window** will restore the checkmarked properties to the default values. (See Section 4.10.2, page 29).

Table B.1 PixeLINK Capture Presets and Defaults

Property	Default Value	Restore Camera Defaults	Reset Preview Window
Control Window			
State of the preview – stopped, playing, or paused	Playing		
Image size	640 × 480	✓	
Exposure (in milliseconds)	PL-A661 and PL-A662 Cameras: 50 ms PL-A641 and PL-A642 Cameras: 25 ms	✓	
AE On (Continuous auto exposure)	No		
White Balance Slider	Midpoint	✓	
White Balance Blue Gain Value	PL-A662 Cameras: 1.96x PL-A642 Cameras: 2.8x	✓	
White Balance Green Gain Value	PL-A662 Cameras: 1.0x PL-A642 Cameras: 2.0x	✓	
White Balance Red Gain Value	PL-A662 Cameras: 1.09x PL-A642 Cameras: 2.3x	✓	
Gain (Mono)	PL-A661 Cameras: 1.0x PL-A641 Cameras: 2.0x	✓	
Saturation	PL-A662 Cameras: 0.76 PL-A642 Cameras: 0.55	✓	
Gamma	0.85	✓	
"Save As" Dialog Box			
Location of capture file	"My Pictures" folder		
Name of capture file	"data" + file format		
File format	.bmp		
"Capture Settings" Dialog Box			
Auto Increment File Name	No		
Preview Image After Capture	No		
Capture Full Frame	No		

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Property	Default Value	Restore Camera Defaults	Reset Preview Window
Apply Overlay On Captured Images	No		
Save Images with 10 Bits/Pixel	No		
Image Enhancement: Histogram Stretch	No		
Multiple Frame Capture	No		
Sum/Average	Sum		
Number of Frames	1		
Time Lapse Capture: Enable Time Lapse	No		
Auto Exposure Before Each Frame Capture	No		
Capture One Frame Every (Number of seconds between captures)	6		
"For" (Total duration of time lapse captures, in seconds)	60		
Options Menu			
Set Subwindow Position: Start Column	Centered	✓	
Set Subwindow Position: Start Row	Centered	✓	
Set Light Source	Incandescent	✓	
Horizontal Flip	No flip	✓	
Vertical Flip	No flip	✓	
White point RGB value for Blue	242	✓	
White point RGB value for Green	242	✓	
White point RGB value for Red	242	✓	
Set Preview Window to	Color	✓	
Set Video Preview Acceleration to	Standard (PL-A661 and PL-A662 Cameras: 12 MHz PL-A641 and PL-A642 Cameras: 16 MHz)	✓	
Reset Preview Window: Height	Image height		✓
Width	Image width		✓
Top	Same top position as control window		✓
Left	Just to right of control window		✓
Always On Top	No		
Tools Menu			
Apply Overlay to Image Preview	No		
Set Bitmap Overlay (Name of the bitmap overlay file)	"PixeLINKLogo" (.bmp file of appropriate size for the image)		

P i x e L I N K

Appendix C. Troubleshooting

When troubleshooting your camera, please follow these steps:

1. Disconnect the camera, wait five seconds, then reconnect it.

2. Review the relevant sections of the documentation, including the common solutions listed in the sections below.

3. Check the PixeLINK Web site (http://www.pixelink.com/) for new software or firmware, and for applicable technical information such as the Frequently Asked Questions List or Application Notes.

4. Carefully document the problem you are experiencing, noting any warning or error messages that may appear during operation

5. Have your camera's serial number and other identifying information at hand. The serial number can be found on bottom of the camera; other information can be found on the "About" screen in the *PixeLINK Capture*

6. Contact your PixeLINK reseller.

C.1   Installation Error

If you receive the error message shown in Figure C.1 (below), logout of the system and login using an account with administrator privileges. Reinsert the Kit CD.
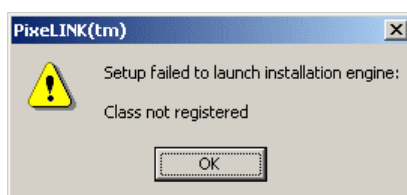

Figure C.1 Installation Error Message

C.2   Control of a Camera by Multiple Applications

A camera cannot be controlled by more than one application at once.

C.3   Camera Not Detected Properly by Windows

If you plugged in the camera before installing the Kit software, Windows might not have detected the camera or the driver might not have been installed.

To remedy this situation, disconnect the camera, wait five seconds, then reconnect it. Windows should automatically detect the connection. The following procedure to check the status in the Device Manager applies to Windows 2000. Other versions of Windows have similar procedures. To check the status:

1) Connect the camera.

2) Click the Windows **Start** button. Select **Settings → Control Panel**.

3) Double click **System**.

4) Choose the Hardware tab, then click **Device Manage**r.

5) One of the categories should be **Imaging Device** or **Imaging Devices**. Click the plus sign to the left of the category name. If "PixeLINK FireWire Camera Release 4" appears, the driver is installed correctly (see Figure C.2, below).

If the above procedure does not work,

1) Disconnect the camera.

2) Uninstall the PixeLINK software according to the instructions in Section 2.3 (on page 9). (If your PixeLINK Kit software does not appear in the program list, the program is not installed properly and should be reinstalled.)

3) Follow the installation directions in Section 2.2.2 (on page 7).

If the wizard informs you that it failed to install the new driver, verify that you are using one of the supported Windows operating systems (see Section 1.3, on page 2).
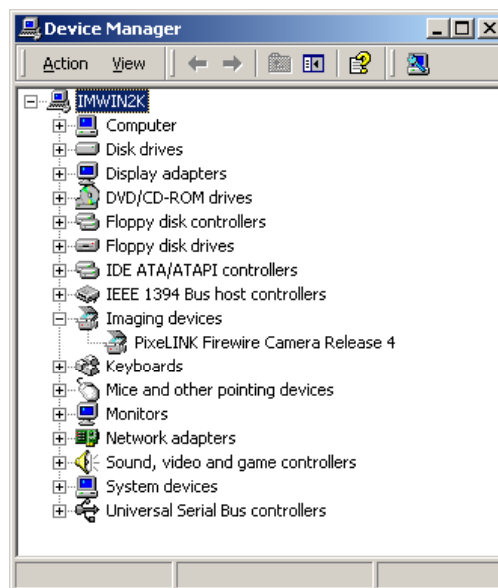

Figure C.2 Checking the Imaging Device Driver

Appendix D. PixeLINK Imaging Module and Camera Models

Because PixeLINK software is backward-compatible, it works with all PixeLINK Megapixel FireWire Imaging Module and Camera models PL-A631 though PL-A662.

D.1   Functional Relationship Between PixeLINK Imaging Modules and Cameras

A PixeLINK imaging module (board-level camera) can perform all of the functions of the equivalent model of PixeLINK camera (that is, a PL-A654 color imaging module can do the same things as a PL-A662 color camera). However, certain models of imaging module offer Enhanced Control functions not available in the cameras, such as shutter and trigger controls.

For more information about PixeLINK imaging modules, including the Enhanced Control header, please refer to the Megapixel FireWire Camera System Guide for PL-A630 to PL-A660 Series Cameras or contact PixeLINK (see page 45).

D.2   Relating Imaging Module Models to Camera Models

Table D.1 PixeLINK Imaging Module and Camera Models

Imaging Module Model	Performs the functions of Camera Model	Type		
		Color	Monochrome	Enhanced Control
PL-A654	PL-A662	✓		✓
PL-A653	PL-A661		✓	✓
PL-A634	PL-A642	✓		✓
PL-A633	PL-A641		✓	✓
PL-A632	PL-A642	✓		
PL-A631	PL-A641		✓	

Technical Support

Tech Notes

Tech Notes on a variety of topics are available on the PixeLINK Support Site, at **http://support.pixelink.com/**.

Download the Latest Software and Firmware

We recommend that you check http://support.pixelink.com/ regularly for the latest versions of your PixeLINK software and firmware.

Technical Questions

Please follow these steps before contacting our technical support team:

- Review the relevant sections of the documentation.

- Check the PixeLINK Support Site for

    o   new software and firmware;

    o   applicable Tech Notes.

- Carefully document the problem you are experiencing, noting any warning or error messages that may appear during operation.

- Have your camera's serial number and other identifying information at hand. The serial number can be found on the camera and the "About PixeLINK Capture" screen.

PixeLINK Customer Support

Email: support@pixelink.com

PixeLINK Support Site: http://support.pixelink.com/

PixeLINK Main Site: http://www.pixelink.com/

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