

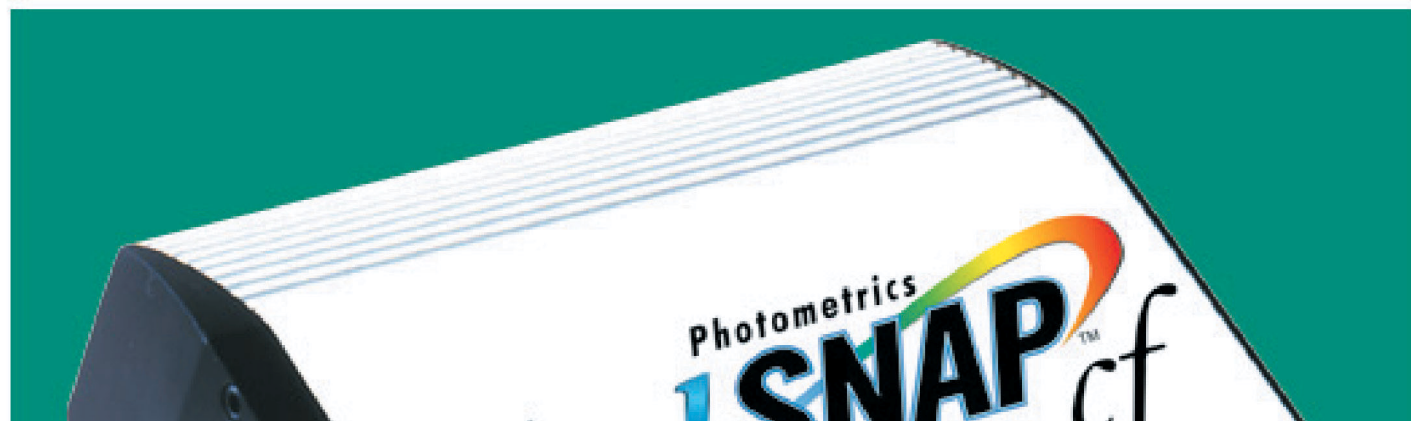
CoolSNAPTM cf

Photometrics
CoolSNAPTM



ROPER SCIENTIFIC
PHOTOMETRICS

User Manual





User Manual for CoolSNAP™ and CoolSNAPcf™ Systems



ROPER SCIENTIFIC™
BEYOND IMAGING

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57-061-001 Rev E1

LIMITED WARRANTY — Roper Scientific Analytical Instrumentation

Roper Scientific, Inc. makes the following limited warranties. These limited warranties extend to the original purchaser only and no other purchaser or transferee.

Limited One (1) Year Warranty

Roper Scientific warrants this product against defects in materials or workmanship for a period 1 year after the date of original invoice. During this period, Roper Scientific will repair a defective product or part, without charge to you. You must deliver the entire product to the Roper Scientific factory or, at our option, a factory authorized service center. You are responsible for all transportation and insurance charges to return the product to the service center, and Roper Scientific will be responsible for all transportation charges and insurance to return the product to you. International customers should contact your local manufacturer's representative/distributor for repair information and assistance or visit our technical support page at www.roperscientific.com.

Sealed Chamber Integrity Warranty

Roper Scientific warrants the sealed chamber integrity of all our products for a period of twenty-four (24) months. *Open chamber products carry no warranty to the CCD imaging device expressed or implied.*

Vacuum Integrity Warranty

Roper Scientific warrants the vacuum integrity of all our products for a period of twenty-four (24) months during which we guarantee the detector head will maintain the factory-set operating temperature without the requirement for customer pumping.

Image Intensifier Detector Warranty

All image intensifiers by nature are susceptible to Phosphor and/or Photocathode burn (physical) damage when exposed to high intensity light. Roper Scientific warrants, with the exception of an image intensifier that is found to have a Phosphor and/or Photocathode burn damage (which carries no warranty expressed or implied), all image-intensified products for a period of 1 year after the date of the original invoice. *See the Limited One (1) year warranty terms and conditions above.*

X-Ray Detector Warranty

Roper Scientific warrants, with the exception of the CCD imaging device and fiber optic assembly damaged due to x-ray (which carry no warranty expressed or implied), all x-ray products for a period of 1 year after the date of the original invoice. *See the Limited One (1) year warranty terms and conditions above.*

Software Warranty

Roper Scientific warrants all Roper Scientific manufactured software discs are free from defects in materials and workmanship under normal use for a period of one (1) year from date of original invoice. Roper Scientific does not warrant that the function of the software will meet your requirements or that operation will be uninterrupted or error free. You assume responsibility for selecting the software to achieve your intended results and for the use and results obtained from the software. In addition, during the 12-month limited warranty the original purchaser is also entitled to receive free version upgrades. Version upgrades supplied free of charge will be in the form of a download from the Internet. Those customers who do not have access to the Internet may obtain the version upgrades on a CD-ROM from our factory for an incidental shipping and handling charge. *See Item 12 in the "Your Responsibility" section of this warranty for more information.*

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 operation difficulties, the owner's manual should be consulted before calling the factory for support. If you have consulted the owner's manual and the problem still persists, please contact the appropriate factory for support. *See Item 12 in the "Your Responsibility" section of this warranty for more information.*

Your Responsibility

The above warranties are subject to the following conditions:

1. You must retain your bill of sale (invoice) or provide other proof of purchase.
2. You must notify the factory service center within the first thirty (30) days after you have taken delivery of a defective product or part. With the exception of customers who claim a "technical issue" with the operation of the product or part, all invoices must be paid in accordance with the terms of sale. Failure to pay invoices when due may result in the interruption of your one (1) year limited warranty and/or any other warranty expressed or implied.
3. All warranty service must be made by the factory or, at our option, an authorized service center.
4. Before products or parts can be returned for service the customer must contact the factory and receive a return authorization number (RMA). Products or parts returned for service without a return authorization will be sent back freight collect.
5. These warranties are effective only if purchased from the factory or one of our authorized manufacturer's representatives or distributors.
6. Unless specified as part of the original purchase agreement, Roper Scientific 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 parts which have been lost or discarded by you; to damage to products or parts caused by misuse in violation of instructions furnished by us; or to units which have had serial numbers removed, altered, defaced, or rendered illegible.
8. At your option after the warranty period has expired, you may contact the factory for repair information and extended warranty plans.
9. Physically damaged units or units that have been modified by a customer are not acceptable for repair in or out of warranty and will be returned as received.
10. All warranties implied by state law or international laws, including the implied warranties of merchantability and fitness for a particular purpose, are expressly limited to the duration of the limited warranties set forth above. With the exception of any warranties implied by state law or international laws, as hereby limited, the forgoing warranty is exclusive and in lieu of all other warranties, guarantees, agreements, and similar obligations of manufacturer or seller with respect to the repair or replacement of any parts. In no event shall Roper Scientific liability exceed the cost of the repair or replacement of the defective product or part.
11. This warranty gives you specific legal rights and you may also have other rights that may vary from state to state and internationally from country to country. Some states and countries do not allow limitations on how long an implied warranty lasts, when an action may be brought, or the exclusion or limitation of incidental or consequential damages, so the above provisions may not apply to you.
12. When contacting us for technical support or service assistance, please refer to the factory of purchase, contact your manufacturer's representative or reseller, or visit our technical support page at www.roperscientific.com.

Optional CoolSNAP Camera System Service Contract

The optional CoolSNAP Camera System Service Contract provides extended coverage for the CoolSNAP camera system. All terms and conditions listed in the CoolSNAP Camera System Warranty, including those pertaining to shipping costs and appropriate system use, apply to the CoolSNAP Camera System Service Contract.

The Service Contract also guarantees that Roper Scientific shall ship a complete replacement CoolSNAP camera system within forty-eight (48) hours of receiving notification of a CoolSNAP camera system defect. All components of the defective CoolSNAP camera system must be returned to Roper Scientific. Shipment of these components should not be made without prior authorization by Roper Scientific.

When purchased within two (2) months of the date listed on the packing slip shipped with the original equipment, the Service Contract is valid for a period of twenty-seven (27) months from the packing slip date.

This period comprises the initial CoolSNAP Camera System Warranty period of twelve (12) months, the CoolSNAP Camera System Service Contract period of twelve (12) months, and an additional three (3) months of free coverage.

When purchased prior to the lapse of the CoolSNAP Camera System Warranty or an active CoolSNAP Camera System Service Contract, the CoolSNAP Camera System Service Contract is valid for twelve (12) months beyond the lapse date of the Camera System Warranty or current Service Contract.

The CoolSNAP Camera System Service Contract can be renewed repeatedly. If the renewal occurs outside of a period covered by Warranty or Service Contract, Roper Scientific may, at its sole discretion, require an inspection of the camera system as a condition of consent to place it under Service Contract.

U. S. Government Restricted Rights

The software and documentation are provided with Restricted Rights. Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 or subparagraphs (c)(1) and (2) of the Commercial Computer Software-Restricted Rights at 48 CFR 52.227-19, as applicable. Contractor/manufacturer is Roper Scientific, 3440 East Britannia Drive, Tucson, AZ 85706.

This license is effective until terminated. It will terminate upon the conditions set forth above or if you fail to comply with any term hereof. Upon termination, you agree that the software and accompanying materials, and all copies thereof, will be destroyed. This agreement is governed by the laws of the State of Arizona. You acknowledge that you have read this agreement, you understand it, you agree to be bound by its terms, and that this is the complete and exclusive statement of the agreement between you and Roper Scientific regarding the software.

Declaration of Conformity

Roper Scientific, Inc. declares that the equipment described in this document is 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	Low Voltage Directive & Amendments

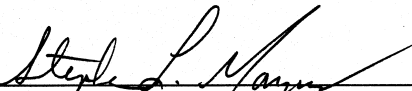
on the approximation of the laws of Member States relating to Electromagnetic Compatibility and Product Safety.

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

EN 55022, CISPR 22B	RF Emissions Control
EN 50082-1, IEC 801	Immunity to Electromagnetic Disturbances
EN 61010-1	Product Safety

Product Description: CoolSNAP Camera with CoolSNAP PCI card
Model: CoolSNAP
Test Reports: 983198CELV, 983196C22A, 983197IEC801, 983199EN60950

Authorized Signature: _____


Stephen L. Marcus, Vice President

January 22, 1999

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



Declaration of Conformity

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:

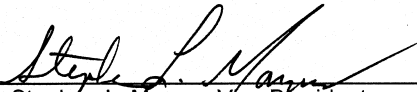
89/336/EEC	EMC Directive & Amendments
93/68/EEC	EMC Directive & Amendments
73/23/EEC	Product Safety with Amendments

on the approximation 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}
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 Britannica Drive
Tucson, AZ, 85706
USA



Manufacturer: ROPER SCIENTIFIC

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Description CoolSNAP and CoolSNAP_{cf}, from Roper Scientific, are ideal cameras for digital microscopy and many other biological applications. The simple, compact CoolSNAP and CoolSNAP_{cf} 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.

Note: Unless otherwise noted, the CoolSNAP and the CoolSNAP_{cf} cameras are referred to by the name "CoolSNAP".

System Components

Components for the CoolSNAP camera system are listed as follows:

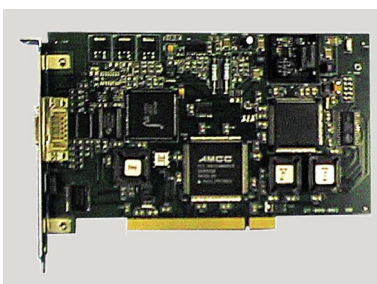
- Camera
- Interface hardware (PCI card installation covered in the *Installation Guide* insert packaged with the CD-ROM)
- Data cable (connects camera and PCI card)
- Software (PVCAM® and RS Image™).



CoolSNAP Camera with Test Lens



CoolSNAP Cable



CoolSNAP PCI Card

About This Manual

The *CoolSNAP User Manual* is divided into four 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.
- **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.
- 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 cable and a CoolSNAP PCI card with your CoolSNAP camera. Using a different cable or PCI card may result in permanent damage to your system.
- Do not use a screw longer than 1/4 inch (.63 cm) 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.

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 -20°C and 60°C with a relative humidity of 0%-90% noncondensing.

Microscopes, Lenses, and Tripods

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. The CoolSNAP camera can be mounted to a tripod using the tripod mounting hole located on the bottom of the camera. See *Additional Measurements* on page 12 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 Roper Scientific. Should your camera system need repair, contact Roper Scientific 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 Roper Scientific Customer Service.

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

Roper Scientific Customer Service

If you have any questions about your camera system, contact Roper Scientific Customer Service. When you call, please have your Roper Scientific job number or equipment serial numbers available.

- Phone: 520.889.9933 between 8:00 am and 5 pm MST
- Fax: 520.295.0299
- E-mail: cservice@roperscientific.com
- Mail: Roper Scientific
3440 East Britannia Drive
Tucson, Arizona 85706

In Europe, you can reach Customer Service at:

BENELUX

- Phone: 31.347.324989
- Fax: 31.347.324979
- E-mail: mailto@roperscientific.com
- Mail: Roper Scientific, BV
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91017 Evry Cedex, France

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- E-mail: sales@roper.co.jp
- Mail: Nipon Roper, K.K.
D-10E 1-3 Nakase,
Mihama-ku, Chiba-shi
Japan 261-8501

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

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 PCI card with your CoolSNAP camera. Using a different cable or PCI card may result in permanent damage to your system.

Introduction

Your CoolSNAP or CoolSNAP_{cf} camera system has the following hardware components:

- PCI card
- Camera and Data cable

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 Roper Scientific Customer Service.

Software Compatibility Requirements

The CoolSNAP package includes the RS 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, PVCAM must be version 2.5.2 or higher.

Host Computer Requirements

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

- Windows 95, Windows 98, Windows ME, Windows NT, or Windows 2000 operating system
- 200 MHz Pentium[®] II (or greater)
- 64 MB RAM (or greater)
- CD-ROM drive
- At least one unused PCI card slot
- 16-bit color display (or greater)

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

Macintosh® OS 8.X or OS 9.X

- 64 MB RAM (or greater)
- CD-ROM drive
- At least one unused PCI card slot
- Video adapter that supports 24-bit color (millions of colors)

Multiple Cameras

PVCAM supports multiple open cameras. In order to use this function, it must also be supported by your imaging software. The RS Image capture software program included with your system supports multiple cameras, as do many other imaging packages.

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

Software Installation

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

The CD-ROM contains the following files.

- Readme text files — these files contain the latest information on the software installations and should be read before you run the PVCAMSetup program.
- PVCAMSetup software program — this software installs the camera interface software.
- RSImageSetup software program — this software installs the RS Image application program.
- MacOS8_OS9 directory — this directory contains the files required for installing to a Macintosh computer.
- Acrobat directory — this directory contains subdirectories containing installation programs for Acrobat Reader.
- Manuals directory — this directory contains user manuals in PDF format.

Installing the PCI Card

You will be using a CoolSNAP PCI 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 supplied with the CD-ROM before installing the PCI card. Depending on your system, you will have received one of two different PCI cards available for CoolSNAP cameras: Video or Non-Video. Please follow the instructions appropriate to the card you have received with your system.

Note: The Video-capable PCI card accepts a standard BNC connector for video output.

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

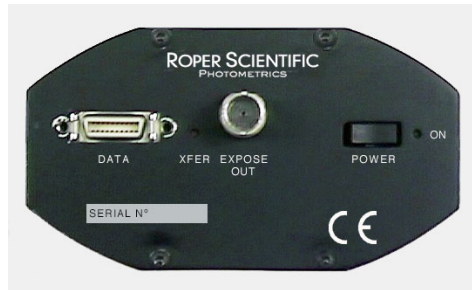
Connecting Your CoolSNAP Camera

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



To connect your CoolSNAP camera:

1. Connect either end of the CoolSNAP cable to the CoolSNAP PCI card that you have installed in the host computer.
2. Connect the other end of the CoolSNAP 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:** standard BNC connector (not video); 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.

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

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Troubleshooting

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

System Does Not Boot Normally

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

1. Turn off your computer and remove the newly installed PCI 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 PCI card that you are installing.
3. If you need assistance resolving the interrupt conflict, contact Roper Scientific Customer Service.

New Hardware Found Dialog Box Does Not Appear (Windows 95/98/2000/ME/XP)

If the New Hardware Found dialog box does not appear after installing a new PCI card to your computer and booting Windows 95/98/2000/ME/XP:

- Check to make sure that the new PCI card is inserted in a PCI slot according to your computer manufacturer's instructions and that the CoolSNAP system's HCK disc is in the host computer's CD drive.
- It is possible that there is a conflict between the new PCI 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 Roper Scientific Customer Service.) Then turn your computer back on and boot Windows 95/98/2000/ME/XP again.
- If the New Hardware Found dialog box still does not appear, contact Roper Scientific 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 CoolSNAP cable), power the computer back on, and then switch on the camera again.
- If the camera still does not have power, contact Roper Scientific Customer Service.

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 9.
- 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 CoolSNAP 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 Roper Scientific Customer Service.

Bright Spots in Image / Increased Background Noise Camera Running Too Warm

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.

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 Roper Scientific Customer Service.

PVCAM Error Message Appears

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

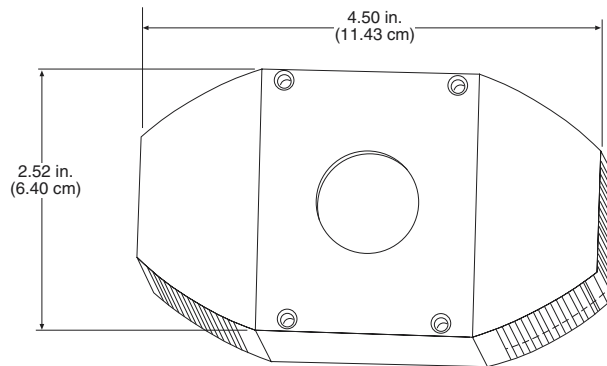
Lengthy Pauses During Imaging

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

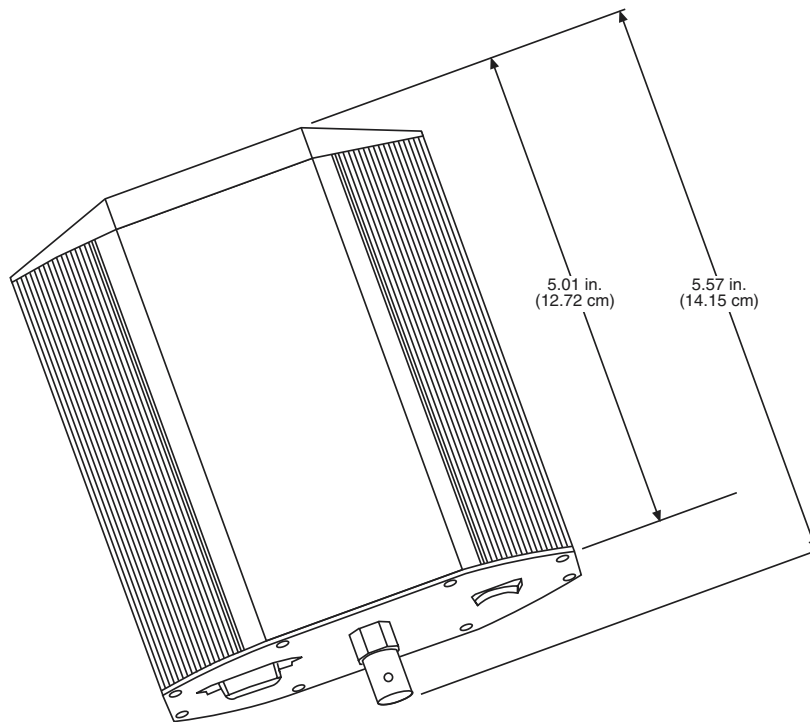
- Close any other programs that may be running.
- Install more physical memory to your computer system.

Basic Specifications

Dimensions



CoolSNAP Camera: Front View



CoolSNAP Camera: Side View

Additional Measurements

Camera weight: 1.9 lb. (863 g)

Tripod mounting hole (bottom of camera): .25 in.-20 UNC-2B

Safe tripod mounting screw length: .25 in. (.63 cm)

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

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

Detector

Resolution: 1392 x 1040

Pixel Size: 4.65 μm x 4.65 μm

Digitization rate: 5 MHz (CoolSNAP); 20 MHz (CoolSNAP_{cf})

Cooling: CCD thermoelectrically cooled to 5°C below ambient temperature

Connectors, Display Lights, and Power Switch

The following connectors and display lights, as well as the power switch, are located on the back of the camera (pictured below).

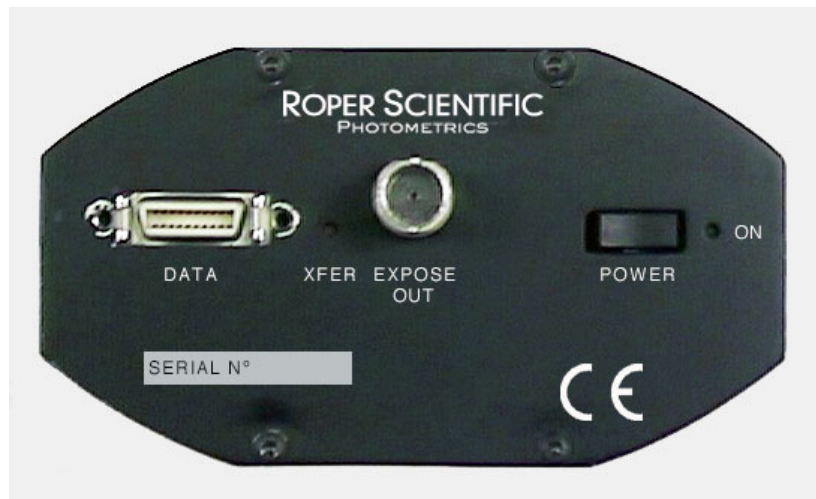
DATA connector: 20-pin, high-density connector for data transfer and power

EXPOSE OUT connector: standard BNC connector (not video); 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: green LED illuminates when camera is powered on

POWER switch: momentary on/off rocker switch.



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