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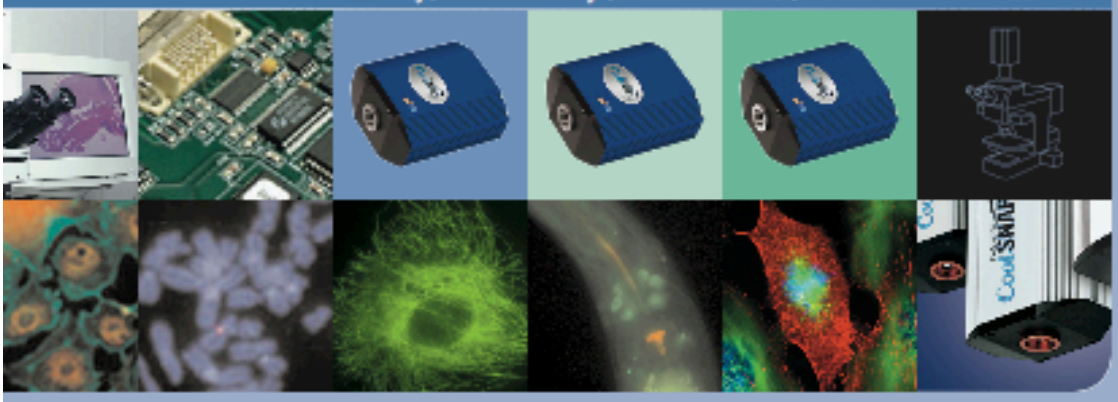
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Photometrics

CoolSNAP

SER MANUAL CoolSNAP$_{cf}$, CoolSNAP$_{cf^2}$, CoolSNAP$_{ES^2}$, and CoolSNAP$_{EZ}$



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User Manual for CoolSNAP$_{cf}$, CoolSNAP$_{cf^2}$, CoolSNAP$_{EZ}$, and CoolSNAP$_{ES^2}$ Systems

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Owner's Manual and Troubleshooting

You should read the owner’s manual thoroughly before operating this product. In the unlikely event that you should encounter difficulty operating this product, the owner’s manual should be consulted before contacting the Photometrics technical support staff or authorized service representative for assistance. If you have consulted the owner's manual and the problem still persists, please contact the Photometrics technical support staff or our authorized service representative. *See Item 12 in the following section of this warranty (”Your Responsibility”) for more information.*

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The above Limited Warranties are subject to the following terms and conditions:

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2. You must notify the Photometrics factory service center within (30) days after you have taken delivery of a product or part that you believe to be defective. With the exception of customers who claim a "technical issue" with the operation of the product or part, all invoices must be paid in full in accordance with the terms of sale. Failure to pay invoices when due may result in the interruption and/or cancellation of your one (1) year limited warranty and/or any other warranty, expressed or implied.
3. All warranty service must be made by the Photometrics factory or, at our option, an authorized service center.
4. Before products or parts can be returned for service you must contact the Photometrics factory and receive a return authorization number (RMA). Products or parts returned for service without a return authorization evidenced by an RMA will be sent back freight collect.
5. These warranties are effective only if purchased from the Photometrics factory or one of our authorized manufacturer's representatives or distributors.
6. Unless specified in the original purchase agreement, Photometrics is not responsible for installation, setup, or disassembly at the customer's location.
7. Warranties extend only to defects in materials or workmanship as limited above and do not extend to any product or part which has:
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   - been damaged as a result of misuse, improper installation, faulty or inadequate maintenance or failure to follow instructions furnished by us;
   - had serial numbers removed, altered, defaced, or rendered illegible;
   - been subjected to improper or unauthorized repair; or
   - been damaged due to fire, flood, radiation, or other "acts of God" or other contingencies beyond the control of Photometrics.
8. After the warranty period has expired, you may contact the Photometrics factory or a Photometrics-authorized representative for repair information and/or extended warranty plans.
9. Physically damaged units or units that have been modified are not acceptable for repair in or out of warranty and will be returned as received.
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Roper Scientific, Inc. declares that the equipment described in this document is a CLASS A DEVICE in conformance with the requirements of the European Council Directives, listed below:

89/336/EEC	EMC Directive & Amendments
93/68/EEC	EMC Directive & Amendments
73/23/EEC	Product Safety with Amendments

on the application of the laws of Member States relating to Electromagnetic Compatibility and Product Safety.

This declaration is based upon compliance of the product to the following standards:

EN 55022	RF Emissions Control
EN 61000-3 Series	Harmonics & Flicker
EN 55024	Immunity from Electromagnetic Disturbances
EN 60950	Product Safety

Product Description:	Video Camera
Model:	CoolSNAP$_{cf}$ / CoolSNAP$_{EZ}$, LVDS
Test Reports:	EMC Rpt 2K01-0122-003B- EN55022
	EMC Rpt 2K00-0122-003C- EN55024
	EMC Rpt 2K01-0122-003D-EN61000-3 Series
	SAFETY Rpt 2K01-0122-003E-EN60950

Authorized Signature: _____

Stephen L. Marcus, Vice President

Roper Scientific, Inc.
3440 East Britannia Drive
Tucson, AZ 85706
USA

CE

Manufacturer: ROPER SCIENTIFIC

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92/31/EEC	Amendment
93/68/EEC	Amendment
73/23/EEC	Product Safety

on the application of the laws of Member States relating to Electromagnetic Compatibility and Product Safety.

This declaration is based upon compliance of the product to the following standards:

EN50082-1, EN60000-3-2	Current Harmonics
EN50082-1, EN60000-3-3	Voltage Fluctuations and Flicker
EN50082-1, EN61000-4-2	Electrostatic Discharge (ESD)
EN50082-1, EN61000-4-3	Radiated Electromagnetic Field (EMF)
EN50082-1, EN61000-4-4	Electrical Fast Transient/Burst (EFT)
EN50082-1, EN61000-4-5	Surge Immunity (Mains)
EN50082-1, EN61000-4-6	RF Injected Current
EN50082-1, EN61000-4-11	Voltage Dips and Interruptions
EN55022-1998	with Amendment A1:2000 (CISPR-22)

Product Description: Video Camera

Model: CoolSNAP$_{cf}$ / CoolSNAP$_{EZ}$, IEEE-1394

Authorized Signature:

E. J. Pisa, Vice President

Roper Scientific, Inc.
3440 East Britannia Drive
Tucson, AZ 85706
USA

CE

Manufacturer: ROPER SCIENTIFIC

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Flom Test Labs

Manufacturer's Declaration Of Conformity

Product Identification

Product	Camera
Brand	Photometrics
Model/Type	CoolSNAP EZ and ES2
Version	N/A
Additional Information	(none)

Manufacturer

Name & Address	Photometrics a division of Roper Scientific, Inc. 3440 E. Britannia Drive, Suite 100 Tucson, AZ 85706
Country:	USA

EU Representative

Name & Address	
Country:	
Function:	

A Sample has been tested by

Name & Address	M. Flom Associates, Inc. 3356 N. San Marcos Place, Suite 107 Chandler, AZ 85225
Country	USA

Standards Used

	EN 50082-1, EN 60000-3-2: Current Harmonics
	EN 50082-1, EN 60000-3-3: Voltage Fluctuations and Flicker
X	EN 50082-1, EN 61000-4-2: Electrostatic Discharge (ESD)
X	EN 50082-1, EN 61000-4-3: Radiated Electromagnetic Field (EMF)
X	EN 50082-1, EN 61000-4-4: Electrical Fast Transient/Burst (EFT)
X	EN 50082-1, EN 61000-4-5: Surge Immunity (Mains)
	EN 50082-1, EN 61000-4-6: RF Injected Current
	EN 50082-1, EN 61000-4-11: Voltage Dips and Interruptions
X	EN 55022-1998 with Amendment A1: 2000 (CISPR-22)
	EN 55011-1998 with Amendment A2: 2002 (CISPR-11)
	EN 50082-1-1997
	EN 60601-1-1, DB9801, HE195: Leakage Current

The product is in conformity with Directive 89/336/EEC based on test results using harmonized standards in accordance with Article 10(a) of the Directive.

Signature of EU Representative

Signature	
Place	
Date	
Number	

Flom Test Labs
3356 N. San Marcos Place, Suite 107
Chandler, Arizona 85225-7176
(866) 311-3268 phone, (480) 926-3598 fax

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Chapter 1. Introduction

Description

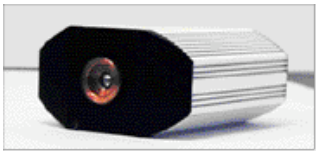
The CoolSNAP$_{cf}$, CoolSNAP$_{cf^2}$, CoolSNAP$_{EZ}$, and CoolSNAP $_{ES^2}$, from Photometrics®, are ideal cameras for digital microscopy and many other biological applications. The simple, compact CoolSNAP$_{cf}$ and CoolSNAP $_{cf^2}$ incorporate a high-quality CCD (charge-coupled device), a 12-bit scientific digitizer, and low-noise electronics to produce high-quality 12-bit monochrome or 36-bit digital color images at greater than 1k x 1k resolution. The CoolSNAP$_{EZ}$ and CoolSNAP $_{ES^2}$ offer higher sensitivity (especially in the red region) and lower read noise to produce high-quality 12-bit monochrome images.

Note: Unless otherwise noted, the CoolSNAP$_{cf}$, CoolSNAP$_{cf^2}$, CoolSNAP$_{EZ}$, and CoolSNAP $_{ES^2}$ cameras are referred to by the name "CoolSNAP".

System Components

Components for the CoolSNAP™ camera system are listed as follows:

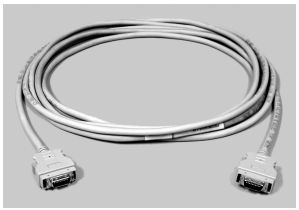
- Camera
- Interface hardware (high-speed digital LVDS or IEEE-1394 data-transfer interface card)
- Data cable (connects camera and interface hardware)
- Software discs (PVCAM® drivers included)



CoolSNAP Camera with Test Lens



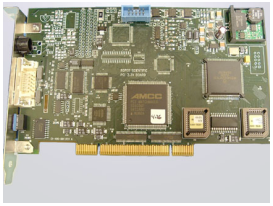
CoolSNAP IEEE-1394 Cable



CoolSNAP LVDS Cable



CoolSNAP IEEE-1394 Interface Card



CoolSNAP LVDS Interface Card

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About This Manual

The *CoolSNAP User Manual* is divided into five chapters. It is suggested that you read the entire manual before operating the camera in order to ensure proper use. The chapters that follow this introduction are:

- **System Installation** — Instructions for installing the camera system's hardware and software.
- **Operating Features** — Descriptions of specific camera features.
- **Troubleshooting** — Answers to camera system problems.
- **Basic Specifications** — Specifications for CoolSNAP components.

Precautions

The CCD and other system electronics are extremely sensitive to electrostatic discharge (ESD). To avoid permanently damaging the system, please observe the following precautions:

- This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take adequate measures.
- If you are using high-voltage equipment (such as an arc lamp) with your camera system, be sure to turn the camera power *on last* and power the camera *off first*.
- Never connect or disconnect any cable while the camera system is powered on (LVDS cameras only).
- Although you should switch off the *camera's* power before disconnecting the CoolSNAP cable from the DATA connector or the PCI card, you do *not* need to power off your computer to detach the cable.
- Use caution when triggering high-current switching devices (such as an arc lamp) near your system. The CCD can be permanently damaged by transient voltage spikes. If electrically noisy devices are present, an isolated, conditioned power line or dedicated isolation transformer is highly recommended.
- Always leave 1/2 inch of space around the camera's external cooling fins for air flow.
- Never open the camera. There are no user-serviceable parts inside the CoolSNAP camera. Opening the camera voids the warranty.
- Use only a CoolSNAP data cable and a CoolSNAP interface card with your CoolSNAP camera. Using a different cable or interface card may result in permanent damage to your system.
- Do not use a screw longer than 1/4 inch (6.3 mm) in the camera's tripod mounting hole.
- Do not use a C-mount lens having optics that extend farther than .47 inches (11.9 mm) behind the flange of the lens.

Environmental Requirements

The CoolSNAP camera system should be operated in a clean, non-condensing environment.

The camera system's ambient operating temperature is 15°C to 30°C.

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Storage Requirements

Store the CoolSNAP camera system in its original containers. To protect the system from excessive heat, cold, and moisture, store at an ambient temperature between 0°C and 70°C with a relative humidity of 0%-80% noncondensing.

Microscopes and Lenses

The camera has a standard threaded video mount and can be mounted to any microscope that accepts a standard C-mount adapter. The camera also allows you to install any lens that is compatible with a standard threaded video mount as long as its optics do not extend farther than .47 inches (11.9 mm) behind the flange of the lens. See *Additional Measurements* on page 17 for more information.

Note: In microscopy applications, a 0.5x C-mount camera coupler is recommended for an expanded field of view.

Repairs

The CoolSNAP camera system contains no user-serviceable parts. Repairs must be done by Photometrics. Should your camera system need repair, contact Photometrics Customer Service. Please save the original packing materials so you can safely ship the camera system to another location or return it for repairs if necessary.

Note: Do not open the camera. Opening the CoolSNAP camera voids the warranty.

Cleaning

Clean exterior surfaces of the camera with a dry, lint-free cloth. To remove stains, contact Photometrics Customer Service.

To clean the camera's imaging window, use only a filtered compressed-air source. Do not touch the window.

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Photometrics Customer Service

If you have any questions about your camera system, contact Photometrics Customer Service. When you call, please have your Photometrics sales order number or equipment serial numbers available.

- Tel: 800. 874.9789/520.889.9933 between 8:00 am and 5:00 pm MST
- Fax: 520.295.0299
- Email: cservice@photomet.com
- Mail: Photometrics
  3440 East Britannia Drive
  Tucson, Arizona 85706

In Europe, you can reach Customer Service at:

BENELUX

- Tel: 31.347.324989
- Fax: 31.347.324979
- Email: mailto@roperscientific.com
- Mail: Roper Scientific, BV
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In Japan, you can reach Customer Service at:

- Tel: 81.3.5639.2731
- Fax: 81.3.5639.2775
- Email: sales@roper.co.jp
- Mail: Nippon Roper, K.K.
  Sakurai Building
  2-8-19 Fukagawa
  Koto-ku, Tokyo
  Japan 135-0033

General product information and answers to some customer service questions can be found on our website: http://www.photomet.com

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Chapter 2. System Installation

Carefully review the *Precautions* section on page 2 before performing any of the procedures outlined here. Again, use only a CoolSNAP cable and a CoolSNAP interface card with your CoolSNAP camera. Using a different cable or interface card may result in permanent damage to your system.

Introduction

Your CoolSNAP$_{cf}$, CoolSNAP$_{cf^2}$, CoolSNAP$_{EZ}$, or CoolSNAP$_{ES^2}$ camera system has the following hardware components:

- Camera
- Data cable
- Interface card

CoolSNAP system components are linked by the data cable and controlled by your host computer system. All of these hardware components should be included with your shipment. Refer to the information and figures in *System Components* on page 1.

The CCD you selected is installed in your camera.

Keep all the original packing materials so you can safely ship the CoolSNAP system to another location or return it for service if necessary.

If you have any difficulty with any step of the instructions, call Photometrics Customer Service.

Software Compatibility Requirements

The CoolSNAP package includes an image-capture software program designed for use with your CoolSNAP camera.

All other imaging software must also be PVCAM-compatible. For full access to imaging software functions, the most current version of PVCAM must be used.

Host Computer Requirements

The host computer (PC) for your CoolSNAP camera must have the following:

- Windows® 2000 or XP operating system
- 1 GHz Pentium® 4 (or greater)
- 256 MB RAM (or greater)
- CD-ROM drive
- At least one unused PCI or PCI-X card slot
- 16-bit color display (or greater)

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If you are a Mac user, the host computer for your CoolSNAP camera must have the following:

- Macintosh OS X.3 (Panther)
- 512 MB RAM (or greater)
- CD-ROM drive
- At least one unused PCI or PCI-X card slot
- Video adapter that supports 24-bit color (millions of colors)

Multiple Cameras

Windows versions of PVCAM support multiple open cameras. In order to use this function, it must also be supported by your imaging software. Many imaging packages support multiple open cameras.

If your imaging software supports multiple cameras, there must be a separate PCI card for each camera.

PVCAM for Macintosh and PVCAM for Linux do not support the multiple open camera feature.

Software Installation

An Installation Guide appropriate to your system is included with your camera system. This guide provides step-by-step instructions for installing the camera interface software and the application software for Windows-based and Macintosh-based computers. Additional instructions are included for installing a PCI card in your computer and capturing images.

The Photometrics CD-ROM contains the following files.

- **Linux directory —** this directory contains the files for installation on a Linux PC.
- **Mac OS directory —** this directory contains the files for installation on a Macintosh computer.
- **Manuals directory —** this directory contains user manuals in PDF format.
- **Win OS directory —** this directory contains the files for installation on a Windows PC.

Installing the Interface Card

You will be using a CoolSNAP interface card to allow the camera to communicate with your computer.

Refer to the Readme text files on the CD-ROM and to the Software Installation insert before installing the interface card.

After installing the interface card, proceed to *Connecting your CoolSNAP Camera* on page 7.

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Connecting Your CoolSNAP Camera

The CoolSNAP cable connects your CoolSNAP camera to the interface card. This cable is designed to serve as a conduit both for data and power.



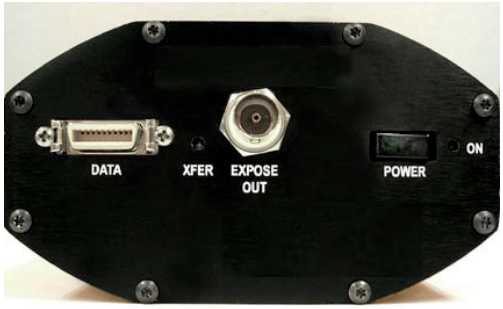
CoolSNAP IEEE-1394 Cable



CoolSNAP LVDS Cable

To connect your CoolSNAP LVDS camera:

1. Connect either end of the CoolSNAP LVDS cable to the CoolSNAP interface card that you have installed in the host computer.
2. Connect the other end of the CoolSNAP LVDS cable to the DATA connector located on the back of the camera (shown below).



The following connectors and display lights, as well as the power switch, are located on the back of the CoolSNAP camera.

- ***DATA connector:*** 20-pin, high-density connector for data transfer and power.
- ***EXPOSE OUT connector:*** BNC connector; the signal at the BNC connector will go to a TTL high level when the exposure begins; useful for synchronizing an external shutter in the illumination pathway; will not power the shutter.
- ***XFER display light:*** amber LED illuminates during data transfer.
- ***ON display light:*** green LED illuminates when camera is powered on.
- ***POWER switch:*** momentary on/off rocker switch (CoolSNAP$_{cf}$ / CoolSNAP$_{cf^2}$) or standard rocker switch (CoolSNAP$_{EZ}$ / CoolSNAP$_{ES^2}$).

Note: CoolSNAP LVDS cameras draw power from the PCI bus via the PCI card. Therefore, the computer must be powered on for the CoolSNAP LVDS camera to operate.

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To connect your CoolSNAP IEEE-1394 camera:

1. Connect either end of the CoolSNAP IEEE-1394 cable to the CoolSNAP IEEE-1394 interface card that you have installed in the host computer.
2. Connect the other end of the CoolSNAP IEEE-1394 interface cable to either DATA connector located on the back of the camera (shown below).



The following connectors and display lights are located on the back of the CooSNAP camera.

- ***DATA connectors:*** 6-pin IEEE-1394 connectors for data transfer and power.
- ***EXPOSE OUT connector:*** BNC connector; the signal at the BNC connector will go to a TTL high level when the exposure begins; useful for synchronizing an external shutter in the illumination pathway; will not power the shutter.
- ***XFER display light:*** amber LED illuminates during data transfer.
- ***PWR display light:*** green LED illuminates when camera is powered on.
- ***EXT PWR connector:*** 5.5 x 2.1 mm DC jack for auxiliary CoolSNAP power supply.

Note: CoolSNAP IEEE-1394 cameras draw power from the IEEE-1394 bus or from the external power supply.

If no power exists on the IEEE-1394 bus, the external power supply must be used.

In either case, the camera does not supply power to other devices connected to the IEEE-1394 bus.

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Chapter 3. Operating Features

Common Features

The features described in this section are identical in all four CoolSNAP cameras. Features that are specific to the CoolSNAP$_{EZ}$ and CoolSNAP$_{ES^2}$ cameras are described separately in the "CoolSNAP$_{EZ}$ / CoolSNAP$_{ES^2}$" section.

Readout Speed

All four CoolSNAP cameras operate at 20-MHz digitization and offer greater than 10 full frames per second.

Binning

All cameras support 1x, 2x, 3x, 4x, and 8x binning in the serial (horizontal) direction and flexible binning in the parallel (vertical) direction. Binning increases the frame rate and sensitivity but at the expense of resolution. Choosing a smaller region of interest (ROI) further increases the frame rate.

CoolSNAP$_{EZ}$ / CoolSNAP$_{ES^2}$ Features

The following subsections describe features that are specific to CoolSNAP$_{EZ}$ and CoolSNAP$_{ES^2}$ camera systems.

Dual Mode Operation

A unique feature of the CoolSNAP$_{EZ}$ and CoolSNAP$_{ES^2}$ is that they allow two different CCD clocking modes that let you choose between speed and NIR sensitivity. In the PVCAM implementation, the clocking modes are referred to as "normal" and "alternate normal".

Normal mode

In "Normal" mode, the CCD is optimized for maximum anti-blooming protection and frame rate. In this mode, the CCD can be clocked so that exposure and readout happen simultaneously as shown in the example below.

Example: Consider a situation where the full frame readout time is 90 msec (at 20 MHz) and the exposure time is 200 msec. The readout of a frame will occur during the exposure of the next frame. This is possible because the CCD has alternate columns of sensitive and masked areas. While charge is integrating in the sensor area, the previous frame, which is in the masked area, can be read out (Figure 1). In this example, the time required to acquire the three-image sequence is 690 ms (3 x 200 + 90) and the frame rate is approximately 4.3 fps.

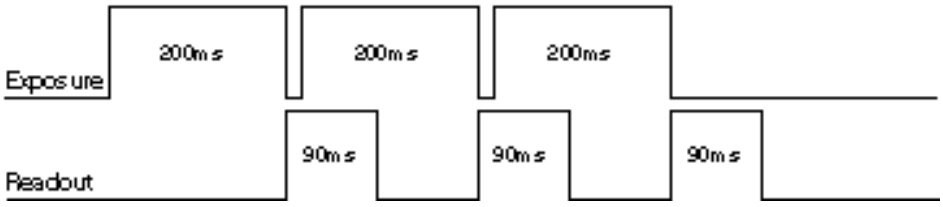


Figure 1. Normal Mode, Overlapped

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If the exposure time is 50 ms, which is less than the readout time, the camera operates in "nonoverlapped" mode (see Figure 2). The effective frame rate for this is 7.14 fps (1/[0.05+0.090]). While in normal mode, the camera firmware automatically calculates the readout times, taking into account binning and/or subregion, and carries out the exposure-readout sequence to maximize the frame rate.

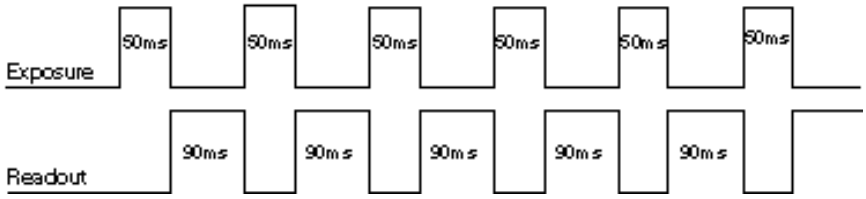


Figure 2. Normal Mode, Nonoverlapped

Alternate Normal mode

In "Alt-Normal", it is possible to achieve higher QE in the NIR (peak QE of approximately 65%) by manipulating the CCD clock voltages. Also, in this high-sensitivity mode, the preamplifier is switched off during the exposure to eliminate the background generated by preamplifier glow. In this clocking mode, irrespective of what the exposure time is, the camera operates in "nonoverlapped" or "sequential" mode.

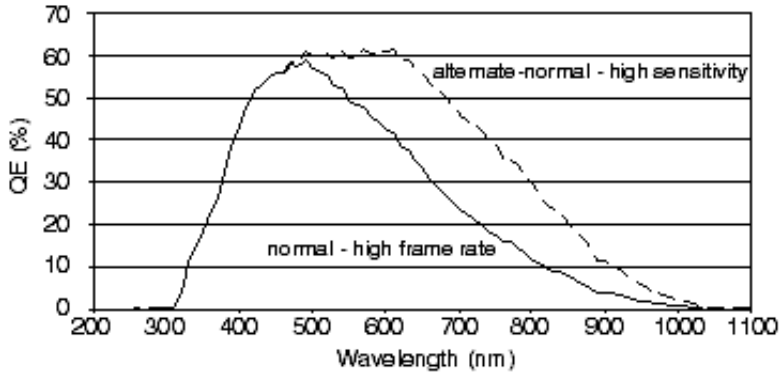


Figure 3. QE for Normal and Alternate Normal Modes

Antiblooming

Typically, interline CCD devices are designed with antiblooming capabilities. To prevent excess electronic charge from migrating to adjacent pixels, "drains" are built into the CCD. These drains remove any excessive charge generated from an overexposed pixel. Sony interline CCDs will prevent blooming for optical signals greater than 1000 times the full-well capacity of a single pixel. However, the extended QE capabilities of the Sony ICX285 in the CoolSNAP$_{EZ}$ and CoolSNAP$_{ES^2}$ reduce the antiblooming suppression for certain modes. In normal mode, the CCD operates with typical antiblooming suppression. But in alternate normal mode, the enhanced sensitivity causes a reduction in antiblooming to greater than 100 times single-pixel full-well capacity.

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Application Examples

Example 1

"I have a CoolSNAP$_{EZ}$ (or CoolSNAP$_{ES^2}$) and want to operate the camera in the most sensitive setting for taking high-resolution, single images."

For this application, the camera should be operated in "alternate normal" mode to provide the best quantum efficiency and the camera gain should be set to 2. These settings will operate the camera in its most sensitive mode.

Example 2

"I would like to acquire sequences of images with a CoolSNAP$_{EZ}$ (or CoolSNAP$_{ES^2}$) to study time-correlated phenomena. My light level is fairly high and I want to optimize the acquisition rate of the camera."

First, the camera speed should be set to 20 MHz. In addition, the camera should be put into "normal" mode to take advantage of the overlapping of the readout with the integration time. Finally, the "clearing" mode of the camera should be set to "clear pre-sequence" to remove the clearing overhead between frames. Of course, reducing the region of interest and increasing binning will always increase the frame rate further.

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Chapter 4. Troubleshooting

If you have any difficulty while troubleshooting, or do not see your camera system's symptoms listed here, contact Photometrics Customer Service.

System Does Not Boot Normally

If your operating system does not boot normally after you have installed a interface card, try installing the new card in another open interface slot. If this does not work:

1. *Turn off your computer* and remove the newly installed interface card.
2. Turn your computer back on. If your system boots normally, there is probably an interrupt conflict between a previously installed expansion card and the interface card that you are installing.
3. If you need assistance resolving the interrupt conflict, contact Photometrics Customer Service.

New Hardware Found Dialog Box Does Not Appear (Windows 2000/XP)

If the New Hardware Found dialog box does not appear after installing a new interface card to your computer and booting Windows 2000/XP:

- Check to make sure that the new interface card is inserted in a PCI slot according to your computer manufacturer's instructions and that the Photometrics disc is in the host computer's CD drive.
- It is possible that there is a conflict between the new interface card and a previously installed expansion card. *With the computer's power turned off,* remove any previously installed expansion cards that your system does not need to function. (If you are unsure which cards can be safely removed, call Photometrics Customer Service.) Then turn your computer back on and boot Windows 2000/XP again.
- If the New Hardware Found dialog box still does not appear, contact Photometrics Customer Service.

Green LED Does Not Illuminate (Camera Has No Power)

If the green LED on the back of the camera does not illuminate when the power switch is pressed to the ON position:

Check to make sure that the host computer has power:

- If it does not, power the computer on and then switch on the camera.
- If it does, power off the computer, check all system connections (particularly both ends of the data cable), power the computer back on, and then switch on the camera again.
- If you are using a CoolSNAP camera with an IEEE-1394 interface, connect only one camera at a time to the IEEE-1394 interface card.
- If the camera still does not have power, contact Photometrics Customer Service.

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Images Not Displayed Properly

If the amber LED on the back of the camera does not illuminate while images are being acquired and no images appear:

- Confirm that the green LED on the back of the camera is illuminated, indicating that the camera is powered on. See *Green LED Does Not Illuminate (Camera Has No Power)* on page 12.
- Confirm that the correct CoolSNAP camera is selected in your imaging software application.
- Power off the camera and the host computer and check all system connections (particularly both ends of the data cable). Restart. If the amber LED on the back of the camera does illuminate while images are being taken, but no images appear:
  - Confirm that Windows is set for at least 16-bit colors.
  - Confirm that the camera is operational by taking an image with a standard C-mount lens attached to your CoolSNAP. Using normal room lighting, place the camera on a table about 3 meters away from an object and acquire an image using your system's Brightfield settings.

If the problem persists, contact Photometrics Customer Service.

Bright Spots in Image / Increased Background Noise

If you notice bright spots (hot pixels) in the image or an increase in background noise, take another calibration image and then re-acquire the original image.

Camera Running Too Warm

It is normal for the camera to be slightly warm to the touch while in operation. However, if the camera is more than slightly warm to the touch (and at least 1/2 inch of space has been left around the external cooling fins for air flow), switch off the camera immediately and contact Photometrics Customer Service.

PVCAM Error Message Appears

If a PVCAM error message appears, note the message's number code and contact Photometrics Customer Service.

Lengthy Pauses During Imaging

If you notice lengthy pauses marked by a lot of disk activity while imaging:

- Close any other programs that may be running.
- Install more physical memory to your computer system.

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IEEE-1394 CoolSNAP Camera Will Not Image When Attached to Certain Dual-processor or Hyperthreading-capable PCs

Some high-end Windows 2000/XP-enabled computers with Intel Pentium or Xeon™ processors include a memory enhancement called Physical Address Extension (PAE). PAE allows these computers to address memory above 4GB; however, when PAE is enabled the IEEE-1394 CoolSNAP camera will not transmit any pixel data.

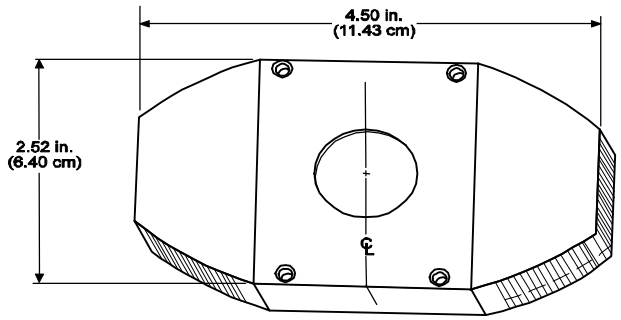
To determine whether your computer is running with PAE enabled, go to the Control Panel and open the "System" icon. Under the "General" tab, you will find a reference to Physical Address Extension in the "Computer" section.

To disable PAE, you must edit your C:\boot.ini file and remove the /PAE flag.

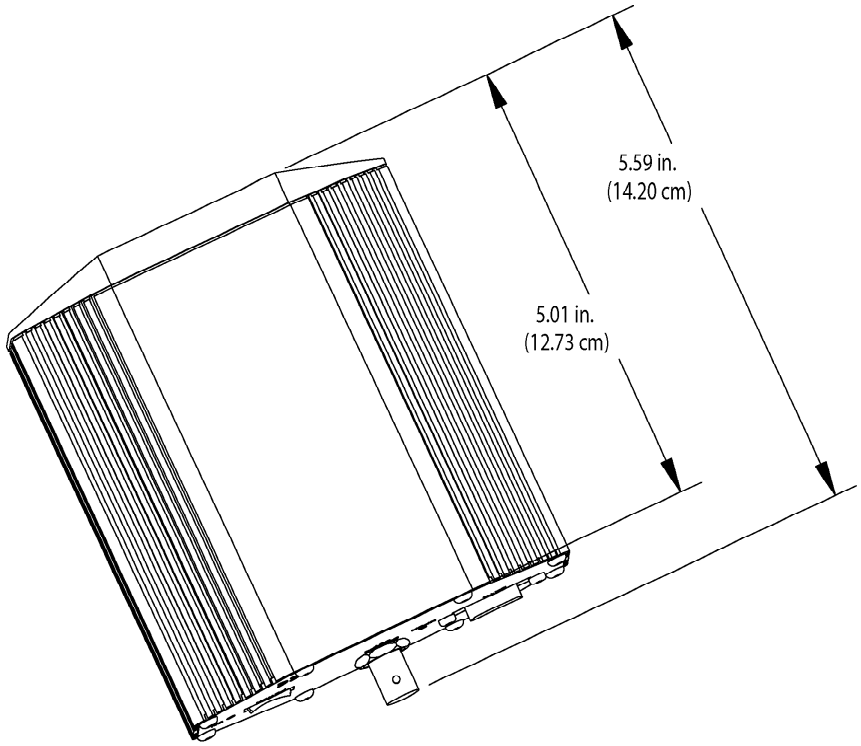
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Chapter 5. Basic Specifications

Dimensions

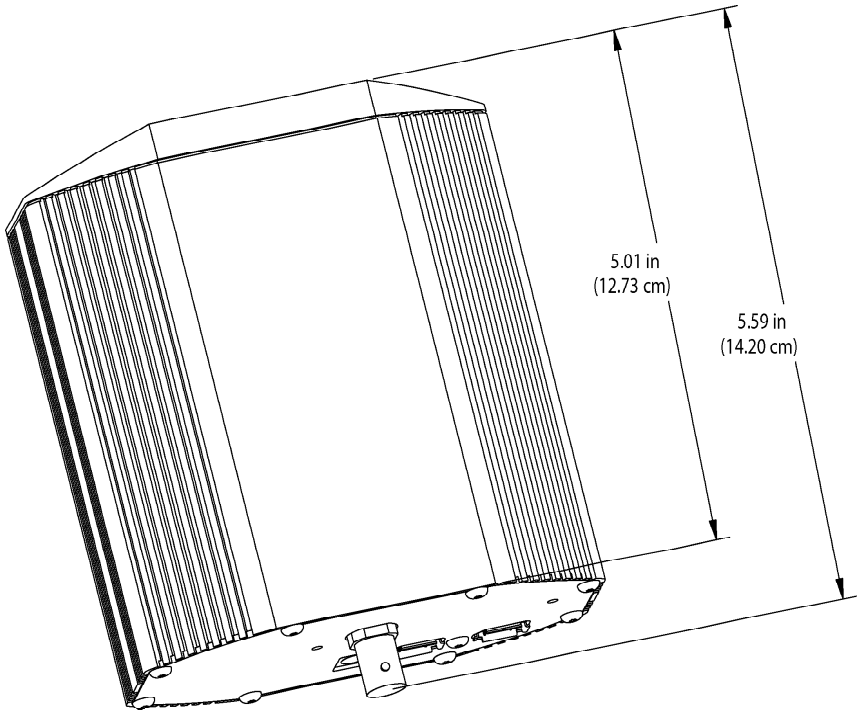


CoolSNAP Camera: Front View



CoolSNAP LVDS Camera: Side View

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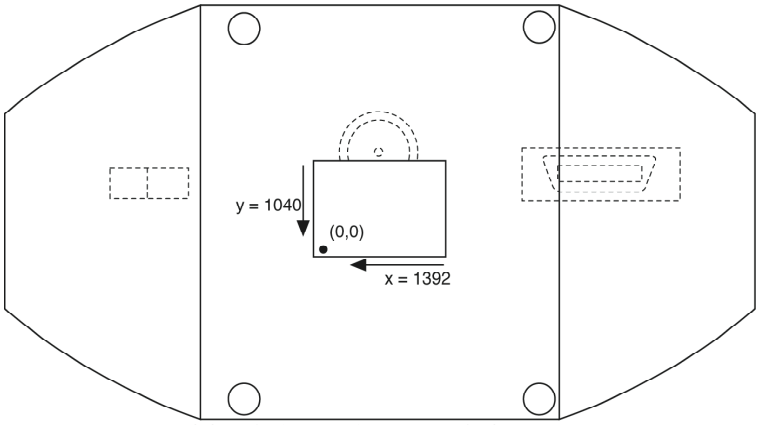


CoolSNAP IEEE-1394 Camera: Side View

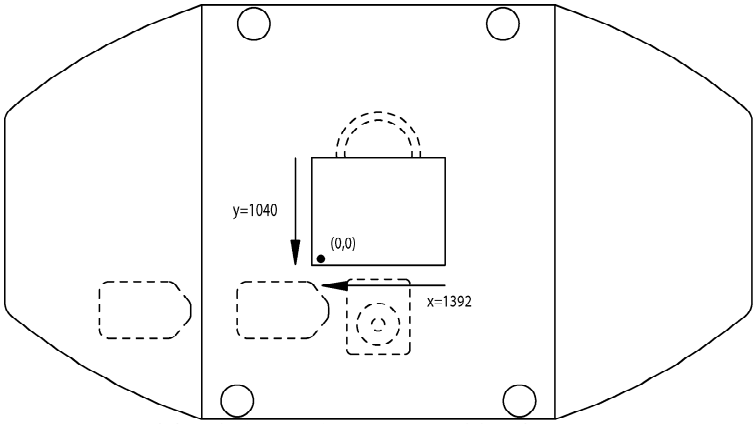
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CCD Specifications and Orientations

	CoolSNAP$_{cf}$ / CoolSNAP$_{cf2}$	*CoolSNAP$_{EZ}$*	*CoolSNAP$_{ES2}$*
Image Type	**Color and Mono**	**Mono**	**Mono**
Array	**Sony ICX205AK (color) Sony ICX205AL (mono)**	**Sony ICX285AL**	**Sony ICX285AL**
Resolution	**1392 x 1040**	**1392 x 1040**	**1392 x 1040**
Pixel Size	**4.65 µm x 4.65 µm**	**6.45 µm x 6.45 µm**	**6.45 µm x 6.45 µm**
Digitization Rate	**20 MHz**	**20 MHz**	**20 MHz**
Readout Noise	**10 e- rms @ 20 MHz**	**8 e- rms at 20 MHz**	**7 e- rms at 20 MHz**
Cooling	**Thermoelectric,** 5°C below ambient temp	**Thermoelectric,** 5°C below ambient temp	**Thermoelectric,** 0°C



CCD Orientation, LVDS Camera



CCD Orientation, IEEE-1394 Camera

Additional Measurements

Camera weight: 1.9 lb. (863 g)

Safe C-mount depth: .47 in. (11.9 mm)

Flange focal distance: .69 in. (17.5 mm)

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Detector

Rear Panel Description

The following connectors, display lights, and controls are located on the back of the cameras (pictured below).

DATA connector: for data transfer and power

- LVDS cameras: 20-pin, high-density connector
- IEEE-1394 cameras: 6-pin IEEE-1394 connector

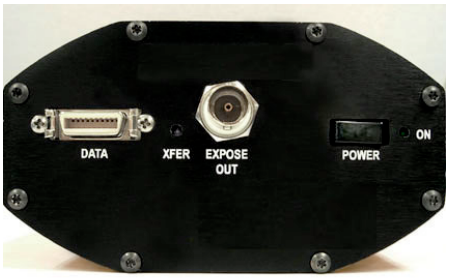
EXPOSE OUT connector: BNC connector; the signal at the BNC connector will go to a TTL high level (+ 5 V) when the exposure begins; useful for synchronizing an external shutter in the illumination pathway; will not power the shutter

XFER display light: amber LED illuminates during data transfer

ON display light (LVDS camera)/PWR display light (IEEE-1394 cameras): green LED illuminates when camera is powered on

POWER switch (LVDS cameras only): standard rocker switch

EXT PWR connector (IEEE-1394 cameras only): 5.5 x 2.1-mm DC jack for auxiliary CoolSNAP power supply



CoolSNAP LVDS Rear Panel



CoolSNAP IEEE-1394 Rear Panel

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Auxiliary Power Supply

Usage Requirements

The auxiliary CoolSNAP power supply (shown below) provides power to your CoolSNAP camera, but is required only under certain conditions.

If your CoolSNAP camera is connected to an IEEE-1394 port that does not supply power (such as a 4-pin connector on a laptop computer) you need to use the auxiliary power supply.

The data ports on the CoolSNAP camera do not pass power. If the CoolSNAP camera is connected in a daisy chain configuration, and it is not the first device in the daisy chain, you need to use the auxiliary power supply.

If the CoolSNAP camera is connected to a PC that supplies power through the 6-pin IEEE-1394 port, the auxiliary power supply is not needed; however, connecting the power supply will not damage the camera.

CoolSNAP $_{ES^2}$ only: The power supply is required for camera cooling. If the power supply is not connected, the fan will not turn and the camera will not cool.

Warning: Use the auxiliary power supply that shipped with your system ONLY. Do not use third-party power supplies.



CoolSNAP$_{EZ}$ Power Supply ***CoolSNAP$_{ES^2}$ Power Supply***

Installation

The auxiliary power supply ships with four unique wall plugs. You need to install one of the plugs on the power supply before using it. Select the correct plug for your wall socket and press it into the power supply. The supplied plugs include:

- NEMA 1-15 for North America/Japan
- BS1363/A for United Kingdom
- EN50075 for Europe
- AS/NZS 3112-1993 for Australia/New Zealand

Specifications

	CoolSNAP$_{ES^2}$	*All other CoolSNAP IEEE-1394 cameras*
Input Voltage	100-240 VAC / 47-63 Hz	
Output Voltage	9 V	12 VDC
Output Current (Max)	3.3 A	1250 mA

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