

Roper Scientific®
ChemiPro™
System

The **Whole** Solution



The “Whole” Solution

The Roper Scientific® ChemiPro™ system is a state-of-the-art laboratory instrument engineered for chemiluminescence imaging of whole plants or whole animals*. This unique, fully integrated system incorporates a high-performance CCD camera, an ultrablack dark box, and simple-to-use software in order to provide a streamlined research solution for a number of challenging chemiluminescence imaging applications.

ChemiPro supports a broad range of experiments:

- Gene expression in plants
- Tissue-specific gene expression in animals*
- Gene expression in isolated-cell preparations

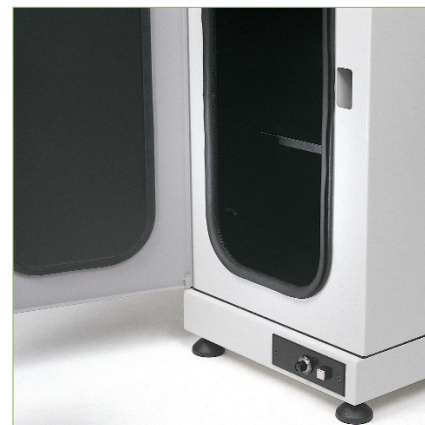


CCD Camera

At the heart of the ChemiPro system is a cryogenically cooled, back-illuminated CCD that boasts excellent quantum efficiency across the visible spectrum. This outstanding QE, combined with the very low readout noise of the camera’s slow analog-to-digital converter, yields maximum sensitivity.

In addition to high-sensitivity image acquisition, the ChemiPro system’s dual-speed readout capability provides a faster operation mode for quick camera setup and focusing. User-programmable gain levels afford even greater detection versatility.

The ChemiPro system includes either a USB 2.0 interface or a high-speed PCI card, as well as all required cables and a camera lens adapter nose (F-mount style). A downward-looking dewar (available with an optional “liquid nitrogen autofill” system) is provided as the standard configuration. Alternatively, an all-directional camera model allows the detector to be mounted on any microscope port, given the appropriate microscope adapter.

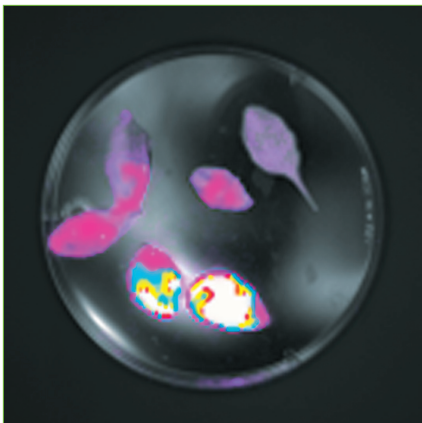


Dark Box

The ChemiPro system’s dark box has been designed to provide a light-tight environment for imaging chemiluminescent samples. The ultrablack box, which features an externally adjustable stage and a “camera-to-dark box” adapter nose, lets samples be observed with negligible background-light contamination.

With the ChemiPro system, there’s no need to waste an undue amount of time repeatedly opening and closing the dark box to fine tune the setup of an experiment. For ease of use, the ChemiPro box has interior lights that are externally controllable, making it simple to acquire a brightfield reference image. Focusing is also aided by conveniently located external controls. For collection of the greatest number of photons emitted from the sample, an ultrafast Nikkor® 50-mm f/1.2 lens is included.

* Please refer to the “Additional Specifications” page for information pertaining to relevant Xenogen Corporation patents.

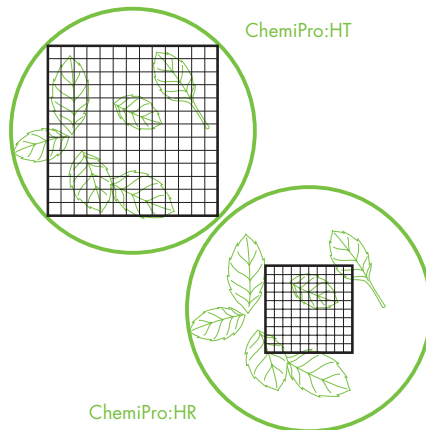


Powerful Software

The ChemiPro system includes imaging software that offers reliable acquisition, processing, and archiving. This full-function package enables the optimization of data collection via on-chip binning, various subregion-readout methods, and the ability to set exposure times anywhere from milliseconds to an hour.

The feature-rich software boasts a comprehensive suite of mathematical functions, allowing researchers to add, subtract, multiply, and divide in order to derive image corrections. The resultant 16-bit data can be saved as a standard TIFF file for export or formatting for publication.

The ChemiPro system is PVCAM® compatible as well. Roper Scientific's exclusive PVCAM application programming interface facilitates the acquisition, processing, and printing of images using dozens of popular third-party packages.



Versatile Performance

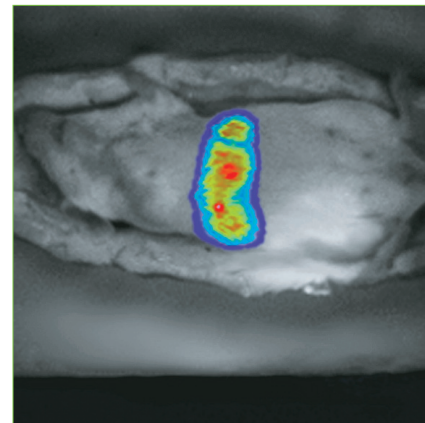
Each ChemiPro system is tailored for either high-throughput (large field of view) or high-resolution (high pixel density) performance. Both models deliver superb ultra-low-light sensitivity at luciferin's emission wavelength.

High Throughput... ChemiPro:HT

- Large field of view for high-density sample evaluation
- High-efficiency light collection
- High intrascene dynamic range for measurement of heterogeneous samples

High Resolution... ChemiPro:HR

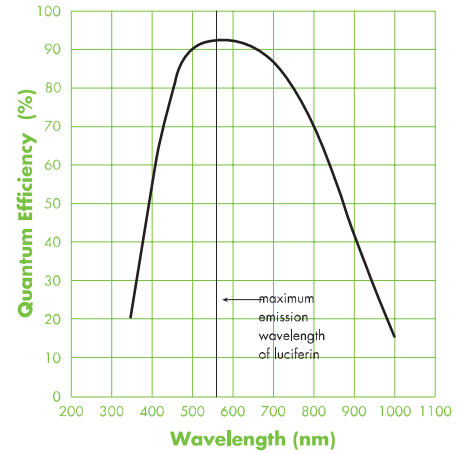
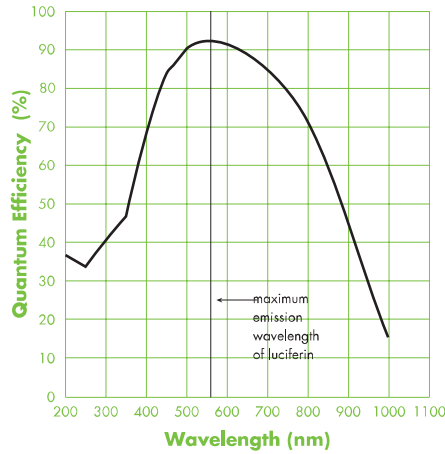
- Excellent resolution attributable to high pixel density
- High intrascene dynamic range for measurement of heterogeneous samples



Superior Support

Purchasing an instrument from the world's largest manufacturer of scientific-performance CCD cameras has distinct advantages. Each ChemiPro system comes from the factory fully tested and guaranteed to perform according to specification. In addition, an optional on-site installation with a one-day, hands-on training session helps make system setup and usage a breeze.

Of course, Roper Scientific imaging experts are always glad to answer any instrumentation questions, as well as help assess suitability for specific laboratory applications. With Roper Scientific facilities and personnel spanning the globe, all ChemiPro users can count on responsive, knowledgeable, local support.



Camera Specifications

Detector:

Chip manufacturer:

Array size:

Pixel format:

Pixel size:

Cooling:

Operational temperature range:

Dark current @ -110°C:

Thermostating precision:

LN hold time:

Dynamic range:

Dual-speed readout:

Full-frame readout times:

System read noise:

Roper Scientific® ChemiPro:HT

High Throughput

scientific-grade, back-illuminated CCD

E2V (Roper Scientific exclusive)

26.8 x 26.0 mm

1340 x 1300 pixels

20 x 20 μm

liquid nitrogen

-80 to -110°C

<1 e-/p/hr

$\pm 0.05^\circ\text{C}$

>25 hours (downward-looking dewar)

16 bits (65,565 gray levels)

100 (or 50) kHz / 1 MHz

<1.8 sec @ 1 MHz

<18 sec @ 100 kHz

<36 sec @ 50 kHz

<5 e- rms @ 100 or 50 kHz

<12 e- rms @ 1 MHz

Roper Scientific® ChemiPro:HR

High Resolution

scientific-grade, back-illuminated CCD

E2V

13.3 x 13.3 mm

1024 x 1024 pixels

13 x 13 μm

liquid nitrogen

-90 to -120°C

<1 e-/p/hr

$\pm 0.05^\circ\text{C}$

>25 hours (downward-looking dewar)

16 bits (65,565 gray levels)

100 (or 50) kHz / 1 MHz

<1.1 sec @ 1 MHz

<10.7 sec @ 100 kHz

<21.5 sec @ 50 kHz

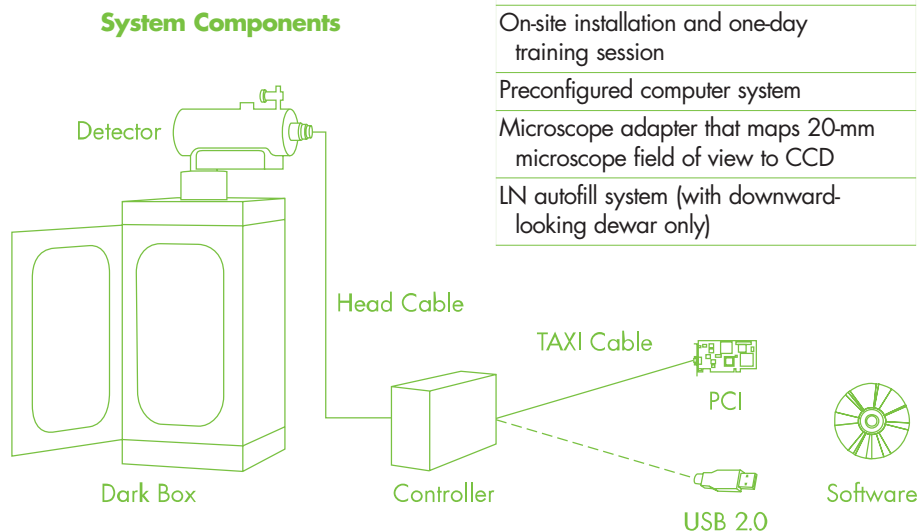
<5 e- rms @ 100 or 50 kHz

<10 e- rms @ 1 MHz

Roper Scientific® ChemiPro™ Additional Specifications

Dark box
Description
Free-standing "Type 2" box
Front-door access to interior
Blackened interior for stray-light rejection
Features
Internal stage with external position-adjustment knob for focusing
Interior lighting with external on/off switch and intensity control
Adapter plate for top-mounted, LN-cooled CCD camera included
Nikkor® 50-mm f/1.2 lens (Nikon® bayonet-style mount) included
Dimensions
Approximate size of dark box: 150 cm (height) x 45 cm (width) x 45 cm (depth)
Approximate size of door: 60 cm (height) x 30 cm (width)
Size of stage: 20 x 20 cm

Options
On-site installation and one-day training session
Preconfigured computer system
Microscope adapter that maps 20-mm microscope field of view to CCD
LN autofill system (with downward-looking dewar only)



Performance
Guaranteed performance
In a partially darkened room, the system is able to collect 10-minute images (at full resolution in the fast ADC channel) that are limited by readout noise only. "A partially darkened room" means that although all room lights are off, computer monitors can still be on.
Translation: <8 counts of noise are introduced by the stray-light signal, which equates to <64 counts of stray-light signal per pixel during the exposure period.
Typical performance
Under standard fluorescence room lighting, the system is able to collect 2-minute images (binned 6 x 6 in the slow ADC channel) that are limited by readout noise only.
Translation: <5 counts of noise are introduced by the stray-light signal, which equates to <25 counts of stray-light signal per pixel during the exposure period.

* Notice to Purchaser

Use of this product to practice *in vivo* imaging in animals (the detection of light emitted from within animals) does not imply or convey a license to practice *in vivo* imaging in animals, as covered by patents controlled by Xenogen Corporation, the owner or exclusive licensee thereunder, and including the following: U.S. patent numbers 6,217,847 and 5,650,135 and European Union patent number 0861093. A license from Xenogen Corporation is required to practice under these patents. No right to use this product under those patents is hereby conveyed by Xenogen Corporation to the purchaser of this product and the purchase or transfer of this product is not intended, either expressly or by implication, to grant any right or license to practice under any such patents. Additional information regarding Xenogen Corporation and its patents can be found at www.xenogen.com <<http://www.xenogen.com>>. Purchasers are advised to contact Corporate Development, Xenogen Corporation, 860 Atlantic Avenue, Alameda, California 94501 for information regarding a license to practice under such patents. Roper Scientific, Inc. disclaims any and all responsibility for, or liability with regard to, Xenogen Corporation's patent rights or licenses or the accuracy, content, completeness, legality, reliability, operability, or availability of information on the Xenogen Corporation website.



Cover Images (from left)

Bioluminescence image of *Vibrio harveyi* courtesy of Dr. Irina Mihalcescu, lab of Dr. Stan Leibler, Princeton University

Chemiluminescence image of mouse courtesy of Dr. Eithan Galun, Goldyne Savad Institute of Gene Therapy, Hadassah University Hospital

Single-cell BRET image courtesy of Dr. David W. Piston, Department of Molecular Physiology and Biophysics, Vanderbilt University

Chemiluminescence image of luciferase-expressing *Arabidopsis* courtesy of Dr. Jian-Kang Zhu, Department of Plant Sciences, University of Arizona

Chemiluminescence image of luciferase-expressing bacteria in *Arabidopsis* leaves courtesy of Dr. Jian-Min Zhou, Kansas State University

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