

BioSpectrum[®] Imaging System

Instruction Guide



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Introduction

The BioSpectrum Imaging System is designed to automate research with one-touch preset or user-defined PC controls for accurate, repeatable imaging and analysis of chemiluminescence, fluorescence, bioluminescence and colorimetric samples (depending upon configuration). The BioSpectrum incorporates a light-tight darkroom with VisionWorksLS software for automated control.

The darkroom has a UV-blocking window, built-in overhead 365nm UV, Visi-Blue™ 480nm and white light, UV transilluminator, LED White Light Illuminator, chemiluminescence tray and five-position emission filter wheel with three emission filters included. The **Automated BioSpectrum** includes a software-controlled lift platform, while the **Manual BioSpectrum** includes a manually adjustable lift platform.

The BioSpectrum includes a highly sensitive CCD camera which supplies real-time, live preview images.



Automated and Manual BioSpectrum Imaging Systems

Components

The BioSpectrum Imaging System is comprised of the following equipment:

- Darkroom Cabinet
- Automated Filter Wheel and Emission Filters (3 Included with System)
- CCD Camera and Lens:
 - MegaCam 810 with either 50mm f/1.2 Fixed, 30mm f/1.4 Fixed, or f/2.8 Zoom Lens
 - OptiChemi™ 610 with either 50mm f/1.2 Fixed, 30mm f/1.4 Fixed, or f/2.8 Zoom Lens
 - Chemi 415 with 12.5-75mm f/1.2 Zoom Lens
 - GelCam 310 with 12.5-75mm f/1.2 Zoom Lens
- UV-Blocking Gel Viewer Window in Darkroom Door
- Automated or Manual Lift Platform (depending upon configuration)
- Epi Illumination
- Chemi Tray
- LED White Light Illuminator
- UV Transilluminator
- VisionWorks®LS Software

Refer to the packing slip for a complete equipment list. System components may vary. The system may additionally include a computer and monitor, printer or BioLite™ MultiSpectral Light Source.



Darkroom Cabinet

The BioSpectrum Imaging System is constructed of aluminum and is fabricated to provide a light-tight chamber.

Darkroom Dimensions: 17.5W x 17.5D x 32H inches (445 x 445 x 813 mm)

Note: The camera cover will add additional height which will vary based on camera application.



Five Position Filter Wheel

The filter wheel accommodates up to five emission filters. The system comes standard with Ethidium Bromide, SYBR Green and SYBR Gold filters. Software controls the selection of filters.



CCD Camera and Lens

The high sensitivity CCD camera and fast optics, housed in the top of darkroom, generate high resolution images. The camera and motorized lens are controlled by VisionWorksLS software.

Refer to the packing slip for the camera configured with your system (**Note:** camera shown to the right may appear different).

Refer to the Cameras section of this manual for installation and operation instructions for the camera shipped with your system.



UV-Safe Gel Viewer Window

The viewer in the darkroom door opens for UV-safe viewing of samples. The acrylic window allows viewing without exposure to ultraviolet radiation.



Lift Platform

The motorized lift platform in the **Automated BioSpectrum**, controlled by the software, can be finely adjusted within a 10-inch range.

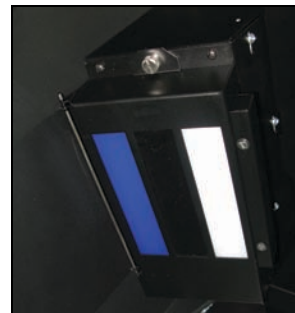
The manual lift platform in the **Manual BioSpectrum** can be manually adjusted to six positions within the travel range.



Epi Illumination

Standard overhead lighting includes 365nm UV, Visi-Blue 480nm and white light. Lighting is controlled via the software interface.

NOTE: The BioSpectrum includes an interlock switch that turns off all UV illumination, including the epi 365nm UV, when the darkroom door is opened. Be sure the darkroom door is completely closed for proper UV operation.



LED White Light Illuminator

The LED White Light Illuminator emits high uniformity with less than 5% coefficient of variance (CV). Store the White Light Illuminator in the exterior darkroom side pocket when not in use.



Chemi Tray

The chemi tray creates a dark background for placement of bioluminescent or chemiluminescent samples such as Western blots, shown here placed on top of the FirstLight UV Illuminator.



UV Transilluminator

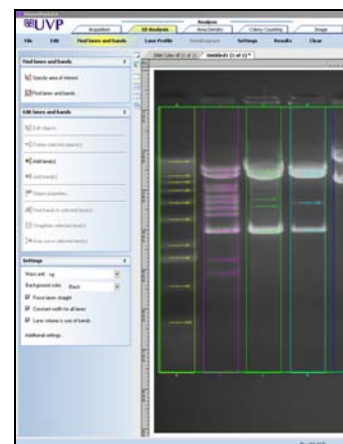
The system may be configured with a UV transilluminator to fluoresce samples. The transilluminator is positioned on a roll out tray for easy access.

NOTE: The BioSpectrum includes an interlock switch that turns off all UV illumination, including the transilluminator, when the darkroom door is opened. Be sure the darkroom door is completely closed for proper UV operation.



VisionWorks®LS Software

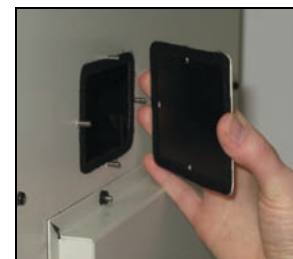
VisionWorksLS software controls the darkroom functions and lighting as well as the motorized lens and camera. The system may be configured with VisionWorksLS analysis software for analysis of gels, plates, blots and other samples.



BioLite Access Ports

Additional optional equipment can be added to the BioSpectrum Imaging System through the side access ports.

- Side access ports allow for connecting the external BioLite™ MultiSpectral Light Source for directed lighting ranging from visible to near IR (note: the **Automated BioSpectrum** has two access ports while the **Manual BioSpectrum** has one access port).
- The access panel on the back of the darkroom provides access for connecting additional equipment within the darkroom.



Minimum Computer Requirements

Processor:	Pentium 4, 1.6 GHz or higher
RAM:	2GB (4GB Preferred)
Display:	1024 x 768
Operating System:	Microsoft Windows XP Service Pack 2 or Newer (32-bit or 64-bit)
Internet Browser:	Microsoft Internet Explorer 6.0 or later
Computer USB Ports:	Computer must come equipped with a minimum of three USB ports; additional peripherals (mouse, keyboard, printer, etc.) may require additional USB ports.

Installation

Installing VisionWorksLS Software

1. Insert the VisionWorksLS CD (not network CD) into the computer.
2. Click on the **Install** button for VisionWorksLS.
3. Click **OK**, **Next**, agree to "I accept terms of licensing agreement", then **Next**. Leave all options in their default settings. Then click **Next**, **Next**, **Install** and finally **Finish**.

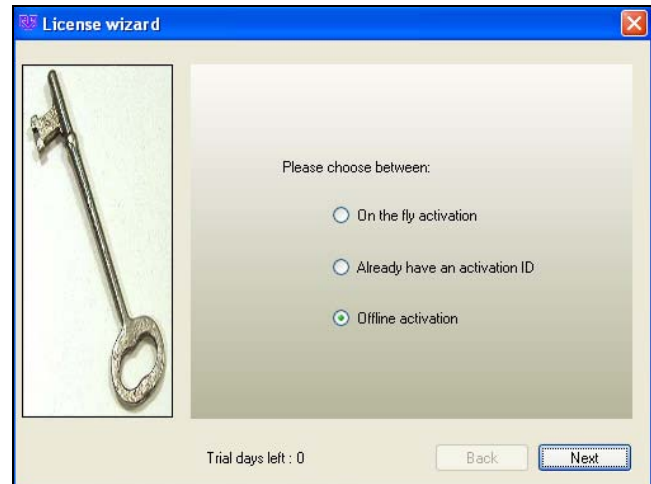
Registering the Software

Open the Software

1. Double click the VisionWorksLS software icon on the desktop.
2. To activate the software, registration is required. To immediately activate the software online, choose **On-the-Fly activation**. If the computer is not connected to the Internet, select **Offline activation** and proceed to the following page of this manual, or call UVP to register the software.
3. Click **Next** to continue.
4. The **Already have an activation ID** option is useful when reloading the software after receiving an initial activation code.
5. Complete all required information on the form.
6. Fill out the Serial Number located on the CD. The number should be four sets of six numbers.
7. Once the form is completed, click on **Get Activation No.** and then click **Activate** once the Activation Number appears in the box.



8. If the computer is not connected to the Internet, click **Offline activation** to register the software. This allows the user to obtain the activation code and enter it at another time.
9. Click **Next** to continue.



10. Click the link provided and complete the form to obtain registration instructions. Click **Finish**.



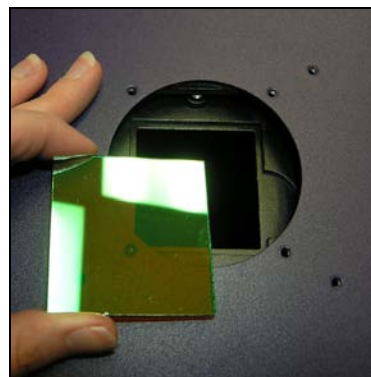
Hardware Installation

Darkroom Setup

1. Remove all the tape on the darkroom (filter wheel, doors and interior cables).
2. If installing the **Automated BioSpectrum**, detach the epi light covers from the Velcro strips at the top of the darkroom and place the covers in a secure location. If installing the **Manual BioSpectrum**, remove the epi light covers from the epi lights and secure them to the sides of the darkroom.
3. Place the UV transilluminator on the pull-out tray and connect the power jumper cable to the interior of the darkroom and to the back of the transilluminator. See “UV Transilluminator Setup” for more information.
4. Place the chemi tray on top of the UV transilluminator. Remove the tray when not required.
5. Unpack the LED White Light Illuminator and place it on top of the UV transilluminator. Place the LED White Light Illuminator in the external darkroom side pocket when not in use. See “LED White Light Illuminator Setup” for more information.
6. Use a level to ensure that the darkroom is flat. If necessary, make adjustments to the four feet of the darkroom by rotating the system’s rubber feet clockwise or counterclockwise to raise or lower each corner of the system.

Darkroom Filter Setup

1. Ensure that the darkroom is in a fixed and permanent location as filters may slide in movement.
2. Locate the filter wheel in the darkroom’s camera well at the top of the darkroom, accessible when the camera and lens are removed.
3. Using your fingers, manually rotate the filter wheel to the appropriate filter location. Each filter location in the darkroom is numbered for a corresponding filter. By touching the sides of the filter only, insert the filter into the proper location (the numbers/letters on the side of the filter should face right side up).
 - Position #1 = Clear (no filter)
 - Position #2 = User Choice (filter provided if ordered separately)
 - Position #3 = SYBR Green (515-570nm)
 - Position #4 = SYBR Gold (485-655nm)
 - Position #5 = Ethidium Bromide (570-640nm)

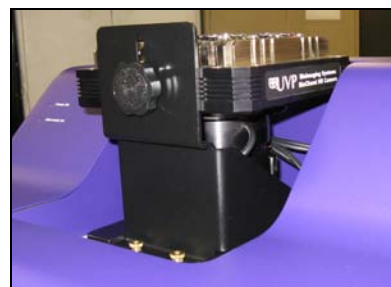


Placing Filter at the Top of the Darkroom

Camera and Lens Assembly

Camera Setup

There are several camera options. Detailed camera and bracket assembly instructions for each camera are listed in the **Camera Installation** section of this manual. Proceed to this section now to continue BioSpectrum installation.

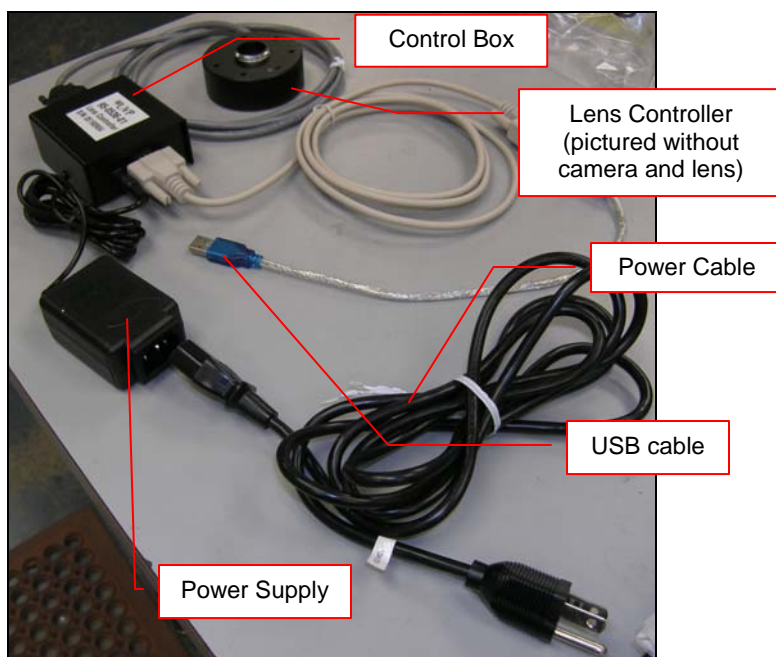


Sample Camera with Base and Lens on Top of the Darkroom

Fixed Lens Controller Setup

The fixed lens controller is attached to the lens at the factory. There are several cables extending externally from the controller. Assemble the lens controller's connective devices as follows:

1. Ensure that the lens controller components and connections are assembled per the picture at right.
2. Plug the power cable into the power supply.
3. Plug the other end of the power cable into an electrical outlet.
4. Wait until VisionWorksLS software is loaded to plug the USB cable into the computer.

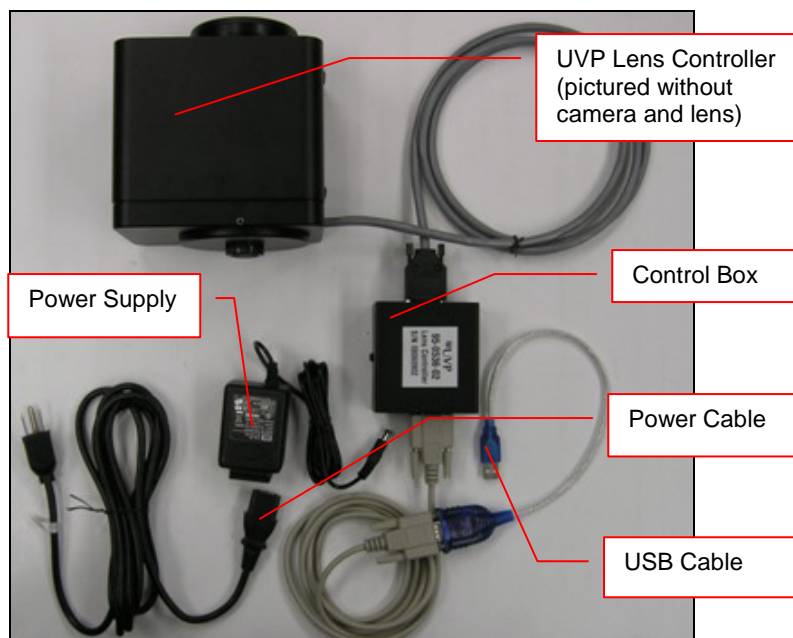


Fixed lens controller and accompanying connective devices

Zoom Lens Controller Setup

Assemble the lens controller's connective devices as follows:

1. Ensure that the zoom lens controller components and connections are assembled per the picture at right.
2. Plug the power cable into the power supply.
3. Plug the other end of the power cable into an electrical outlet.
4. Wait until VisionWorksLS software is loaded to plug the USB cable into the computer.



Zoom lens controller and accompanying connective devices

UV Transilluminator Setup

1. Plug the power jumper cord into the back of the transilluminator.
2. Place the transilluminator on the tray.
3. Plug the other end of the transilluminator power jumper cord into the darkroom outlet on the inside top rear of the darkroom as shown below.



LED White Light Illuminator Setup

1. Position the LED White Light Illuminator inside the darkroom so that the FRONT label is closest to the door.
2. Plug the power cord into the darkroom outlet labeled with "LED illuminator plate" on the inside top rear of the darkroom as shown below.



Connecting to a PC and Powering Up the System

1. Connect the USB cable from the computer to the rear exterior of the darkroom.
2. Connect the camera to the computer and darkroom per the camera instructions in the back of this manual. Ensure that the camera is connected to its own dedicated USB port and not to a USB hub or other similar shared device.
3. Turn the darkroom ON (power switch is located on the upper right side of the darkroom) to ensure that the computer communicates with the darkroom.
4. Open VisionWorksLS. The software will automatically detect the new hardware.

Printer Setup

If this order did not include a printer, move on to the next section.

To install the printer:

1. Plug the power cable from the printer into a power source.
2. Press the button to open the lid of the printer and load the paper by allowing the loose end of the roll to come off the top of the roll.
3. Tear off the excess paper that is visible after shutting the printer lid.
4. Plug the USB cable from the printer into the computer.
5. Load the driver CD for the printer that came shipped in the printer box.
6. To set the printer settings, click **"Start"** at the lower left of the computer, select **"Settings"** and click **"Printers and Faxes"**. Right click on the correct printer icon and select **"Printing Preferences"**.
7. Choose the following settings: High Density paper, 1280X1280, Portrait mode.
8. Click on the **"Option"** tab and click the **"Enlarge Image to Fit Paper"** box. Then select **"Apply"** and **"OK"**.
9. Close VisionWorksLS software to save and apply the printer changes.

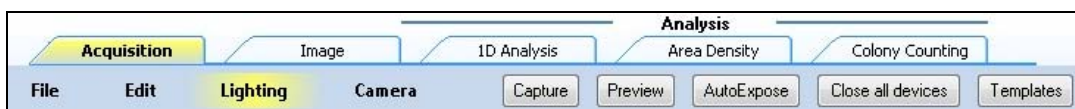
Operation

Using the System

Caution: In BioSpectrum systems equipped with a motorized lift platform, do not place objects under the platform as these items will suffer damage if lift platform is moved to the lowest position.

Note: The motorized lift platform (if equipped) is only functional if the darkroom door is closed.

- Turn on the darkroom power switch, located on the upper right side of the darkroom, prior to opening the software. This will enable hardware-to-software connection.
- To operate the darkroom controls, open VisionWorksLS, click on the Acquisition Action Tab and then click on the Lighting Menu button. The software operates the motorized lens, emission filters, overhead lighting, transillumination and power lift platform (if equipped).

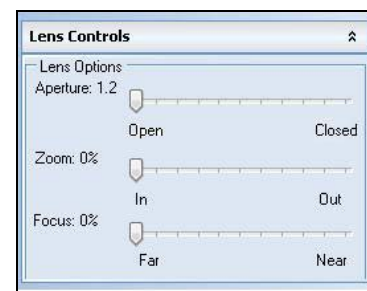


NOTE: Refer to the software help files or the software manual (PDF file) for additional software information.

Lens Control

The motorized lens is controlled via the **Lens Controls** section of the **Lighting Menu** in VisionWorksLS. The lens is motorized for adjusting aperture, zoom or focus settings.

1. In the lens area, adjust the **Aperture** by moving the slider to the left to let more light into the camera's CCD or to the right to decrease the amount of light. The f-stop number indicates the opening of the lens aperture, and is shown next to the word "Aperture" in the Lens Control module. (Note: The lower the f-stop number, the more light will be allowed to enter the camera.)
2. Adjust the **Zoom** slider to control the magnification of the lens by moving the slider to the left to increase the size of the image or to the right to decrease the size of the image. (Not all motorized lenses are zoom lenses.)
3. Adjust the **Focus** slider to control the near/far focus of the lens. Sliding the control from left to right will adjust the focus from far to near.



Camera Control

The camera is controlled via VisionWorksLS software by clicking on the **Acquisition Action Tab** and then clicking on the **Camera Menu Button**. (Cameras have different functionality. Some options listed to the right in the **Camera Menu** may not appear for each camera. VisionWorksLS software automatically detects and enables the built-in functionality for each camera.)

Preset Capture: Use these buttons for one-touch image capture of fluorescence, white light or chemi images (note: additional adjustments may be required to achieve ideal images).

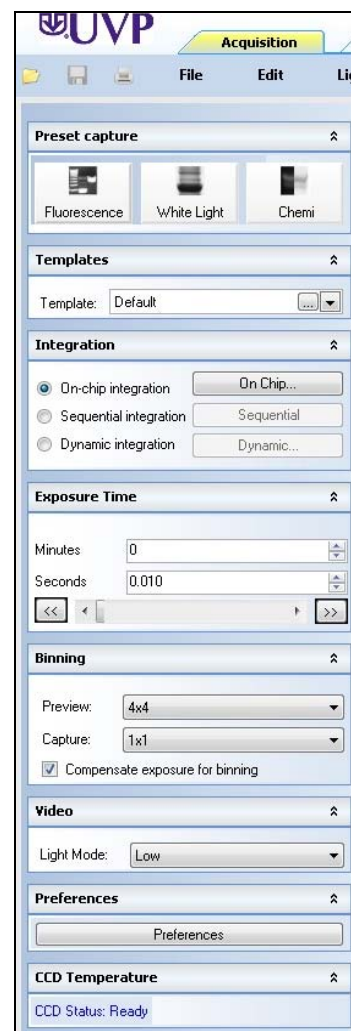
Templates: Templates can be user-defined to allow quick access and to load regularly-used camera settings based on application.

Integration: Integration allows the user to automatically capture multiple images, whether at regular intervals or at user-defined intervals. Integration also allows the user to stack multiple images into one or to save each image separately.

Exposure Time: Use the various sliders and drop-downs to select the ideal exposure time for each specific experiment.

Binning: Use binning to achieve quicker preview and capture images. Binning is discussed further in the **Capturing Images and Using Templates** section of this manual.

CCD Temperature: When using cooled cameras for longer exposures (such as with chemiluminescent experiments), the CCD temperature status area will inform the user when the CCD's temperature is low enough for long exposure times.

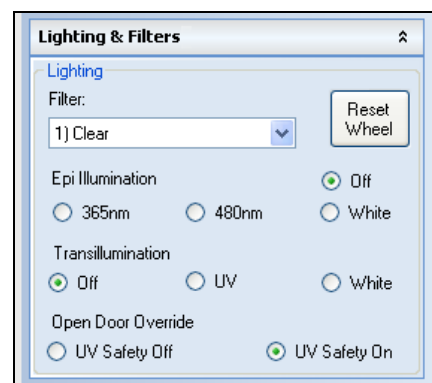


Lighting and Emission Filter Selection

The lighting in the BioSpectrum darkroom is controlled via the **Lighting & Filters** section of the **Lighting Menu** in VisionWorksLS.

1. Select the appropriate emission **Filter** from the drop-down menu.
2. Select the appropriate **Epi Illumination** source from the buttons.

Plates cover the lights to prevent any reflective light when lighting is not required. When illuminating the epi lighting, remove the plates and store in a convenient place to reattach when needed (**Automated BioSpectrum**) or fold away to the side of the darkroom (**Manual BioSpectrum**).



3. Select the appropriate **Transillumination** source from the buttons.

When using transillumination, switch the transilluminator power to ON (switch is located on the front of the transilluminator).

When using the LED White Light Illuminator, ensure that it is plugged in to the power receptacle located at the upper rear right corner of the darkroom.

Note: The UV transilluminator will automatically shut off when the darkroom door is open. The transilluminator also has a timer to shut off the transilluminator after 20 minutes of inactivity.

Note: The BioSpectrum includes a UV interlock switch that shuts off all UV operation when the darkroom door is opened. Be sure the darkroom door is completely closed to ensure proper UV operation.

Adjusting the Lift Platform Height

BioSpectrum with Automated Lift Platform

When using the **Automated BioSpectrum**, the lift platform height is adjusted from the **Tray Height** section of the **Lighting Menu** in VisionWorksLS. The lift platform adjusts to any location within a ten-inch travel range. When adjusting the lift platform for experiments, the software continuously tracks the position. The lift platform height can be adjusted in several ways:

- Adjust the lift platform height by moving the slider bar within VisionWorksLS.
- Adjust the lift platform height by typing a value ranging from 0-100 in the text box.
- Adjust the lift platform height by moving the up/down arrows.

Note: The lift platform will only move if the darkroom door is closed.

BioSpectrum with Manual Lift Platform

When using the **Manual BioSpectrum**, the lift platform height is adjusted by manually moving the lift platform. There are six positions for the lift platform above the base position. Position markings are located along the darkroom opening.

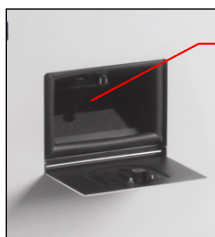
Pivot the lift platform up slightly to disengage it from the pawl in the back of the darkroom and slide it up or down on the two metal rods. Once the desired position has been located, pivot the lift platform back down to a flat, horizontal level, and make sure the platform has reengaged with the pawls in the back of the darkroom by ensuring that it is firmly in place.

Chemi Tray

Place the Chemi Tray on top of the transilluminator and place blots or plates on the center of the tray. Remove the tray when not required and store underneath the darkroom or in the side pocket for easy access. **NOTE:** When conducting chemi experiments, be sure that the transilluminator is turned OFF.

Gel Viewer Window

The Gel Viewer Window is located on the front of the darkroom door and has a pressure-sensitive clasp. Press firmly to open the viewer. The window is UV blocking while providing a clear view to the transilluminator or lift platform surface for visibility of samples without opening the darkroom door.

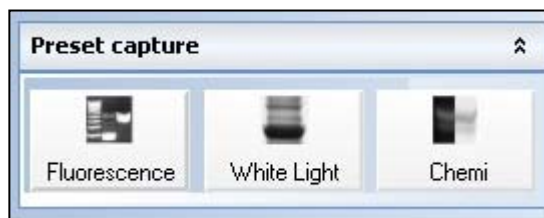


Gel viewer window blocks UV and allows sample viewing with darkroom door closed

Capturing Images and Using Templates

Using the Preset Capture Buttons

1. Place the sample or focus target on the surface where the sample will be imaged.
2. Click on the White Light Preset Button.
3. If the image needs adjustment, start the image preview by clicking on the Preview button and move the sample as needed.
4. Slightly adjust the aperture, exposure time, zoom (or lift platform height) and focus until an ideal image has been achieved. (**Note:** Not all lenses have zoom capability, in which case the lift platform height must be adjusted.)
5. Use the Chemi or Fluorescent Preset Capture buttons to capture an image of the chemiluminescent blot or fluorescent gel.
6. If needed, adjust the aperture and/or exposure time to capture an ideal image.



Focusing the Lens Using Image Preview

1. Place the sample or focus target on the surface where the sample will be imaged.
2. Turn on the darkroom white light.
3. Start the image preview by clicking on the Preview button within VisionWorksLS and move the sample around as necessary.
4. Set the aperture to the lowest setting (lowest f-stop number) and adjust the exposure time to see the target clearly.
5. Zoom to the desired region of interest or adjust the lift platform height. (**Note:** Not all lenses have zoom capability, in which case the lift platform height must be adjusted.)
6. Adjust the focus until the image is sharp.

Note: Decrease the aperture after focusing the lens if possible. This will sharpen the focus and increase the depth of field at the expense of some of the brightness of the image.

Capturing Images Without Using the Preset Capture Buttons

1. Depending on the sample type, place the sample on the chemi tray, transilluminator or white light plate.
2. For a chemiluminescent sample, turn off all darkroom lighting and use the small black plates to cover the overhead light modules within the darkroom. For a fluorescent gel sample, turn on the UV transilluminator.
3. Adjust the capture settings in VisionWorksLS.
4. Click the **Capture** button.

Recommended Settings for Short Exposures and Focusing

1. Increasing the **Binning** will increase the camera's refresh rate and sensitivity. However, it also exponentially decreases overall image resolution. Binning works by combining smaller pixels into one larger pixel. For example, 2x2 binning will take a 2x2 area of pixels (4 pixels all together) and combine them into one large pixel, 4x4 binning will combine a 4x4 area of pixels (16 pixels all together) into one large pixel, and so forth, thus increasing image sensitivity but decreasing overall image resolution.

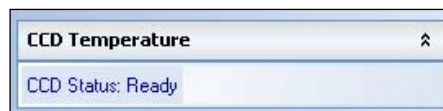
In most cases, 4x4 binning is recommended for general focusing and the fastest possible frame rates. (**NOTE:** Binning is not available on 300-series cameras)

2. Decrease the preview exposure time to 15-100ms.

3. Always focus at a lower (faster) f-number than the capture setting. Increasing the f-number will increase the “depth of field” creating a better focus on the target.

Capturing Longer Image Exposure with the Least Noise

1. **Binning** can be ideal for very dim images where high sensitivity is needed. Binning of at least 2x2 is recommended for exposures over 1-2 minutes.
2. Ensure that the camera has had an adequate amount of time to cool before taking long exposure images. This can be verified by referencing the “CCD Temperature” status in the lower-left corner of VisionWorksLS.



Take a test image with a short exposure (less than 1 minute) to ensure adequate focus before starting longer (greater than 1 minute) exposures.

Using Templates

Set Up and Save Camera Templates

NOTE: Without using templates, camera settings can be manually adjusted directly in the software.

Chemi Blot Pre-Capture Positioning: For this application, use a preview binning of 1x1, a capture binning 1x1 and an exposure time of 0.2sec. Have the darkroom door cracked open to let in some ambient light.

Chemi Blot with Fast Capture and Lower Resolution: For this application, use a preview binning of 8x8, a capture binning of 4x4, and an exposure time of 15sec. This setting is useful for quick screening; the time can be increased or decreased depending on the intensity of the signal from the blot.

For better resolution, set the preview binning to 8x8, the capture binning to 2x2, and the exposure time to 60sec. The preview is the same and the exposure time is intermediate, but the final image is of higher resolution than when using 4x4 binning.

Chemi Blot with Slower Capture and Higher Resolution: For this application, use a preview binning of 8x8, a capture binning of 1x1, and an exposure time of 5min. This will result in the best possible capture resolution. However, the exposure takes longer because the image is unbinned.

Set Up Darkroom Templates

NOTE: Without using templates, darkroom settings can be manually adjusted directly in the software.

Chemi Blots: Place a business card on the chemi tray in the BioSpectrum darkroom. Set the lens to the fastest f-stop (the lowest aperture number) and focus on the business card with darkroom door cracked open, no emission filter in place, no lighting on, and either the lens zoomed or the lift platform positioned to fit the blot.

To Process a Blot

1. Place the Western blot on a hinged transparency or in clear plastic bag.
2. Position the blot on the black chemi tray.
3. Pre-focus and position the blot with the lights off, the door cracked open and the lens set to the fastest f-stop (the lowest aperture number). Use the small black plates to cover the overhead light modules inside the darkroom. Use the “Chemi Blot Pre-Capture Positioning” template discussed earlier.
4. Apply the chemi substrate on the blot (front side up) and then close the hinged transparency over the blot and smooth out any bubbles. Reposition the blot in the field of view if needed. Close the darkroom door.
5. Immediately start previewing with the “Chemi Blot with Fast Capture and Lower Resolution” template. Let the blot develop inside the darkroom while watching the preview. When

approaching maximum signal (which should take 2 to 3 minutes) use the “Chemi Blot with Lower Capture and Higher Resolution” template to capture the image.

6. Light emission will drop off quickly, so capture several images as quickly as possible.
7. Save and archive original files for future quantitative analysis.
8. After creating a copy of an image file, use the image invert function in VisionWorksLS, adjust the image histogram for optimal viewing, and burn the changes to a new file.

Note: Capture and image processing steps are described in more detail in the LS software manual and in the software help files.

Camera Installation

High sensitivity, scientific grade CCD cameras are designed for use with UVP's BioSpectrum Imaging Systems. This section covers the components and steps required to install and operate UVP's cameras. Each camera has slightly different installation instructions, and the following cameras are covered in this manual:

- GelCam 310
- Chemi 415
- OptiChemi™ 610
- MegaCam 810

Refer to the packing list for the camera included with your specific system.

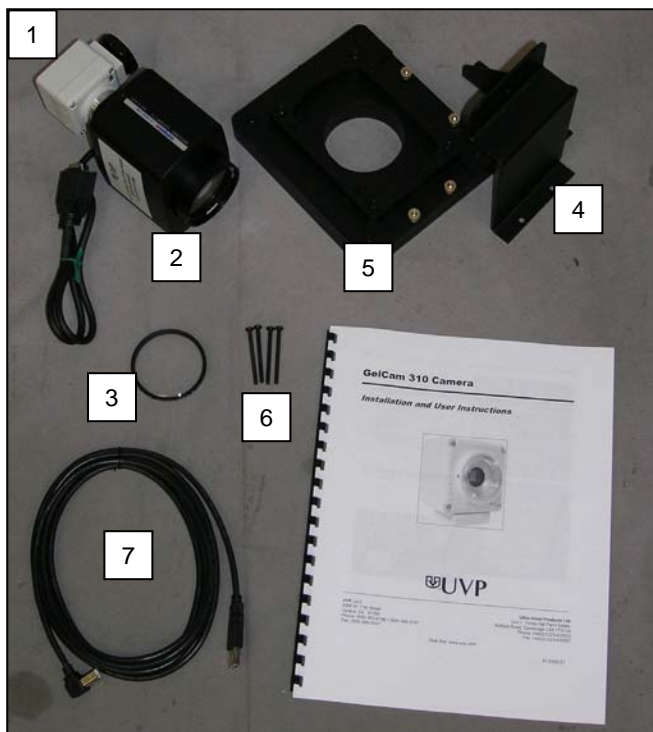
GelCam 310 Camera

Camera Specifications

Specifications	GelCam 310 Camera
Type	CCD, Monochrome
Resolution	1600 x 1200
Bit Depth	16-bit
Quantum Efficiency	NA
Cooling	None
Binning	None
PC Interface	USB

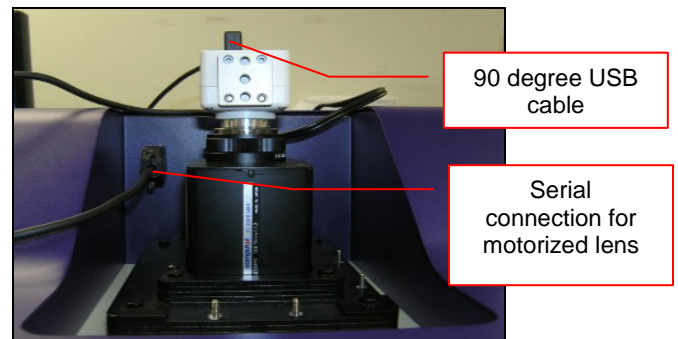
Components

- GelCam 310 Camera
- Motorized lens
- +2 diopter
- Bracket
- Base (typically shipped installed on system)
- Base Mounting Screws
- USB Cable (for connection from camera to PC)



Hardware Installation

1. Slide the camera and lens assembly into the camera base. The base comes installed to the darkroom from the UVP factory.
2. Plug the serial cable from the motorized lens into the darkroom.
3. Plug the 90 degree USB cable into the top of the camera. Leave the other end unplugged until ready to install the VisionWorksLS CD.

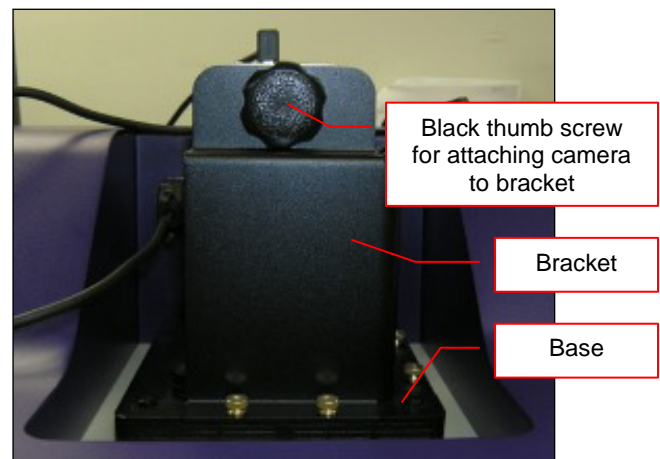


4. Place the bracket on the mounting base aligning the holes on the bracket with the all-thread screws protruding from the camera base. Using the four brass thumb screws provided, secure the bracket to the base.

Insert black thumb screw into the central hole



5. Insert and tighten the black thumb screw and washer to secure the camera to the bracket. **Be sure to position the screw in the central hole in the camera.**



Bracket and base securing camera

Software Installation

Install the Camera Driver

1. Install VisionWorksLS software.
2. Plug in the 90 degree USB cable from the camera into the USB port. Ensure that the camera is connected to its own dedicated USB port and not to a USB hub or other similar shared device.
3. The computer should display **Found New Hardware**. Click **Yes**, **Next**, **Install from a list, Next**, **Don't search**, **Next**, double click on **Show all Devices**, click **Have disk**, and then **Browse**.
4. Browse to the **C:\Windows\system32\drivers** folder and select the **STUSB.inf** file.
5. Select **Open** and then **OK** to install the camera.
6. Select **Finish**.

Note: The installation may cause a warning message stating that the drivers are "not verified by Microsoft". Select **Continue Anyway** and the drivers will be installed correctly

MegaCam 810, OptiChemi 610 and Chemi 415 Cameras

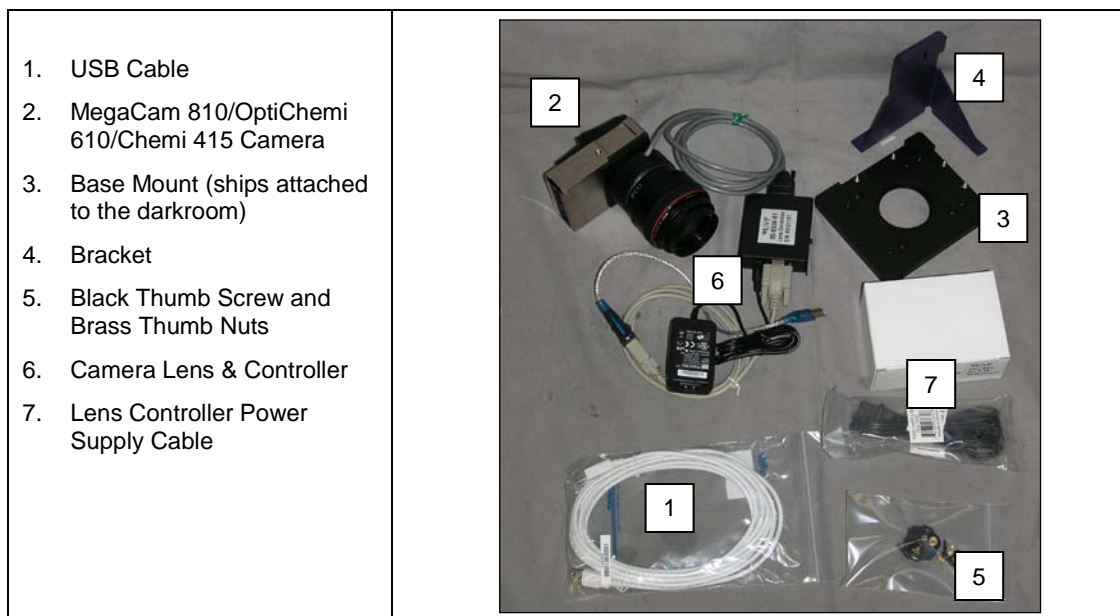
Camera Specifications

Specifications	MegaCam 810	OptiChemi 610	Chemi 415
Type	CCD, Monochrome	CCD, Monochrome	CCD, Monochrome
Resolution	3296 x 2472	2184 x 1472	1360 x 1024
Bit Depth	16-bit	16-bit	16-bit
Quantum Efficiency	50% peak	86% peak	62% peak
Cooling	-35°C from Ambient	-50°C from Ambient	-35°C from Ambient
Binning	Yes, 1x1 thru 8x8	Yes, 1x1 thru 10x10	Yes, 1x1 thru 8x8
PC Interface	USB	USB	USB

Components

Note: Some components may not be shipped with all systems.

Note: The MegaCam 810, OptiChemi 610 and Chemi 415 cameras use many of the same components and are installed in a similar manner. Therefore, the installation instructions herein will refer to all three cameras interchangeably.



Hardware Installation

The photograph shows the parts required for assembly of the MegaCam 810 and Chemi 415 camera kits with the automated lens on the BioSpectrum Imaging System. The OptiChemi 610 camera will have a different appearance but will be installed in the same manner.

Note: The image above shows the 50mm f/1.2 lens (6). Another lens and/or lens controller may be shipped with the system.

1. Attach the camera bracket (4) to the base mount with the brass thumb nuts (5).
2. If not already removed, take the lens cap off the lens. Do not unscrew the lens cap, as it will simply pull straight off.
3. Place the camera/lens assembly in the hole in the base mount. Then, use the black thumb screw (5) to secure the camera in place, attaching it through the hole at the top of the bracket (4).

Note: When looking at the darkroom from the front, the MegaCam 810, OptiChemi 610 and Chemi 415 cameras attach to the bracket with the Black Thumb Screw at the right of the system. The USB and power cables will extend from the front of the camera, facing the user.

Software Installation

Install the Camera Driver

1. All of the software required to operate the MegaCam 810, OptiChemi 610 and Chemi 415 cameras as well as their respective lens controllers is embedded within VisionWorksLS. Therefore, once VisionWorksLS has been installed, plug in the camera and lens controller. No additional drivers or software are required.
2. Connect the camera's USB cable to the camera and to a USB port on the computer. Ensure that the camera is connected to its own dedicated USB port and not to a USB hub or other similar shared device.
3. Connect the power supply coming from the top of the darkroom to the camera.

Service Procedures

Return Procedure

A **Returned Goods Authorization (RGA)** number must be obtained from UVP Customer Service before returning any product.

Troubleshooting

No Power to the Darkroom

1. Recheck main power cord connections to the darkroom.
2. Check fuses, located at the back of the unit, near the power port. A flat-head screwdriver will be required. Turn the fuseholder cap counterclockwise and the fuse holder will pop out. Inspect the thin wire within the glass fuse to see if there is a break in the wire. If so, replace the fuse(s). If fuses are blowing repeatedly, contact UVP Technical Support for additional troubleshooting.

Transilluminator Will Not Turn On

1. There is a UV interlock switch that turns off the transilluminator and epi UV illumination when the darkroom door is opened. Be sure the darkroom door is completely closed.
2. Be sure the darkroom cabinet's "Power On" indicator light is lit. If not, refer to "No Power to the Darkroom" above.
3. The transilluminator itself has a power switch; make sure that the transilluminator power switch is in the "On" position.
4. Ensure that the transilluminator power jumper cord is securely connected at both the ends.
5. There is a timer that turns off the transilluminator automatically after 20 minutes of use. Use VisionWorksLS to deactivate and restart the transilluminator.

Replacement Parts and Accessories

Replacement parts and accessories part numbers are shown below. To order accessories or replacement parts, contact UVP's offices listed under Technical Support.

Part Description	Part Number
Power Cord, 100V/115V	46-0023-38
Power Cord, 230V	46-0023-39
Tube, 13W PL White	34-0093-01
Tube, 13W BLB 365nm Longwave	34-0093-02 (Qty 2)
Visi-Blue Converter Plate, 21x26cm	38-0200-01
Visi-Blue Converter Plate, 25x26cm	38-0200-04
Thermal printer, digital archive quality 256-grayscale (Mitsubishi)	89-0069-06 (115V)
Thermal printer, digital archive quality 256-grayscale (Mitsubishi)	89-0069-07 (230V)
Thermal printer, digital archive quality 256-grayscale (Sony for Europe)	89-0069-15 (230V)
Thermal paper, Mitsubishi (4 rolls – 800 images)	89-0038-01
Thermal paper, Sony high gloss (5 rolls – 1000 images)	89-0174-01
Thermal paper, Sony glossy (5 rolls – 1000 images)	89-0031-01
Gel-Cutter	85-0002-01
Gel-Ruler	85-0003-01
Gel-Scooper	85-0006-01
Gel-Tray, small	85-0007-01
Gel-Sentry DNA Preparation Plate	97-0076-01
Fluorescent Standard Step Tablet	33-0014-02
Spectacles, UV Blocking (UVC-303)	98-0002-01
Goggles, UV Blocking (UVC-503)	98-0002-02
Faceshield, UV Blocking (UVC-803)	98-0002-04

Contact UVP for information on the **BioLite MultiSpectral Light Source** for directed epi or transillumination fiber optic lighting with filters for excitation of fluorescent multiplexed Western blots, NIR, DIGE 2D gels, PAGE gels, microplates and more.

Technical Support

UVP offers expert technical support on all UVP products. If there are any questions about product use, operation or repair, contact UVP's offices at the locations below.

NOTE: A Returned Goods Authorization (RGA) number must be obtained from UVP's Customer Service prior to returning any product.

If you are in North America, South America, East Asia or Australia:	If you are in Europe, Africa, the Middle East or Western Asia:
Call (800) 452-6788 or (909) 946-3197 , and ask for Technical Support during regular business days, between 7:00 am and 5:00 pm, PST.	Call +44(0) 1223-420022 , and ask for Customer Service during regular business days between 9:00 am and 5:30 pm.
E-mail your message to: info@uvp.com or techsupport@uvp.com	E-mail your message to: uvp@uvp.co.uk
Fax Technical Support at (909) 946-3597	Fax Customer Service at +44(0) 1223-420561
Write to: UVP, LLC. 2066 W. 11 th Street, Upland, CA 91786 USA	Write to: Ultra-Violet Products Ltd. Unit 1, Trinity Hall Farm Estate, Nuffield Road, Cambridge CB4 1TG UK

Warranty

UVP's products are guaranteed to be free of defects in materials, workmanship and manufacture for one (1) year from date of purchase. Consumable and disposable parts including, but not limited to tubes and filters, are guaranteed to be free from defects in manufacture and materials for ninety (90) days from date of purchase. Transilluminators carry a two (2) year warranty from date of purchase. If equipment failure or malfunction occurs during the warranty period, UVP shall examine the inoperative equipment and have the option of repairing or replacing any part(s) which, in the judgment of UVP, were originally defective or became so under conditions of normal usage and service.

No warranty shall apply to this instrument, or part thereof, that has been subject to accident, negligence, alteration, abuse or misuse by the end-user. Moreover, UVP makes no warranties whatsoever with respect to parts not supplied by UVP or that have been installed, used and/or serviced other than in strict compliance with instructions appearing in this manual.

In no event shall UVP be responsible to the end-user for any incidental or consequential damages, whether foreseeable or not, including but not limited to property damage, inability to use equipment, lost business, lost profits, or inconvenience arising out of or connected with the use of instruments produced by UVP. Nor is UVP liable or responsible for any personal injuries occurring as a result of the use, installation and/or servicing of equipment.

This warranty does not supersede any statutory rights that may be available in certain countries.