Carestream Gel Logic 212 PRO
User's Guide

IB5438180 Rev A 0409

Should you have any questions concerning this product, contact Technical Support, Carestream Molecular Imaging, Carestream Health, Incorporated, 4 Science Park West, New Haven, CT 06511 USA.

For laboratory research use only. Not suitable for human or animal diagnostic or therapeutic use.

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Introduction

Thank you for purchasing the Carestream Gel Logic 212 PRO Imaging System (GL212 PRO). The GL212 PRO, in combination with Carestream Molecular Imaging Software (Carestream MI), is specially designed for gel documentation and analysis. The IEEE 1394 (FireWire) 1.4 mega pixel CCD camera with an automated lens provides real time imaging for increased throughput in your laboratory. The scientific grade CCD provides a 12-bit data file which can be accumulated up to 14-bit image files for improved sensitivity and data accuracy.

The GL212 PRO fully automated cabinet integrates both transillumination and epi-illumination for both UV and white light excitation allowing you to image a wide variety of fluorescent and colorimetric samples. The broadband UV excitation (peak at 306 nm) provides for the detection of a broad range of fluorescent dyes including ethidium bromide, SYBR Green and SYBR Red. The white light illumination is ideal for illumination of protein gels, blots and plates.

The GL212 PRO Acquire Software module, running within Carestream MI allows you to:

- ✔ Image electrophoresis gels, microtiter plates, and colony and plaque assays.
- ✔ Analyze your image for molecular weight, mass, optical density, and intensity measurements.
- ✔ Annotate and prepare your images for publication.
- ✔ Generate hard copy prints at a fraction of the cost of instant photography.
- ✔ Easily share or transmit image files over local or worldwide networks.

Carestream Molecular Imaging is dedicated to providing cutting edge imaging product systems for scientific research applications. For more information on-screen products for scientific imaging applications, please visit us on the worldwide web at mi.carestreamhealth.com.

About the User's Guide

The Carestream Gel Logic 212 PRO User's Guide provides you with all of the information you need to capture images. It is designed to be used in conjunction with the Carestream Molecular Imaging Software User's Guide.

If you are like most users, you will want to get started right away; but before you do, you need to have basic computer skills including:

- ✔ Launching applications
- ✔ Using a mouse
- ✔ Using pop-up menus
- ✔ Selecting and editing text
- ✔ Saving and printing your work
- ✔ Dragging and dropping objects

Refer to your computer manual to become familiar with the skills listed above.

Conventions

This User's Guide utilizes the following conventions:

- ✔ Menus and dialog boxes are displayed using Windows XP and may appear differently on your screen. Any significant differences in commands between Macintosh and Windows platforms are noted in the text.
- ✔ Menu commands, tool names, and window names are shown capitalized.
- ✔ Warnings, tips, and notes appear in the text like this:

  ☞ NOTE: Carestream Molecular Imaging provides maximum performance products.

- ✔ Important safety warnings appear in the text as follows:

WARNING: This symbol is used in the User's Guide to designate a warning or caution statement.

WARNING: This symbol is used in the User's Guide to designate where electrical shock is possible.

WARNING: This symbol is used in the User's Guide to designate when there is a potential exposure to hazardous ultraviolet light.

WARNING: This symbol is used on the instrument indicates protective earth.

Navigating Through the User's Guide

The Carestream Gel Logic 212 PRO Imaging System User's Guide is divided into the chapters listed below:

- ✔ Chapter 1: *Introduction* gets you started by describing system components and requirements.
- ✔ Chapter 2: *System Overview* details the instrument and software related to GL212 PRO.
- ✔ Chapter 3: *Setting Up Your System* walks you through the installation process.
- ✔ Chapter 4: *Capturing Images* describes how to use the GL212 PRO to capture images.
- ✔ Chapter 5: *Maintaining Your System* describes how to care for and maintain your GL212 PRO.
- ✔ Chapter 6: *Troubleshooting* offers tips if you encounter any problems with your system.
- ✔ *Warranty* reviews the warranty and repair coverage provided by Carestream Health, Inc.
- ✔ Appendix A: *Related Products* provides you information on accessories and replacement parts for your GL212 PRO.

Package Contents

When unpacking your Carestream Gel Logic 212 PRO Imaging System, please take a moment to ensure that all the necessary parts have been received. Your package should contain:

Carestream Gel Logic 212 PRO Hardware (1)

- ✔ Carestream GL212 PRO Imaging Cabinet with the Carestream GL212 PRO Camera
- ✔ GL PRO Camera/Computer Interface FireWire Cable
- ✔ Serial Communication Cable
- ✔ 590 nm Filter, 52 mm
- ✔ Filter Tool
- ✔ Carestream GL212 PRO User's Guide
- ✔ White/Black Epi-Illumination Pad Set
- ✔ Gel Tray
- ✔ UV Shield (optional accessory)
- ✔ UV Epi-illumination Modules, 370 nm, 302 nm, or 254 nm (optional accessories)
- ✔ White Light Transilluminator Module (optional accessory)

Carestream Molecular Imaging Software (1)

- ✔ Carestream Molecular Imaging Software CD (1)
- ✔ Carestream Molecular Imaging Software User's Guide (2)
- ✔ Copy Protection Device (2)
- ✔ Registration Card

  (or)

- ✔ Carestream Molecular Imaging Software Network Edition (Custom Package)
  - • Carestream Molecular Imaging Software Network Edition CD (1)
  - • Carestream Molecular Imaging Software Network Edition Administrator's Manual (1)
  - • Carestream Molecular Imaging Software User's Guide (2)

System Requirements

These are minimum specifications, however, we cannot ensure that all hardware and software systems are compatible. For optimal performance, we strongly recommend dedicating a computer exclusively for use with your imaging system.

Minimum System Requirements—Windows

- ✔ Personal computer with a USB port and IEE 1394 (FireWire) port
- ✔ Pentium IV (or equivalent) processor greater than 2 GHz is recommended
- ✔ Windows XP (Service Pack 3 or greater) or Windows Vista Business (Service Pack 1 or greater) operating system software

  ☞ NOTE: Check your operating system version by right-clicking on the My Computer icon and then on Properties.
- ✔ 17 in. display—1280 x 1024 resolution
- ✔ 2 GB recommended
- ✔ Minimum 10 GB of available hard disk space
- ✔ CD drive, CD-RW drive recommended
- ✔ TCP/IP
- ✔ Internet Explorer 7.0 or greater web browser

Minimum System Requirements—Macintosh

- ✔ Intel Macintosh with a USB port and IEE 1394 (FireWire) port
- ✔ Mac OS (10.5 or greater)

  ☞ NOTE: Check your operating system version by selecting About This Mac under the Apple menu item.
- ✔ 17 in. display—1280 x 1024 resolution
- ✔ 2 GB recommended
- ✔ Minimum of 10 GB of available hard disk space
- ✔ CD drive, CD-RW drive recommended
- ✔ TCP/IP
- ✔ Safari 3.0 or greater web browser

Technical Support

For technical support, contact Carestream Molecular Imaging Technical Support or your Carestream Molecular Imaging dealer. For up to date dealer information, visit our WEB site at mi.carestreamhealth.com. When contacting technical support, please have the following information available:

- ✔ The serial number of your GL212 PRO located on the back of the unit.
- ✔ The serial number of your GL212 PRO Camera—press Control and T buttons simultaneously when the GL212 PRO Acquire window is displayed.
- ✔ The serial number and version number of your Carestream MI software.

  ☞ NOTE: With the software running, select About MI under the Help menu (Windows) or select About MI under the Apple menu item (Macintosh).
- ✔ The type of computer you are using (make, model).
- ✔ Operating system software version.

  ☞ NOTE: Check your operating system version by right-clicking on the My Computer icon and then on Properties (Windows) or select About This Mac under the Apple menu item (Macintosh).
- ✔ The type of image you are capturing or analyzing.
- ✔ The problem you are having and what you were doing when the problem occurred. Please note the exact wording of any error messages, including any error numbers displayed.

Carestream Molecular Imaging Technical Support

Contact Carestream Molecular Imaging Technical Support by:

- ✔ Utilizing our World Wide Web support pages at:

  mi.carestreamhealth.com
- ✔ Calling Carestream Molecular Imaging Technical Support at:

  In US and Canada 877-747-4357 or world wide 203-786-5657, between the hours of 8:00 a.m. and 6:00 p.m. (Eastern Standard Time) Monday through Friday
- ✔ E-mailing Carestream Molecular Imaging Technical Support at:

  molecular-support@carestreamhealth.com
- ✔ Faxing Carestream Molecular Imaging Technical Support at:

  203-786-5656

Registering your System

It is important for you to register your Carestream Molecular Imaging System. Once registered, you will receive information on maintenance releases, upgrades, and exciting new products. Register by filling out and returning the registration card included with your software package.

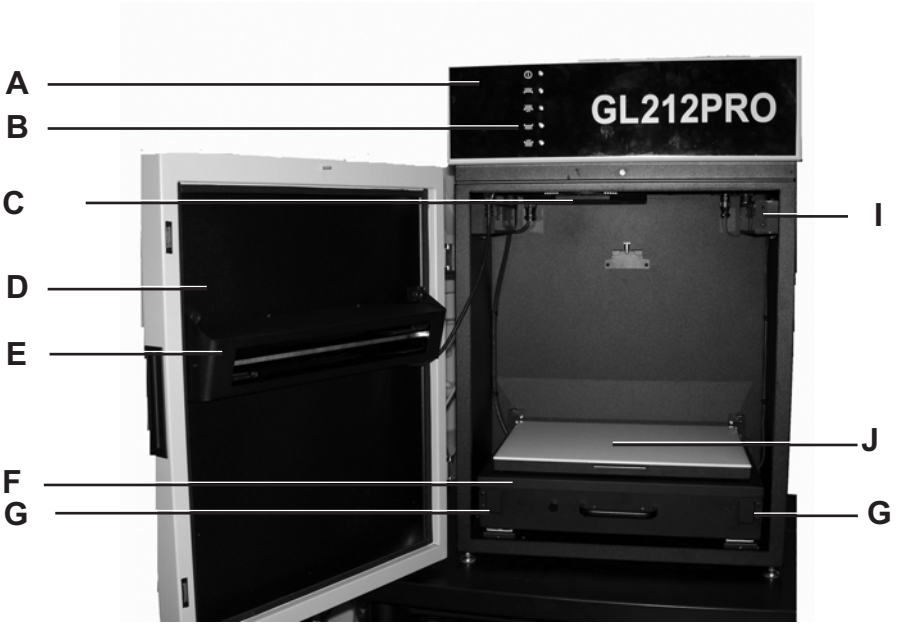
You can also register any time on-line. If your computer connects to the Internet, select Register MI from the Help menu (Windows) or Register Online from the Apple menu item (Macintosh).

System Overview

This section provides an overview of the Carestream Gel Logic 212 PRO Imaging System (GL212 PRO). You will review the principles of operation and get a better understanding of the critical components—the Carestream GL212 PRO Imaging Cabinet with accessories and the Carestream GL212 PRO Acquire Software.

The Carestream GL212 PRO Imaging Cabinet

The *Carestream GL212 PRO Imaging Cabinet* provides a a light tight environment for imaging. It is equipped with built-in white light epi-illumination for imaging opaque samples like plates and colorimetric blots. The built-in UV transillumination provides broadband UV ideal for imaging fluorescent samples like ethidium bromide stained gels. The White Light Transilluminator Accessory (optional) is an excellent way to image Coomassie gels or for densitometry of films. In addition, the Epi-illumination Modules provides the illumination needed to image thin layer chromatography plates and fluorescent stained blots. The cabinet accommodates samples up to 24.5 cm x 33 cm.



A The *GL212 PRO Camera* is mounted in the top of the imaging cabinet. The camera captures 1392 x 1032 pixel images at 12-bits per channel and image file accumulations greater than 14-bits.

B The *Indicator Display* indicates on/off status of the system and what illumination source is operating.

C The *Automated Filter Wheel* facilitates the use of up to six (6) filters. A 590 nm filter is included in the package. Additional filters including 440 nm, 535 nm, 570 nm and 670 nm are available from Carestream Molecular Imaging or your Carestream Molecular Imaging dealer (See Appendix A: *Parts and Accessories*).

D The *Imaging Cabinet Door* accesses the area under the camera, which accommodates the imaging of samples up to 24.5 x 33 cm.

E The *UV Epi-illumination Light* is an optional accessory. The light accessory is easily installed inside the GL212 PRO cabinet door. Wavelengths available include 370 nm, 306 nm or 254 nm.

DANGER—Ultraviolet radiation emitted from this product. Avoid exposure. ALWAYS WEAR PROTECTIVE CLOTHING. EXPOSURE MAY CAUSE PREMATURE AGING OF THE SKIN AND CANCER. ALWAYS WEAR PROTECTIVE EYEWEAR; FAILURE TO DO SO MAY RESULT IN SEVERE BURNS OR LONG TERM INJURY TO EYE. Never look directly into the lamp. Exposure can cause eye and skin allergy and allergic reactions. Medications or cosmetics may increase your sensitivity to ultraviolet radiation. Consult physician before operating this product if you are using medications or have a history of skin problems or believe yourself especially sensitive to sunlight. For Laboratory Use Only.

The UV source does not operate when the door is open. Do not attempt to override this feature.

F The *UV Transilluminator* provides a uniform intense (306 nm peak emission) source of ultraviolet radiation. The sample work area is 35 cm by 47 cm, however the UV image area is limited to 24.5 cm x 33 cm.

DANGER—Ultraviolet radiation emitted from this product. Avoid exposure. ALWAYS WEAR PROTECTIVE CLOTHING. EXPOSURE MAY CAUSE PREMATURE AGING OF THE SKIN AND CANCER. ALWAYS WEAR PROTECTIVE EYEWEAR; FAILURE TO DO SO MAY RESULT IN SEVERE BURNS OR LONG TERM INJURY TO EYE. Never look directly into the lamp. Exposure can cause eye and skin allergy and allergic reactions. Medications or cosmetics may increase your sensitivity to ultraviolet radiation. Consult physician before operating this product if you are using medications or have a history of skin problems or believe yourself especially sensitive to sunlight. For Laboratory Use Only.

The UV source does not operate when the door is open. Do not attempt to override this feature.

Discontinue use if the Platen is damaged or broken.

G The *UV Switch* turns on the UV transilluminator only when the optional UV Safety Shield is in place and UV Trans is selected in the GL212 PRO Acquire window. Use this feature to visualize or excise bands.

H The *UV Safety Shield (not shown, optional accessory)* is designed to limit your exposure to UV when using the UV transilluminator for non-imaging applications such as viewing gels or cutting bands.

☞ NOTE: The optional UV Safety Shield engages an inter-lock feature and allows safe viewing of the cabinet interior during UV illumination.

DANGER—Ultraviolet radiation emitted from this product. Avoid exposure. ALWAYS WEAR PROTECTIVE CLOTHING. EXPOSURE MAY CAUSE PREMATURE AGING OF THE SKIN AND CANCER. ALWAYS WEAR PROTECTIVE EYEWEAR; FAILURE TO DO SO MAY RESULT IN SEVERE BURNS OR LONG TERM INJURY TO EYE. Never look directly into the lamp. Exposure can cause eye and skin allergy and allergic reactions. Medications or cosmetics may increase your sensitivity to ultraviolet radiation. Consult physician before operating this product if you are using medications or have a history of skin problems or believe yourself especially sensitive to sunlight. For Laboratory Use Only.

The Safety Shield must be in place when the door is open and the UV Transilluminator is activated. UV will not be emitted at the Platen surface if the UV Safety Shield is not in place. Replace the UV Safety Shield if cracked or damaged.

Personal Protective Wear. If your hands are in close contact with the Platen surface or anywhere behind the UV Safety Shield, to prevent injury it is imperative that appropriate gloves be worn (i.e. nitrile). Latex gloves are also effective, however latex may present an allergic reaction in some individuals. In addition, long-sleeved lab coat or other tightly woven material will be effective in reducing UV exposures.

Protective eye wear should be worn by users when the Platen surface is pulled out.

WARNING:The Line Cord is the primary disconnect device from the AC (MAINS) supply. Always turn the Illumination Selector off and disconnect the unit from the AC (MAINS) source before performing any service.

I The *White Light Epi-illumination* floods the chamber with light and is ideal for imaging opaque samples, e.g., colorimetric stained blots or plate assays.

J The *White Light Transillumination Module* (optional accessory) provides white light transillumination that is ideal for imaging translucent samples, e.g., Coomassie stained gels or plate assays.

K The *Camera Cable Connector (not shown)* couples the GL212 PRO camera to your computer's IEEE 1394 (FireWire) with a special *Camera/Computer Interface Cable.* This cable also provides power to the camera.

☞ NOTE: The GL212 PRO requires a 6-PIN IEEE 1394 (FireWire) connection. If you are using a laptop computer with a PMCIA card, the IEEE 1394 card must be powered by an external power source.

⚠ WARNING: Use only the provided Camera/Computer Interface Cable to attach the GL212 PRO to your computer. When plugging in the IEEE 1394 cable into the computer, be sure to orient the camera cable connector properly with the narrow end pointing correctly to avoid damage to the circuitry and voiding the warranty.

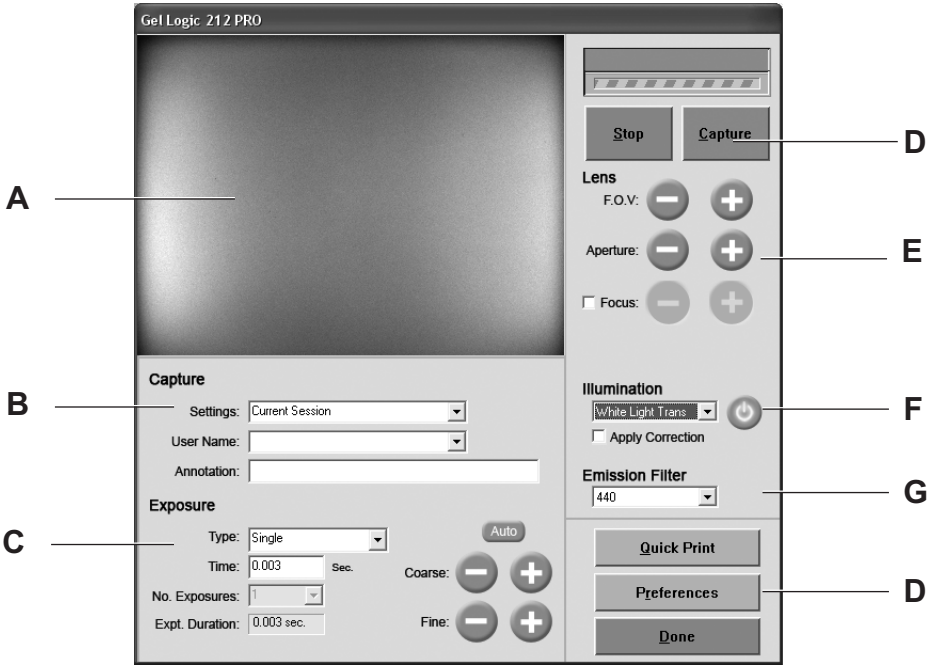
⚠ WARNING: We recommend connecting the GL212 PRO as the only device on the IEEE 1394 (FireWire) bus.

L The *Serial Communication Cable Connector (not shown)* couples the GL212 PRO Cabinet to your computer's serial port using a special S*erial Communication Cable*.

The GL212 PRO Acquire Software

The GL212 PRO Acquire window supports a wide variety of image capture methods including single capture exposure, multiple capture exposure (accumulated into a single file or as separate files), and time lapse exposures. Using these exposure modes, the minimum and maximum exposure times are 0.001 second and 16 seconds, respectively.

The GL212 PRO Acquire window is accessed from within Carestream MI. Choose Select Digital Camera from the File menu and GL212 PRO from the Digital Camera pop-up menu. The GL212 PRO Acquire window appears. Let's review.



A The *Image Preview* window displays continuous/successive "live" captures.

B The *Capture* section contains options to apply predefined settings, record your name, and add annotations on the image.

C The *Exposure* section allows you to select the various exposure options necessary to capture images, including the auto exposure mode. You can adjust exposures using the course and find adjustment buttons.

D The *Buttons* section contains the Stop, Capture, Preferences, Quick Print and Done buttons and the Progress bar and Elapsed Time text boxes, used to navigate through an image capture.

E The *Lens* section contains the FOV, Aperture and Focus settings. The FOV buttons adjusts the field of view. The Aperture regulates the amount of light reaching lens for an exposure. The Focus enables you to adjust focus for varying sample types.

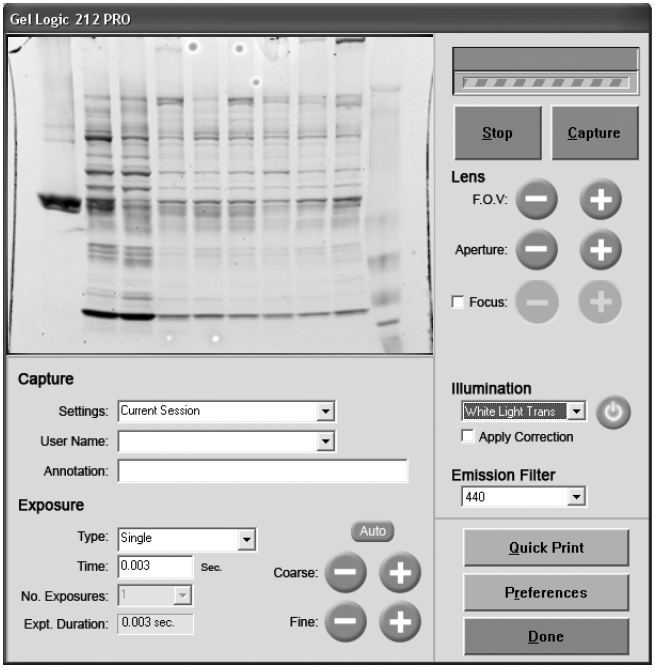
F The *Illumination* sections contains the pop-up menu in which you select your illumination type. White light epi-illumination and UV transillumination are provided as standard illumination modes. White light transillumination and UV epi-illumination modules are available as optional accessories.

G The *Emission Filter* section selects the filter you wish to use. A 590 nm filter is included in the package. It is especially designed to eliminate light other than 590 nm wavelength produced by ethidium bromide (or other similar emission wavelength). Additional filters including 440 nm, 535 nm, 570 nm and 670 nm are available from Carestream Molecular Imaging or your Carestream Molecular Imaging dealer (See Appendix A: *Parts and Accessories*).

The GL212 PRO Image Preview

When the GL212 PRO dialog box is open the preview initiates the “live” stream of single capture images in the Image Preview window. The Progress bar become active and provide feedback on the current capture. The Preview ON/OFF is a toggle switch.

Preview is used primarily for optimizing your capture conditions including sample placement, aperture, field of view (FOV), and exposure time. While previewing a capture, the focus options are accessible (See *Using the Focusing Tool* in Chapter 4: *Capturing Images*).



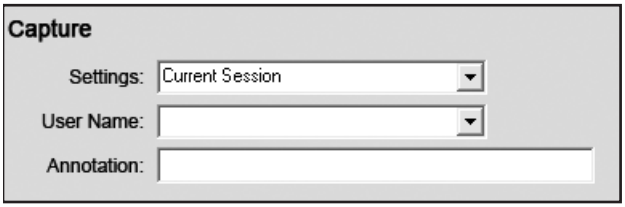
☞ NOTE: If you have selected a rotation preference, the preview will not reflect the rotation setting. The rotations are performed upon image capture and display after submission to Carestream MI.

The preview will continuously take and display images until you click the Capture or Quick Print button.

- ✔ The *Capture* button captures an image subject to the user, exposure, and zoom settings. The image opens as a new Carestream MI project.
- ✔ The *Quick Print* button sends the captured image directly to the default printer without saving to disk.

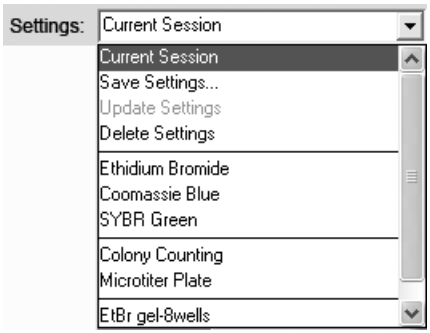
Capture Section of the GL212 PRO Acquire Window

The Capture section of the GL212 PRO window contains the Settings, User Name, and Annotation options. Let's review each option:



Settings

You can speed up the capture process by creating custom capture settings for the various types of experiments or for specific personal preferences. Once saved, these settings can be conveniently applied to future image captures.



You can make modifications to the settings (i.e., change exposure time) or delete a setting using the Update Settings or Delete Settings option, respectively. The Settings pop-up menu also contains a number of factory-defined settings useful for common laboratory imaging applications.

Saved settings include:

- ✔ Type
- ✔ Exposure time
- ✔ Number of exposures
- ✔ Illumination correction
- ✔ Image orientation
- ✔ Preferences selections
- ✔ Saturation levels

☞ NOTE: The Settings option does not save the user name or annotations.

☞ NOTE: Custom settings are saved as individual files in C:\Program Files\Molecular Imaging\ MI\Application\GL_212_\GL_212_Settings (Windows) or in the Molecular Imaging\MI\Application\MI Extensions\GL_212_Settings (Macintosh) subfolders.

User Name

Use the User Name text edit box to type in your name. To save your name for future experiments, choose Add User from the pop-up menu. The name appears in the menu. Names can be deleted in the same manner by choosing Delete User.

Annotations

You can tag your image with an Annotation bar with up to 48 characters of text. In addition, the Annotation bar lists the time and date of the image capture, the exposure time, and the illumination source. The text appears on the long axis at the top of the page.

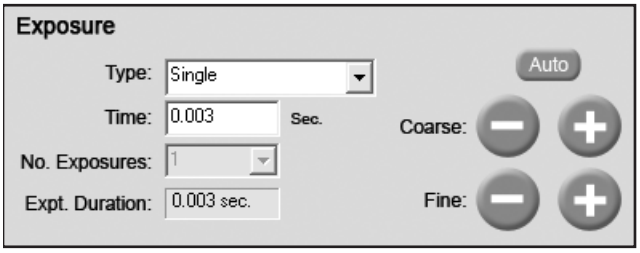
All items in the Annotation bar are separate objects and can be displayed in the Annotations window. This allows you to edit the text, change the font style, color, or size prior to printing. The contents are grouped, therefore, you must ungroup these objects prior to editing.

☞ NOTE: Each time you capture an image, the Annotations text edit box is cleared. Annotations are not saved with Custom Settings.

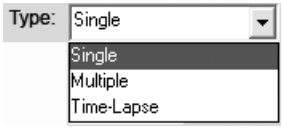
☞ NOTE: Display or hide the Annotation bar by selecting the Show Annotation bar from within the Annotations panel.

Exposure Section of the GL212 PRO Acquire Window

You can define the exposure parameters using the Exposure section of the GL212 PRO Acquire window. Select the type of exposure, exposure time, and number of exposures.



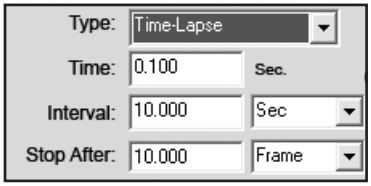
The Exposure Type Options



The Type pop-up menu defines the type of exposure. You can choose to take a single, multiple or time lapse exposure. Using these exposure modes, the minimum and maximum exposure times are 0.001 second and 16 seconds, respectively.

- ✔ *Single Exposure* takes one 12-bit image. After capture, the image file automatically opens as an Carestream MI project.
- ✔ *Multiple Exposure (Final Accumulation)* adds successive captures into a single accumulated image. The maximum number of images accumulated is 32 generating up to a 14-bit image file. The final accumulated image is automatically opened as an Carestream MI project.

  These accumulated images expand the dynamic range of signal you can capture for more quantitative accuracy while also improving detection sensitivity.
- ✔ *Time Lapse Exposure* provides exposures at set intervals. You can set the exposure time, the time lapse interval, the total exposure time, and the total number of images. Each file is automatically saved to your hard drive.



— The *Exposure Time* defines the exposure. The minimum and maximum exposure times are 0.001 seconds per frame and 16 seconds per frame, respectively. The minimal increment is 0.001 second.

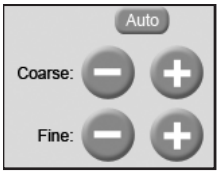
— The *Coarse* and *Fine Exposure* arrows allow you to adjust the exposure time in either coarse or fine increments. This eliminates the need for you to use your keyboard.

— The *Interval* is the time interval between the beginning of one exposure and the beginning of the next exposure. The minimum and maximum intervals are 5 seconds and 24 hours, respectively.

— *Stop After* determines when to stop time lapse captures. You can set stop criteria based on experimental duration or by the number of frames. The maximum duration time is 200 hours. The maximum number of image frames that may be captured is 100.

The Exposure Time

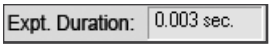
The Exposure Time text edit box defines the exposure. The minimum and maximum exposure times are 0.001 second per exposure and 16 seconds per exposure, respectively. The time units can be set as seconds or minutes. The minimum increment is 0.001 second for short exposures.



Use the Auto Exposure button for automated exposure determination.

Use the Coarse and Fine Exposure arrows to adjust the exposure time in either coarse or fine increments. This eliminates the need for you to use your keyboard.

When you have selected Multiple Exposure Type, you can accumulate up to 32 captures into a single image. This is especially useful when you have faint signal. You select the number of exposures by typing in a value or by selecting one of the predefined options from the pop-up menu.



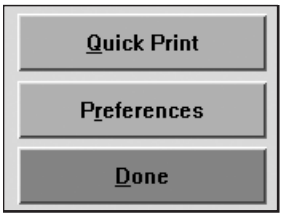
The Expt Duration indicates the total capture duration in hours. The software will automatically calculate the total duration of the exposure based on the number of exposures and the time of each exposure.

Buttons on the GL212 PRO Acquire Window

The buttons on the GL212 PRO Acquire window execute functions. Let's review.

The *Preview/Stop* button initiates the Preview mode. When the Preview is running the button toggles to the Stop button.

The *Capture* button initiates image acquisition. Once acquired, files can be analyzed, annotated, and printed.



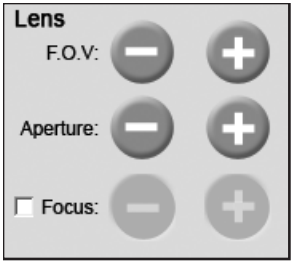
The *Quick Print* button sends the image directly to your printer and no copy of the image is saved.

The *Preferences* button opens the GL212 PRO. Preferences window is where you can customize certain capture parameters. The GL212 PRO Preferences window is described in more detail later in this chapter.

The *Done* button closes the GL212 PRO Acquire window and returns you to Carestream MI.

Lens Section of the GL212 PRO Acquire Window

The GL212 PRO camera lens is computer controlled.



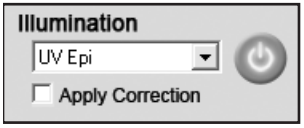
The *Field of View (F.O.V)* buttons adjusts the field of view setting of the lens.

The *Aperture* buttons regulates the amount of light reaching the sensor for an exposure.

The *Focus* buttons adjusts the focus of the lens. The *Focus* checkbox accesses the software-assisted focusing aid that is described in *Using the Focusing Tool* in Chapter 4: *Capturing Images*.

Illumination Section of the GL212 PRO Acquire Window

After selecting the type of exposures you want to take from the Type pop-up menu, the exposure setting section updates with the appropriate text and checkboxes for that type of capture. The GL212 PRO can image up to a 24.5 x 33 cm area.



Illumination Pop-Up Menu

White Light Trans using the White Light Transilluminator Module, an optional accessory is ideal illumination for non-opaque samples (plates and visible dye stained gels).

UV Trans is ideal illumination for providing illumination of fluorescently stained images (i.e., ethidium bromide, SYBR Green).

White Light Epi is ideal illumination for imaging samples such as plates and blots.

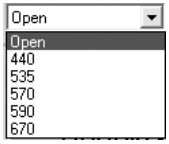
UV Epi is ideal illumination for imaging samples like TLC plates. This is an optional accessory. Wavelengths available include 370 nm, 306 nm, and 254 nm.

Apply Correction Checkbox

Use the *Apply Correction* checkbox to generate and apply an illumination correction. To correct for uneven illumination and improve the quality of your data, an illumination reference can be used. The nonuniformity in the illumination generated by the UV bulbs or white light is highly reproducible and may be corrected by simply dividing the image by an illumination reference image. The exposure settings used to capture the image must match those used to create an illumination reference image. Please note that the illumination reference image cannot contain saturated pixels.

Emission Filter Section of the GL212 PRO Acquire Window

Selecting a filter may optimize the fluorescent signal by discriminating against background and/or differentiating between multiple fluorochromes within the experimental sample.



The *Filter pop-up menu* selects the emission filter used during capture.

The system includes a 590 nm band pass filter. The 590 nm filter is specially designed to eliminate light other than 590 nm wavelength produced by ethidium bromide (or other similar emission wavelength) stained samples. It permits maximum sample detection sensitivity by minimizing background. Additional filters including 440 nm, 535 nm, 570 nm and 670 nm are available from Carestream Molecular Imaging or your Carestream Molecular Imaging dealer (See Appendix A: *Parts and Accessories*).

The GL212 PRO Preferences Dialog Box

You can choose a variety of options using the GL212 PRO Preferences dialog box. Let's review the dialog box options:

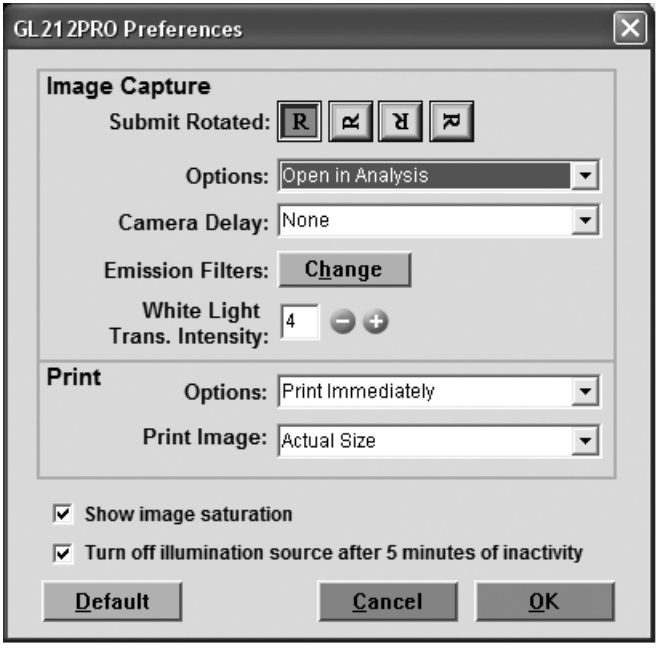


Image Capture Preferences

The Image Capture Preferences allows you to select:

✔ *Submit Rotated*—provides the option of automatically rotating a newly captured image to a desired orientation, as they are downloaded from the camera.


The image is in the default orientation.


Rotate the image 90˚ counterclockwise.

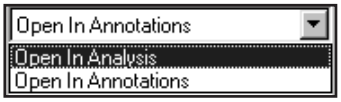

Rotate the image 180˚.


Rotate the image 90˚ clockwise.

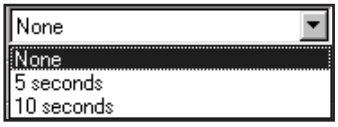
☞ NOTE: The Rotation buttons do not change the orientation of the preview image. The rotation occurs during submission of the image to Carestream MI.

☞ NOTE: Rotation events are documented in the History tab of the Lane Information window, since rotations are destructive to the original data file.

✔ *Options*—You can choose to open images after capture in either Carestream MI Analysis panel or Annotations panel.

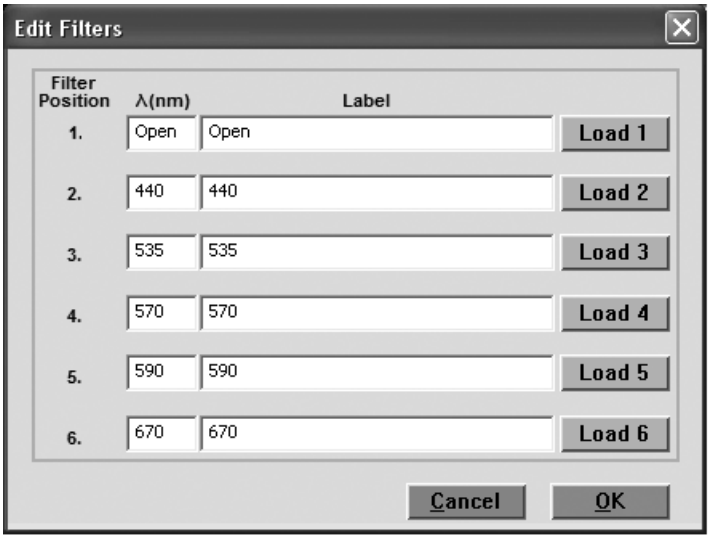


✔ *Camera Delay*—configures the GL212 PRO camera to take a picture with 5 or 10 second delay. This delay occurs after the capture command is executed and before the actual picture is taken. Choose the time in the Camera Delay pop-up menu.

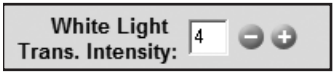


☞ NOTE: This option is useful in situations when light tables take several seconds to become completely illuminated.

✔ *Emission Filters Change button* access the Edit Filters dialog box where you can load or change position of filters.



White Light Transillumination Intensity



The White Light Transillumination Intensity allows you to set the intensity of light used in the illuminator.

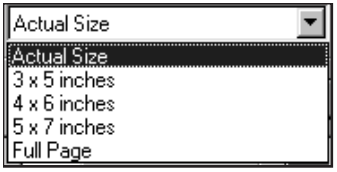
Print Preferences

The Quick Print feature is used when a printed copy is all that you require. When you click Quick Print, an image is captured and sent directly to your printer. The Printing Preferences allows you to control the various print options from within the GL212 PRO window.

The Options pop-up menu allows you to select:

Print Immediately bypasses the standard Print dialog box and immediately prints the image on the current default printer. Once printed, the file is deleted.

Open Print Dialog opens the Print dialog box where you can select print parameters. Once printed, the file is deleted.



The *Print Image* pop-up menu sets the image size. By default, the image is printed at *Actual Size* (1X). Alternatively, chose an image size of *3 x 5 in, 4 x 6 in, 5 x 7 in* or *Full Page*.

Show Saturation Checkbox

Click the Show Saturation checkbox to turn image pixels red when the pixel is saturated. Saturated pixels adversely affect the quality of your image analysis since the signal readings do not accurately measure intensity. Use this option to aid you in selecting the ideal exposure conditions (aperture and exposure time).

Warning Preference

You can set a reminder to display on-screen to remind you to turn off your illumination.

Click OK when you have finished setting your preferences.

Setting Up Your System

In this chapter you will learn how to set up your system so that you can begin taking pictures.

- ✔ The GL212 PRO digital CCD camera provides mega pixel resolution that allows you to resolve closely spaced bands. In addition, the scientific grade sensor can integrate frames provides outstanding dynamic range and increase sensitivity.
- ✔ The GL212 PRO Acquire Software is integrated into Carestream MI and controls the camera during image capture and printing. Once acquired, images can be analyzed, annotated, and saved from within Carestream MI.
- ✔ The GL212 PRO Imaging Cabinet may be equipped with both transillumination and epi-illumination for both white and UV light. The cabinet maintains a light-tight environment and optimal focal length to image a wide variety of samples.
- ✔ The GL212 PRO automated zoom lens achieves proper focus and field of view for gels ranging from 4.25 x 6.0 cm to 24.5 x 33 cm.
- ✔ The 590 nm filter is specially designed to eliminate light other than 590 nm wavelength produced by ethidium bromide (or other similar emission wavelength) stained samples. It permits maximum sample detection sensitivity by minimizing background.
- ✔ White/Black Backdrop Screen positioned in the Gel Tray provides good non-reflective surfaces for capturing epi-illuminated images.
- ✔ The Gel Tray supports the White/Black Backdrop Screen and also provides a gel cutting surface for excising bands from your gel when using the optional UV Safety Shield.
- ✔ The White Light Transillumination Module (optional accessory) provides white light transillumination that is ideal for imaging translucent samples, e.g., Coomassie stained gels or plate assays.
- ✔ The UV Epi-illumination Light Modules are optional accessory. The light accessory is easily installed inside the GL212 PRO Imaging Cabinet door. Wavelengths available include 370 nm, 306 nm or 254 nm.
- ✔ The UV Safety Shield (optional accessory) is designed to protect you from UV when using the UV transilluminator for non-imaging applications such as viewing gels or cutting bands.

Environmental Requirements

The GL212 PRO designed to operate effectively within the temperature and humidity ranges typically found in laboratories. For effective operation, the temperature and relative humidity should be:

- ✔ Temperature: 18° to 28° C
- ✔ Relative Humidity: < 75%, non-condensing
- ✔ Altitude: This product is designed for use at altitudes up to 2000 meters.

This product is designed for indoor use only. This product meets Pollution Degree 2 standards in accordance with IEC 664.

Electrical Requirements

There are several versions of the GL212 PRO available:

- ✔ 120VAC*, 60Hz, 2A
- ✔ 230VAC*, 50Hz, 2A

* Supply voltage fluctuations should not to exceed ± 10%.

This product is designed to withstand transient over voltage according to Installation Category II.

Refer to your computer operators's manual for its electrical requirements.

Space Requirements

The GL212 PRO overall weight and dimensions are as follows:

- ✔ 54.6 cm (21.5 inches) length and 42 cm (16.5) deep and 62.6 cm (24.6 inches) high
- ✔ 57.1 kg (125.6 pounds)

We recommend that the instrument and computer be placed on a bench or table that is level and capable of supporting 68 kg(150 pounds), located not more than 3 feet (91 cm) from an electrical outlet.

The GL212 PRO, including computer CPU, monitor and keyboard, requires a minimum space 48 inches wide, 20 inches deep and 35 inches high (122 cm x 51 cm x 69 cm). These dimensions do not allow for a printer or other peripheral device.

Additional space adjacent to, above or behind the GL212 PRO will allow for easier operation.

Installing the Carestream Molecular Imaging Software—Windows

Any prior versions of MI, 1D and/or camera software that are loaded on the computer must be uninstalled prior to installation. If you are a new user, proceed to *Carestream Molecular Imaging Software Installation—Windows.* Windows Vista and Windows XP installations may require administrator privileges.

If you have purchased the Carestream Molecular Imaging Software Network Edition (Carestream MI NE) to use with your GL212 PRO:

- ✔ Follow the instructions in the Carestream Molecular Imaging Software Network Edition Administrator's Manual to install Carestream MI NE Software.
- ✔ Then proceed to *Launching Carestream Molecular Imaging Software for the First Time*, later in this chapter.

If you have purchased the Carestream Molecular Imaging Software, Regulatory Edition with Network Licensing (Carestream MI RE) to use with your Gel Logic 212 PRO Imaging System:

- ✔ Follow the instructions in the Carestream Molecular Imaging Software, Regulatory Edition Network Administrator's Manual to install Carestream MI RE Software.
- ✔ Then proceed to proceed to *Launching Molecular Imaging Software for the First Time*, later in this chapter.

Uninstalling a Previous Version MI or 1D Software—Windows

1 Remove your MI or 1D copy protection device from your computer.

2 Inactivate any virus protection software.

☞ NOTE: Norton Utilities and Norton Antivirus software must be deactivated before you uninstall the software. The software might not uninstall properly with the virus protection left running. After installation, you can restart your virus protection software.

3 Close all software applications that may be running on your computer.

☞ NOTE: Cameras should not be connected to the computer while uninstalling the software.

4 Move any customized standards or templates and any projects from their respective subfolders in your existing MI or1D X.X folder to a temporary folder outside the MI or 1D folder. If you are currently using the MI database, also move the database folder.

5 Uninstall previous version(s) of MI or 1D Software.

- ✔ Uninstall MI by choosing Control Panel from the Start menu and Add/Remove Programs (Windows XP) or Uninstall a Program from the Program menu (Windows Vista). Scroll to locate MI X.X. Click to select. Click the Add/Remove button (Windows XP) or Uninstall/Change (Windows Vista) and follow the on-screen instructions to uninstall. You can also uninstall the application using your MI CD. The installer shield automatically detects that you have the software loaded and offers an uninstall option. A window informs you as each software has successfully been removed.
- ✔ Uninstall 1D by choosing Programs from the Start menu and selecting Remove 1D X.X from the 1D X.X submenu.
- ✔ Uninstall MI NE or 1D NE following the instructions provided in your Network Administrator's Manual.

6 Uninstall additional software (Windows XP) by choosing Control Panel from the Start menu and Add/Remove Programs or Uninstall a Program from the Program menu (Windows Vista). Scroll to locate Sentinel System Driver. Click to select. Click the Add/Remove button (Windows XP) or Uninstall/Change (Windows Vista) and follow the on-screen instructions to uninstall. A window informs you as each software has successfully been removed.

☞ NOTE: Automated uninstall features on some systems may not remove all previous program elements. Check drives for residual folders and files. Manual deletion of these folders and files may be necessary.

7 Restart your computer.

8 Proceed to *Carestream Molecular Imaging Software Installation—Windows.*

Carestream Molecular Imaging Software Installation—Windows

Carestream Molecular Imaging Software is installed like most Windows application programs and requires administrator privileges.

1 Inactivate any virus protection software.

☞ NOTE: Norton Utilities and Norton Antivirus software must be deactivated before you install the software. The installation might not run properly with the virus protection left running. After installation, you can restart your virus protection software.

2 Close all software applications that may be running on your computer.

☞ NOTE: Cameras should not be connected to the computer while installing the software.

☞ NOTE: Remove any copy protection devices attached to your computer during installation.

3 Insert the Carestream Molecular Imaging Software Version 5.X CD into your CD drive and double-click on the Carestream MI SE Installer.exe icon to launch the installer.

☞ NOTE: To install Carestream MI 5.X on Windows Vista, right-click on the Installer and select Run as Administrator. In the User Account Control pop up menu, select All, to obtain administrator privileges to allow the installer to run.

4 The installer leads you through the installation process. Make sure to select the Complete Setup to install the software in the default directory to ensure full functionality of the system.

☞ NOTE: The Select Components window allows you to install Carestream MI without the database. Only install the database in the location that you want to maintain images acquired from the system.

5 While the software installation is occurring, complete your Carestream MI Software Registration Card and return the card by mail. This ensures that you receive information on new software releases, periodic maintenance releases, and technical bulletins.

6 A dialog box appears when the installation is complete. Select the option to restart the computer and click Finish.

7 Proceed to *Copy Protection Device Installation—Windows.*

Copy Protection Device Installation—Windows

Carestream MI is copy protected using a device that plugs into the USB port of your computer. It will not launch unless this device is attached to your computer. If you are installing the system for the first time, locate and install the copy protection device according to the instructions below. If you are upgrading your system, your package may or may not contain a new copy protection device.

To install the copy protection device:

1 Plug the copy protection device into a USB port of your computer. Please make sure that the connection is secure.

☞ NOTE: Windows XP Users: A Welcome to the Found New Found Hardware Wizard dialog box appears on screen. You will be asked if you want the Windows update to search for software. Click No not at this time and advance through the installation wizard.

☞ NOTE: Windows Vista Users: Installing Device Driver Software dialog box will appear in the lower right hand corner. Upon completing installation, a message appears informing you that Rainbow USB Superpro Device Driver Software installed successfully.

☞ NOTE: If you are upgrading from a previous version of the MI or 1D Software and received a new copy protection device, you must attach both the old and new copy protection devices to your computer. After you launch the newest version for the first time, your old copy protection device is be deactivated. Remove and discard the old key.

☞ NOTE: If your computer has multiple USB ports, you can plug the copy protection device into any of them. The software, when launched, checks all available USB ports.

2 Proceed to *Windows Power Settings*, later in this chapter.

Windows Power Settings

The GL212 PRO requires that your computer Energy Saver features be disabled. This process by may differ depending upon the Windows software installed.

Windows XP

1. Click the Power Options icon from the Start menu and the Control Panel.
2. Click Power Schemes tab and select Always On from the Power Schemes pop-up menu.
3. The settings for Turn off monitor, Turn off hard disks, System standby and System hibernates functions become *Never.*
4. Click OK and proceed to *Launching Carestream Molecular Imaging Software for the First Time.*

Windows Vista

1. Select System and Maintenance from the Start menu and the Control Panel.
2. Click Power Options, select to Create a power plan and choose High Performance from the list of protocols.
3. Proceed to *Launching Carestream Molecular Imaging Software for the First Time.*

Installing the Carestream Molecular Imaging Software—Macintosh

Any prior versions of MI, 1D or camera software that are loaded on the computer must be uninstalled prior to installation. If you are a new user, proceed to *Carestream Molecular Imaging Software Installation—Macintosh.* Macintosh OS X installations may require authentication of permissions.

If you have purchased the Carestream Molecular Imaging Software Network Edition (Carestream MI NE) to use with your Carestream Gel Logic 212 PRO Imaging System:

- ✔ Follow the instructions in the Carestream Molecular Imaging Software Network Edition Administrator's Manual to install Carestream MI NE Software.
- ✔ Then proceed to *Launching Carestream Molecular Imaging Software for the First Time*, later in this chapter.

If you have purchased the Carestream Molecular Imaging Software, Regulatory Edition with Network Licensing (Carestream MI RE) to use with your GL212 PRO:

- ✔ Follow the instructions in the Carestream Molecular Imaging Software, Regulatory Edition Network Administrator's Manual to install Carestream MI RE Software.
- ✔ Then proceed to *Launching Carestream Molecular Imaging Software for the First Time*, later in this chapter.

Uninstalling a Previous Version of MI or 1D Software—Macintosh

1. Remove your MI or 1D copy protection device from your computer.
2. Inactivate any virus protection software.

   ☞ NOTE: Norton Utilities and Norton Antivirus software must be deactivated before you uninstall the software. The software might not uninstall properly with the virus protection left running. After installation, you can restart your virus protection software.

3. Close all software applications that may be running on your computer.

   ☞ NOTE: Cameras should not be connected to the computer while uninstalling the software.

4. Move any customized standards or templates and any projects from their respective subfolders in your existing MI X.X or 1D X.X folder to a temporary folder outside the folder. If you are currently using the MI database, also move the database folder. Click the Applications folder and locate the database folder labeled GMPDB located in the MI folder and the KodakAdminPortal subfolder.
5. Place the MI X.X or 1D X.X folder in the Trash.

   ☞ NOTE: If uninstalling MI version 4.5 or greater, double-click the uninstall application in the Applications folder and the MI subfolder. Follow the on-screen instructions to uninstall MI.

6. Restart your computer.
7. Empty the Trash.
8. Proceed to *Carestream Molecular Imaging Software Installation—Macintosh.*

Carestream Molecular Imaging Software Installation—Macintosh

1 Inactivate any virus protection software.

☞ NOTE: Norton Utilities and Norton Antivirus software must be deactivated before you install the software. The installation might not run properly with the virus protection left running. After installation, you can restart your virus protection software.

2 Close all software applications that might be running on your computer.

☞ NOTE: Cameras should not be connected to the computer while installing the software.

☞ NOTE: Remove any copy protection devices attached to your computer during installation.

3 Insert the Carestream Molecular Imaging Software Version 5.X CD into your CD drive and double-click the Carestream MI SE Installer.mpkg icon to launch the installer application.

4 The installer leads you through the installation process. Make sure to select the Easy Install to install the software in the default directory and ensure full functionality of the system.

☞ NOTE: The Select Components window allows you to install MI without the database. Only install the database in the location that you want to maintain images acquired from the system.

5 While the software installation is occurring, complete your Carestream MI Software Registration Card and return the card by mail. This process takes only a few minutes to complete and ensures that you receive information regarding new software releases, periodic maintenance releases, and technical bulletins.

6 The installer notifies you when the installation is complete. Click Restart.

7 Proceed to *Copy Protection Device Installation—Macintosh.*

Copy Protection Device Installation—Macintosh

Carestream Molecular Imaging Software is copy protected using a device that plugs into the USB port of your computer. Carestream MI will not launch unless this device is attached to your computer. If you are installing the system for the first time, locate and install the copy protection device according to the instructions below. If you are upgrading your system, your package may or may not contain a new copy protection device.

To install the copy protection device:

1. Plug the copy protection device into a USB port of your computer. Please make sure that the connection is secure.

   ☞ NOTE: If you are upgrading from a previous version of the MI or 1D Software and received a new copy protection device, you must attach both the old and new copy protection devices to your computer. After you launch the newest version for the first time, your old copy protection device is deactivated. Remove and discard the old key.

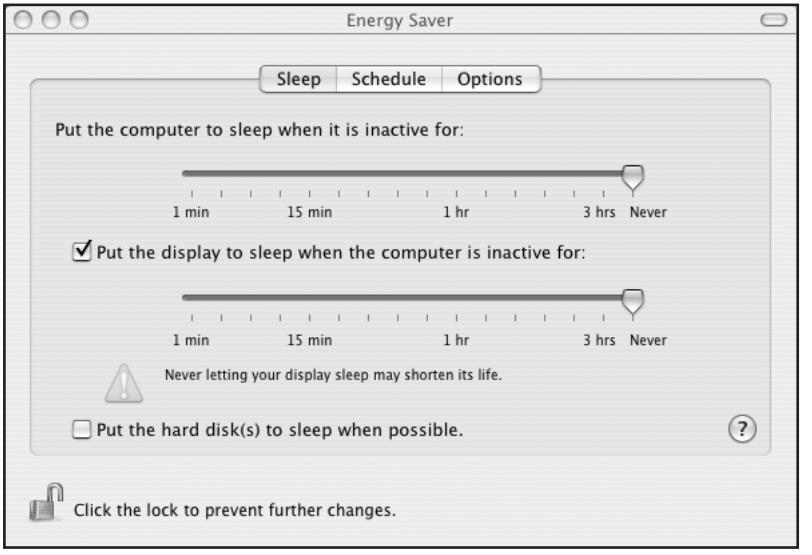
2. Proceed to *Macintosh Power Settings*.

Macintosh Power Settings

The GL212 PRO requires that the Energy Saver settings on your computer be disabled.

To disable the system sleep features:

1 Choose Energy Saver from the File menu and the System Preferences submenu or from System Preferences on the Dock. The Energy Saver window opens.



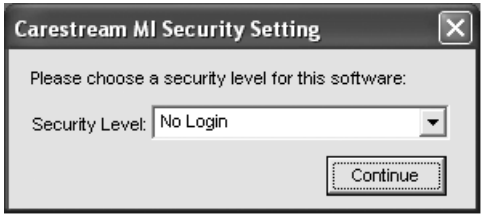
2 Click the Sleep tab and set the Computer and Display sleep sliders to Never. Ensure the Put the hard disk(s) to sleep when possible checkbox is unchecked.

3 Proceed to *Launching Carestream Molecular Imaging Software for the First Time.*

Launching Carestream Molecular Imaging Software for the First Time

1 Launch Carestream MI software by clicking on the MI icon found on the desktop.

2 The Carestream MI Security Setup dialog box appears. You must select either *No Login* or *Login Required* from the pop-up menu. Click Continue.



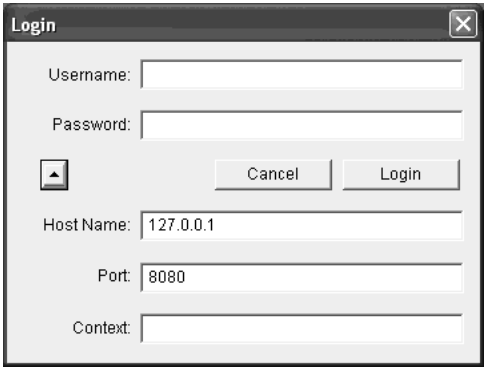
☞ NOTE: The selected Carestream MI Security feature applies to your new Carestream MI installation for all users.

✔ In *No Login Mode*—all users gain access to Carestream MI bypassing the login screen.

✔ In *Password Mode*—requires you to enter your User Name and Password every time Carestream MI starts up.

☞ NOTE: The initial installation of Carestream MI comes with a single user with the User Name “Admin” and the Password “password”. Use this User name to gain access to Carestream MI Image Database to set up users.

3 The Login window appears. Enter “Admin” as the Username and “password” as the Password. The Host Name default value will cause Carestream MI to search your local drive for the Carestream MI database. If the Carestream MI database is located on another machine or file server, enter the IP address of that machine in the Host Name field. Click Login.



☞ NOTE: The initial installation of Carestream MI comes with a single user with the User Name “Admin” and the Password “password”. Use this User name to gain access to Carestream MI Image Database to set up users.

☞ NOTE: If no Carestream MI database is detected at the Host Name location, you will be asked if you would like to continue without connection to a database.

4 If you selected No Login in the Carestream MI Security Setup dialog box, future launches of Carestream MI will skip the login windows and open to a Carestream MI Project window. Proceed to Step 6 to enter your User Name, Company and Carestream MI Software serial number.

5 If you selected Login Required in the Carestream MI Security Setup dialog box, you will be prompted to contact database administrator. Click OK to open Carestream MI. Future launches of Carestream MI will require both Username and Password to gain access to Carestream MI and the Carestream MI database.

6 Type your Name and Organization in the boxes provided.

7 Enter your Serial Number exactly (including dashes) as provided on your registration card or serial number card included in your Carestream MI package.

☞ NOTE: The serial number is required when installing Carestream MI or when contacting Carestream Molecular Imaging Technical Support. Keep the serial number in a safe location.

8 Click OK. The Carestream MI Project window appears. Your installation is complete.

☞ NOTE: Previous MI or 1D users may move any customized standards or templates, any projects, and database folders back into the new MI folder.

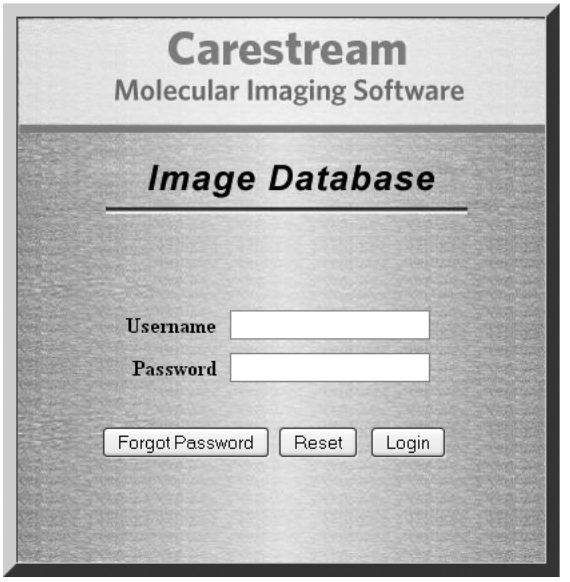
☞ NOTE: If you selected Login Required in the Carestream MI Security Setup dialog box when Carestream MI was first launched, you can set up User Names and Passwords for each Carestream MI user. Proceed to *Carestream MI Image Database*, later in this chapter.

Carestream MI Image Database

The initial installation of Carestream MI comes with a single user with the User Name “Admin” and the Password “password”. Use this User name to gain access to Carestream MI Image Database to set up additional users.

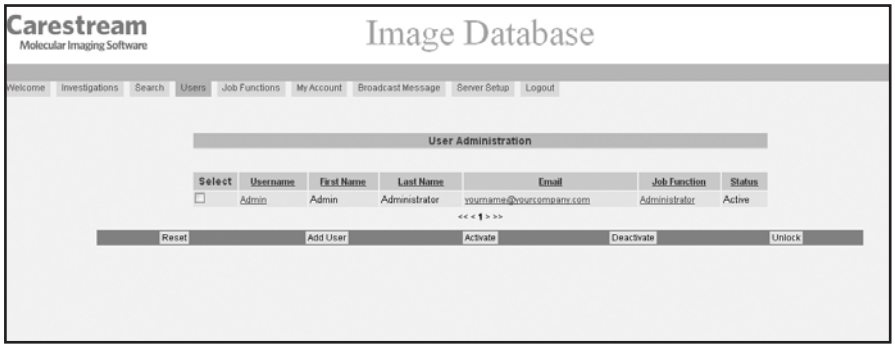
1 Select Database from the Navigation panel.

2 Your web browser launches and displays the Image Database window opens.



3 Select the default Username, “Admin”, type the Password “password” (No quotation marks) and click Login.

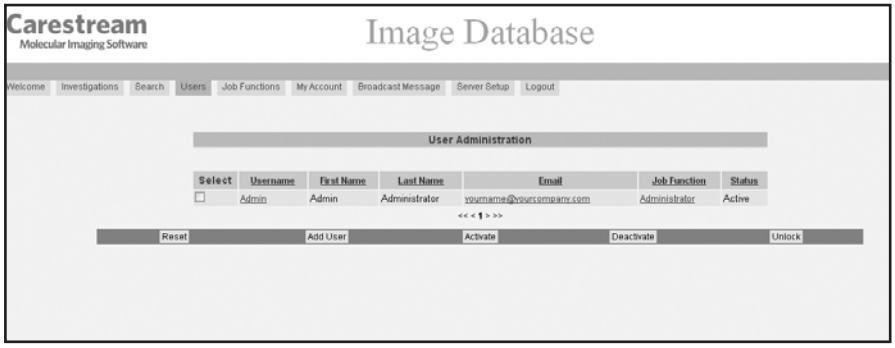
4 Click the Users tab to access the User Administration page, where you can add users. Select Add Users.



5 The User Information page appears. Fill out the information including First Name, Last Name, Username (enter a temporary password), Password, Job Function (Administrator, Principal Investigator, Research Scientist), an e-mail address. Click Create.

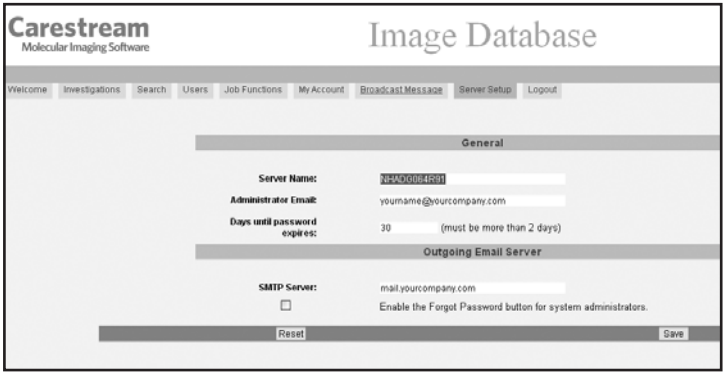
☞ NOTE: New users are automatically added to the default Investigation and default Study.

6 You may want to take some time to click on the Server Setup button to give your database server a name and specify a SMTP mail server.

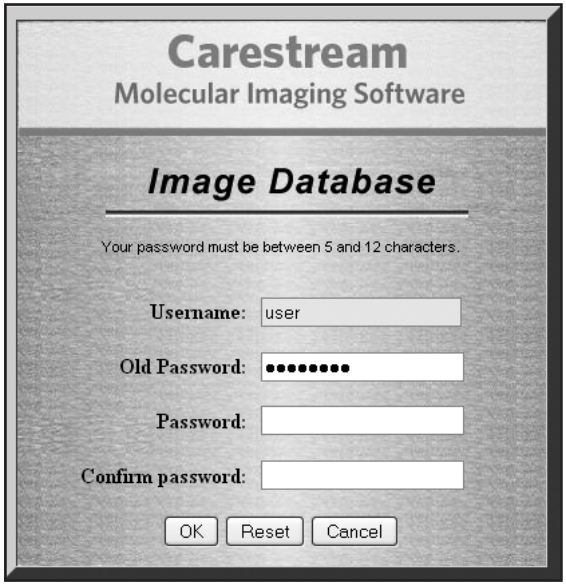


- ✔ *Server ID*—is a unique name for your machine. The Server ID can either be a name or number.
- ✔ Administrator E-mail—this indicates the e-mail address of the Administrators's.
- ✔ *Days until password expire*—allows administrators to determine how frequently passwords expire. When a user password expires, you will be prompted to enter a new password. the minimum is 2 days.
- ✔ *SMTP Server*—This mail server can be used for sending out e-mails and broadcasting messages. This is a mandatory field that must be entered. The SMTP mail server is required when users click the Forgot Password button.
- ✔ If the checkbox *Enable the forget password button* for administrator is checked. A user with system administrator privileges can use the forget password function.

7 An additional feature of Carestream MI Image Database is the ability to broadcast e-mail messages to users. Administrators can enter a subject and message in the fields provided and click Send. All users receive the broadcast message. To send/receive a message, the user must have a valid e-mail address entered.



8 Click Logout to exit Carestream MI Image Database. On the next restart of Carestream MI, new users must enter their username and password. The user will then be prompted to access the web portal to change their password.



9 Shut down Carestream MI and your computer. Proceed to *Installing the Carestream Gel Logic 212 PRO Imaging System.*

Installing the Carestream Gel Logic 212 PRO Imaging System

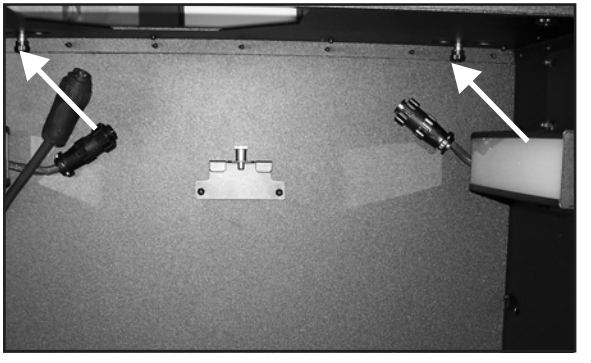
The GL212 PRO has been designed to eliminate the need to take pictures in a darkroom. The set-up is designed to only take a few minutes. So let's begin.

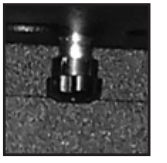
WARNING: Do not plug the Camera/Computer Interface Cable or the Communication Cable into the computer unless Carestream Molecular Imaging Software has been installed. (See *Installing the Software—Windows* or *Installing the Software—Macintosh*, later in this chapter).

WARNING: The power cord is the primary disconnect device from the AC (MAINS) outlet. Do not connect the unit to the AC (MAINS) outlet until installation is complete.

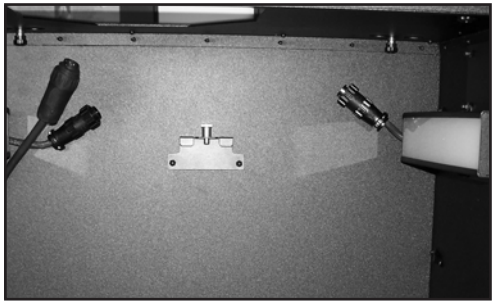
Installing the GL212 PRO Imaging Hardware

1. Remove the base GL212 PRO Imaging Cabinet and GL212 Camera Module from the shipping container. Remove packing materials.
2. Verify components listed in *Package Contents* in Chapter 1: *Introduction* of this User's Guide.
3. Position the base cabinet next to your computer.
4. Use the wrench provided to level the unit on your lab bench. Verify that the cabinet door clears the table.
5. Open the door of the GL212 PRO Imaging Cabinet. Carefully set the GL212 PRO Camera Module on top of the imaging cabinet.
6. Secure the GL212 PRO Camera Module to the cabinet by tightening the four (4) thumbscrews installed on the ceiling of the cabinet (two shown).

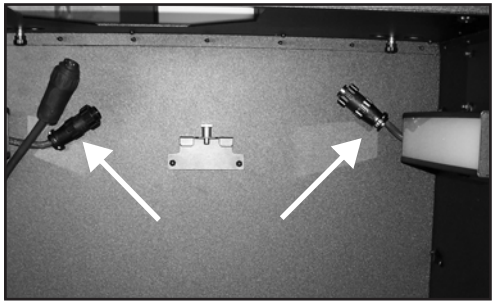




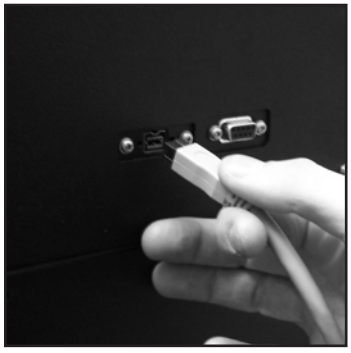
7 Attach the Transilluminator Cable Connector (larger connector) into the keyed connection on the left side of the ceiling in the imaging cabinet.



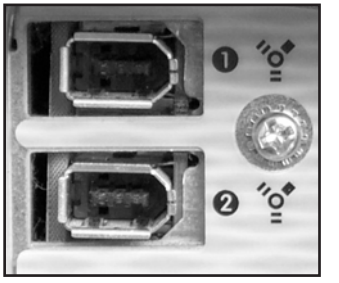
8 Attach the two (2) Epi White Light Cable Connectors (smaller connector) into the keyed connections on both sides of the ceiling in the cabinet.



9 Connect the Camera/Computer FireWire Interface Cable to the back of your GL212 PRO Imaging Cabinet.

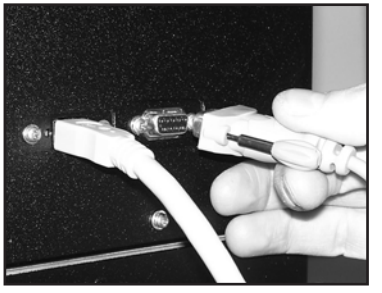


10 Attach the IEEE 1394 (FireWire) plug into your computers IEEE 1394 (FireWire) port.



WARNING: Your computer should be turned off when connecting your camera to your computer.

11 Connect the GL PRO Serial Communication Cable to the Serial Port to the back of your GL212 PRO Imaging Cabinet.



12 Attach the GL Serial Communication Cable to the Serial Port on your computer.

13 Insert the Line Power cord in the IEC power input and connect into the AC (MAINS) source.

14 Turn the power switch (located on the back of unit), to the ON position.

15 The hardware installation of the base system is complete.

- ✔ If you do not have any optional accessories, proceed to *Launching Carestream Molecular Imaging Software with your Carestream Gel Logic 212 PRO Imaging System*, later in this chapter.
- ✔ If you have purchased accessories, proceed to *Carestream Gel Logic 212 PRO Accessories Installation.*

Carestream Gel Logic 212 PRO Accessories Installation

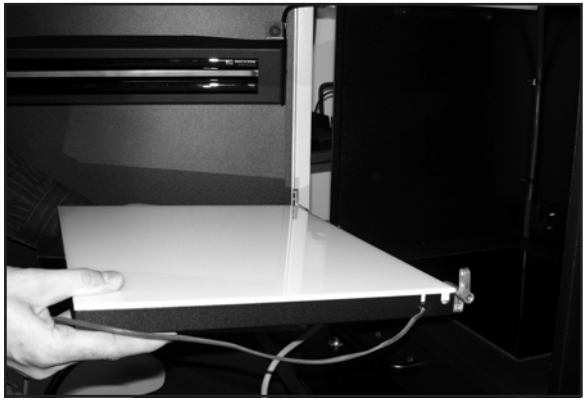
Accessories are available for use with your Carestream Gel Logic 212 PRO Imaging System to expand your system's capabilities.

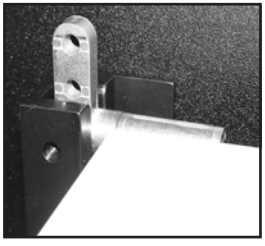
- ✔ The White Light Transillumination Module (optional accessory) provides white light transillumination that is ideal for imaging translucent samples, e.g., Coomassie stained gels or plate assays.
- ✔ The UV Epi-illumination Light Modules are optional accessory. The light accessory is easily installed inside the GL212 PRO Imaging Cabinet door. Wavelengths available include 370 nm, 306 nm or 254 nm.
- ✔ The UV Safety Shield (optional accessory) is designed to protect you from UV when using the UV transilluminator for non-imaging applications such as viewing gels or cutting bands.

Installing the White Light Transilluminator Module (Optional Accessory)

The White Light Transilluminator Module is an optional accessory. The light accessory is easily installed inside the GL212 PRO Imaging Cabinet.

1. Unpack the module and carefully examine it to determine that the imaging surface is not broken or scratched.
2. Open the cabinet door.
3. Insert the White Light Transilluminator Module into the cabinet engaging the tabs into the retaining clips mounted in the back of the cabinet.

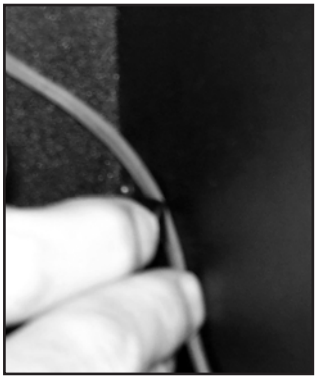




WARNING: Cover the Platen with a soft cloth to protect it during the installation.

4 Connect the White Light Transilluminator Connector the port located on the right side of the cabinet ceiling.

5 Use the retaining clips on the right side of the cabinet to retain the White Light Transilluminator Connector Cord.



NOTE: The White Light Epi-illumination module illuminates when White Light Epi is selected in the GL212 PRO Acquire window.

6 If you do not have any other optional accessories, proceed to *Launching Carestream Molecular Imaging Software with your Carestream Gel Logic 212 PRO Imaging System*, later in this chapter.

Installing the UV Epi-illumination Light Module (Optional Accessory)

The UV Epi-illumination Light Accessory is an optional accessory. The light accessory is easily installed inside the GL212 PRO Imaging Cabinet door.

DANGER—Ultraviolet radiation emitted from this product. Avoid exposure. ALWAYS WEAR PROTECTIVE CLOTHING. EXPOSURE MAY CAUSE PREMATURE AGING OF THE SKIN AND CANCER. ALWAYS WEAR PROTECTIVE EYEWEAR; FAILURE TO DO SO MAY RESULT IN SEVERE BURNS OR LONG TERM INJURY TO EYE. Never look directly into the lamp. Exposure can cause eye and skin allergy and allergic reactions. Medications or cosmetics may increase your sensitivity to ultraviolet radiation. Consult physician before operating this product if you are using medications or have a history of skin problems or believe yourself especially sensitive to sunlight. For Laboratory Use Only.

WARNING: The UV source does not operate when the door is open. Do not attempt to override this feature.

1. Unpack the module and carefully examine it to determine that the glass filter is not broken. A slight rattling sound is normal caused by the movement of small particles in the fluorescent bulbs.
2. Open the cabinet door.
3. With the filter glass facing you and the wire at the top of the module, position the slotted arms over the thumbscrews.

4. Tighten the thumbscrews.

5 Plug the power connector into the receptacle inside the cabinet above the door on the left side.

6 Close the door making sure that the door is not pinching the power cord when it is closed. If it is being pinched, unplug the cable and rotate the connector 360 degrees to eliminate any twist that is in the cable.

☞ NOTE: The UV Epi-illumination Module illuminates when UV Epi is selected in the GL212 PRO Acquire window.

7 If you do not have any other optional accessories, proceed to *Launching Carestream Molecular Imaging Software with your Carestream Gel Logic 212 PRO Imaging System*, later in this chapter.

Installing the UV Safety Shield

The UV Safety Shield is designed to limit your exposure to UV when using the UV transilluminator for non-imaging applications such as viewing gels or cutting bands.

DANGER—Ultraviolet radiation emitted from this product. Avoid exposure. ALWAYS WEAR PROTECTIVE CLOTHING. EXPOSURE MAY CAUSE PREMATURE AGING OF THE SKIN AND CANCER. ALWAYS WEAR PROTECTIVE EYEWEAR; FAILURE TO DO SO MAY RESULT IN SEVERE BURNS OR LONG TERM INJURY TO EYE. Never look directly into the lamp. Exposure can cause eye and skin allergy and allergic reactions. Medications or cosmetics may increase your sensitivity to ultraviolet radiation. Consult physician before operating this product if you are using medications or have a history of skin problems or believe yourself especially sensitive to sunlight. For Laboratory Use Only.

The UV source does not operate when the door is open. Do not attempt to override this feature.

Discontinue use if the Platen is damaged or broken.

1. Open the front door of the GL212 PRO Imaging Cabinet.
2. Use the handle to pull out the UV transilluminator until it stops.
3. Fully insert the lower edge of the safety shield in the slots in the two (2) black support brackets.

   ☞ NOTE: The Gel Tray provides a cutting surface for excising bands from your gel when using the optional UV Safety Shield.

   ☞ NOTE: The UV Transilluminator illuminates when UV Trans is selected in the GL212 PRO Acquire window and you press the switch on the front of the Transilluminator.

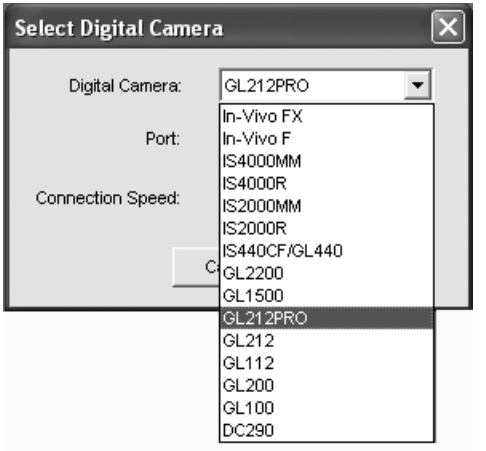
4. If you do not have any other optional accessories, proceed to *Launching Carestream Molecular Imaging Software with your Carestream Gel Logic 212 PRO System.*

Launching Carestream Molecular Imaging Software with your Carestream Gel Logic 212 PRO Imaging System

1 Launch the software by clicking on the desktop application icon shortcut.

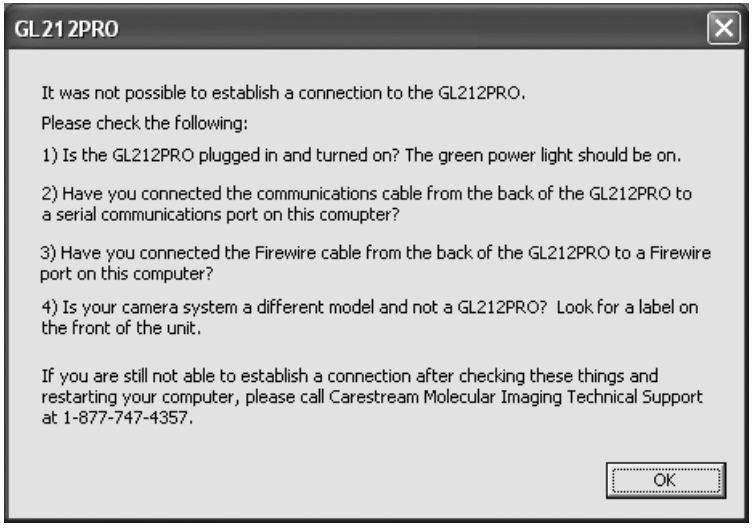
☞ NOTE: If no shortcut is found navigate to Programs from the Start menu and selecting Carestream MI SE from the Carestream Molecular Imaging menu (Windows) or by clicking on the Carestream MI icon found in the Carestream Molecular Imaging folder (Macintosh).

2 Choose Select Digital Camera from the File menu. Choose the GL212 PRO from the Digital Camera pop-up menu. The software systematically searches the appropriate computer port(s). If the selected imaging device is not found, one of several messages appear on-screen depending upon the imaging system selected.



3 Click OK.

☞ NOTE: If you fail to communicate and have followed the suggestions in the dialog box, please contact Carestream Molecular Imaging Technical Support for further assistance.



4 Choose the GL212 PRO Acquire window using the Select Your System dialog box.

5 The GL212 Pro Acquire window appears. Your installation is complete.

6 Proceed to *Installing Emission Filters*.

Installing Emission Filters

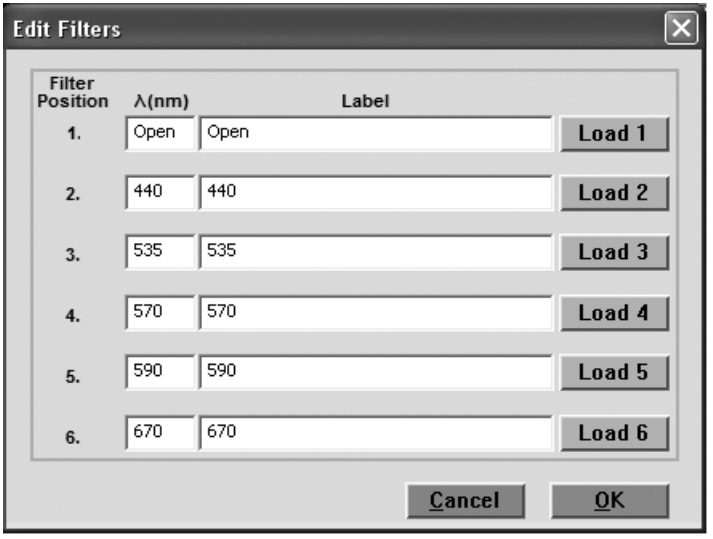
The Automated Filter Wheel facilitates the use of up to six (6) filters. A 590 nm filter is included in the package. Additional filters including 440 nm, 535 nm, 570 nm and 670 nm are available from Carestream Molecular Imaging or your Carestream Molecular Imaging dealer (See Appendix A: *Parts and Accessories*). To install the filters, Carestream MI software must be running as the software controls the position of the Emission Filter Wheel.

WARNING: To avoid damaging the automated Emission Filter Wheel, do not move the wheel manually.

1 Open the GL212 PRO Imaging Cabinet door.

2 From the GL212 PRO Acquire window, select the Preferences button. The Preferences window appears.

3 Click the Emission Filter Change button. The Edit Filters dialog box opens.



4 Click the Load button of the filter position you want to install. The Emission Filter Wheel moves to the correct loading position.

5 Carefully position the filter, thread side down into the Filter Tool while pressing firmly on the Filter Wheel Tool handle. Be careful not to touch the filter element. Gently release your grip as you position the filter in the filter wheel. The filter will drop into position.

6 Click OK.

7 Enter the wavelength and a label for the filter you have loaded in the Wavelength and Label text edit box.

8 Repeat Steps 4–7 for all the filters that you want to install.

9 Click OK.

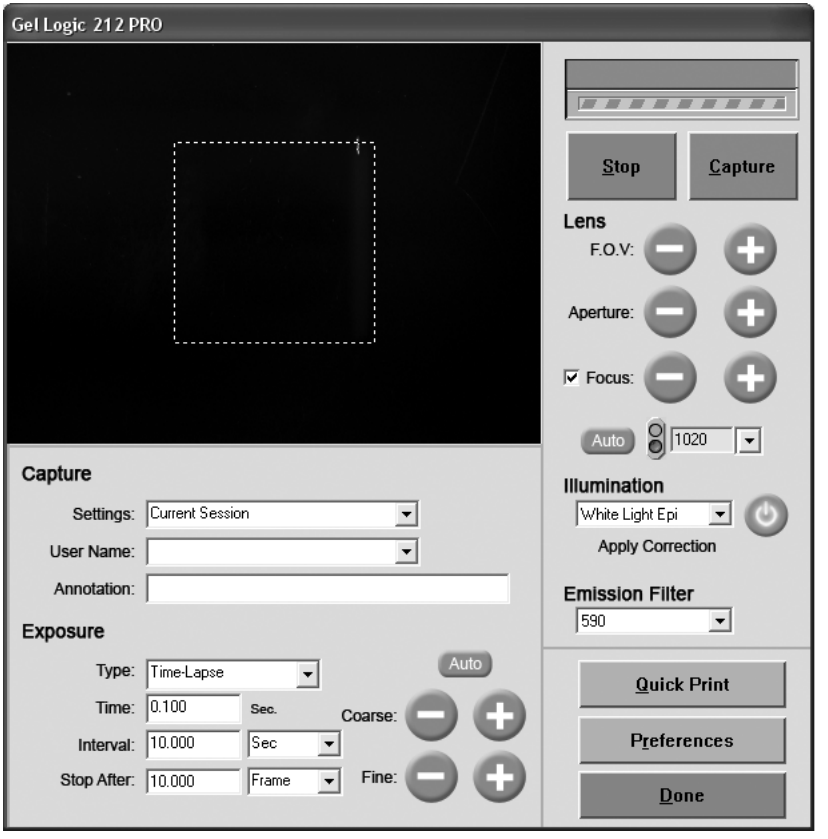
The table below defines the appropriate filter for many common stains and dyes:

Dye/Stain	Filter (nm)
Coomassie Blue	590 or none
Ethidium Bromide	590
Fluorescein	535
Oregon Green	535
Gel Star	535
SYPRO Orange	590
SYBR Green	535
SYBR Gold	535

Proceed to the next section, *Focusing the Camera.*

Focusing the Camera

1. Place a target directly on the Platen. A ruler or business card is a good target to use.
2. Select White Light Epi from the Illumination Source pop-up menu.
3. Select the Emission Filter position to Open. (Do not select an emission filter).
4. Set to view entire test target.
5. Click Preview. The GL212 PRO Preview window appears.
6. Click Focus checkbox. A selection rectangle appears.



7 Click and drag to position the rectangle to contain the center of the focus target and then choose Auto Focus or adjust the Focal Plane using the +/- buttons.

☞ NOTE: Hold down the Escape key if you find that the fine focus has passed through the best focus value. Auto Focus will use the best focus value up to the time you pressed the Auto Focus button again.

8 You are now ready to begin capturing images. To learn about capturing images with the GL212 PRO, proceed to Chapter 4: *Capturing Images*.

Capturing Images

Once your Carestream Gel Logic 212 PRO Imaging System (GL212 PRO) has been set up and Carestream Molecular Imaging Software (Carestream MI) is installed, you are ready to capture high quality digital images.

The GL212 PRO supports several image capture methods including single capture exposure, multiple capture exposure (accumulated into a single file or as separate files) and time lapse exposures. Using these exposure modes, the minimum and maximum exposure times are 0.001 second and 16 seconds, respectively.

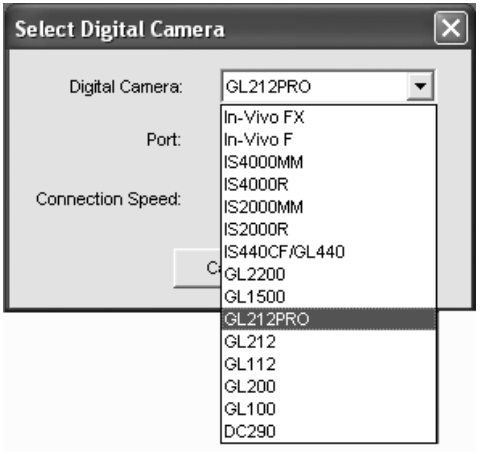
- ✔ Using GL212 PRO, you can document your laboratory experiments with floating point accuracy and analyze images:
  - •DNA, RNA and protein electrophoresis gels, including gels stained with ethidium bromide, SYPRO Orange, SYBR Green, SYBR Gold, and Coomassie Blue
  - •Microtiter plate assays
  - •Colony plates
  - •Plaque screening
  - •Thin-layer chromatography plates
- ✔ Generate a quick print of your image.
- ✔ Annotate, analyze, and print your images.

Launching Carestream Molecular Imaging Software and the GL212 PRO Acquire Window

Once you have set up your GL212 PRO and positioned your sample using the framing masks, you are ready to launch Carestream MI to communicate with the camera and capture an image. If you have not yet set up your system, see Chapter 2: *Setting Up Your System*.

1 Launch Carestream MI software by clicking on the MI icon found on the desktop.

2 Choose Select Digital Camera from the File menu. Choose GL212 PRO as the Digital Camera.



3 Carestream MI systematically searches the computer's ports for a digital camera.

- ✔ If you previously used a camera, Carestream MI searches for that camera in the port last used.
- ✔ If you are a new user, the software will first search for a IEEE 1394 (FireWire) port.
- ✔ If no camera is found, the Select Digital Camera dialog box appears, allowing you to manually specify the camera. Make sure that the camera is connected. Use the Digital Camera pop-up menu to select your digital camera and click OK.

  ☞ NOTE: The Port and Connection Speed pop-up menus will be disabled because these are not user defined for FireWire devices.

- ✔ Once a GL212 PRO is found, the Status bar and the Camera Access button reflect the current camera selection.

4 The GL212 PRO Acquire window appears.

5 You are ready to begin imaging. Proceed to *Preparing for Image Capture.*

Preparing for Image Capture

Your GL212 PRO should be installed, if it is has not yet been installed, see Chapter 3: *Setting up the System.*

Be sure that the imaging surface is clean prior to any sample placement. Dust, particles or scratches on the surface may introduce artifacts in your data. Extra care should be taken when cleaning the surface to avoid scratches.

1 Open the GL212 PRO Imaging Cabinet Door.

2 Place the sample in the center of the appropriate imaging surface.

- ✔ For white light transillumination using the optional accessory—place the sample on the fold-down White Light Transilluminator Module inside the cabinet.
- ✔ For UV transillumination—place the sample on the UV Transilluminator Platen.
- ✔ White light epi-illumination—place the sample on the Epi-White/Black Backdrop Screen positioned in the Gel Tray. Place the sample on the black or white side to achieve the best contrast, i.e., Coomassie stained gels are best imaged on the white side.
- ✔ UV epi-illumination—place the sample on the black side of the Epi-White/Black Backdrop Screen positioned in the Gel Tray.

☞ NOTE: Special care should be taken if your sample is dry. Ensure a dry surface by a quick ethanol wipe.

☞ NOTE: Do not use metal utensils or tweezers since they may scratch and permanently damage the glass surface.

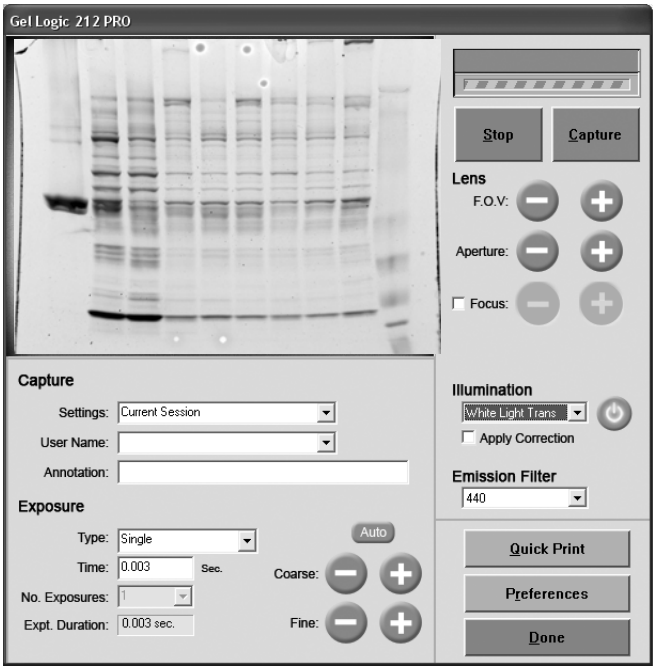
3 Choose an optical filter appropriate for your imaging type using the Emission Filter pop-up menu. Refer to the Filter Selection Table below:

Dye/Stain	Filter (nm)
Coomassie Blue	590 or none
Ethidium Bromide	590
Fluorescein	535
Oregon Green	535
Gel Star	535
SYPRO Orange	590
SYBR Green	535
SYBR Gold	535

Previewing and Capturing Images

The Preview mode offers you a way to view what the camera will image. In preview mode you can optimize the sample placement, aperture, field of view, and exposure time. Launching the Acquire window initiates the “live” stream of single capture images. The Progress bars are active providing feedback on the current capture.

1 Once the sample is in place, close the GL212 PRO Imaging Cabinet door. The Preview is initiated. If the sample is not being displayed, click Preview.



☞ NOTE: Preview is used primarily for optimizing your capture conditions including sample placement, aperture, field of view (FOV), and exposure time. You may want to use the white light epi-illumination setting or ambient light to aid in positioning your sample.

☞ NOTE: The Show Saturation feature (Preferences) displays image pixels red when the pixel is saturated. Saturated pixels adversely affect the quality of your image analysis since the signal readings do not accurately measure intensity. Use this option to aid you in selecting the ideal exposure conditions (aperture and exposure time).

2 Select your illumination type from the Type pop-up menu—the exposure time defaults to a typical exposure time.

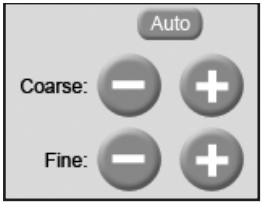
- ✔ *White Light Trans* using the White Light Transilluminator Module, an optional accessory, is ideal illumination for non-opaque samples (plates and visible dye stained gels).
- ✔ *UV Trans* is ideal illumination for providing illumination of fluorescently stained images (i.e., ethidium bromide or SYBR Green).
- ✔ *White Light Epi* is ideal illumination for imaging samples such as plates and blots.
- ✔ *UV Epi* is ideal illumination for imaging samples like TLC plates using the optional accessory UV Epi-illumination Module(s). Wavelengths available include 370 nm, 306 nm, and 254 nm.

3 Adjust the Exposure Time and/or Aperture to display the desired features without saturating (pixels displayed in red on-screen) the pixels in the image.

Type	Recommended
UV Transillumination	3 seconds
White Light Epi-Illumination	0.1 second
White Light Transillumination	0.005

☞ NOTE: The aperture controls the amount of light that passes through the lens, while the exposure time controls how long the CCD is exposed. Improve resolution by using the smaller aperture with a longer exposure time.

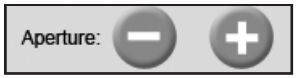
Type an exposure time in the Exposure Time text edit box.



Use the Auto Exposure button for automated exposure determination.

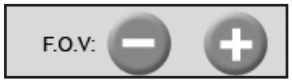
Use the Coarse and Fine Exposure arrows to adjust the exposure time in either coarse or fine increments. This eliminates the need for you to use your keyboard.

☞ NOTE: The minimum and maximum exposure times are 0.001 second per exposure and 16 seconds per exposure, respectively. The time units can be set as seconds or minutes. The minimum increment is 0.001 seconds for short exposures.



Adjust the aperture using the Aperture buttons located in the Lens section of the GL212 PRO Acquire window.

4 Adjust the F.O.V. buttons to fill the entire frame with the sample image or features of interest. This maximizes the number of pixels within your sample image.



☞ NOTE: The F.O.V. setting relates directly to the image resolution. The GL212 PRO CCD camera has a pixel resolution of 1280 x 960 pixels. At the smallest field of view (48 mm), the number of pixels are spread over a 4.25 x 6 cm area. At the largest field of view setting (8 mm), the pixels are spread over a 24.5 x 33 cm area (46 microns/pixel). An important consideration is the number of pixels that are applied to the smallest feature of interest.

5 If the preview is out of focus, click on the Focus checkbox, use the Focus buttons to adjust the focus.

☞ NOTE: If you have problems focusing, a software assisted focusing tool can be used. See *Using the Focusing Tool*, later in this chapter.

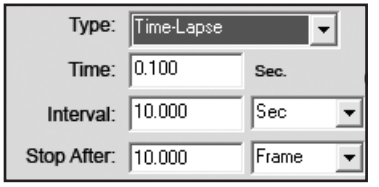
6 Choose your Exposure Type.

✔ *Single Exposure* takes one 12-bit image. After capture, the image file automatically opens as a Carestream MI project.

✔ *Multiple Exposure (Final Accumulation)* adds successive captures into a single accumulated image. The maximum number of images accumulated is 32 generating up to a 14-bit image file. The final accumulated image is automatically opened as a Carestream MI project.

These accumulated images expand the dynamic range of signal you can capture for more quantitative accuracy while also improving detection sensitivity.

✔ *Time Lapse Exposure* provides exposures at set intervals. You can set the exposure time, the time lapse interval, the total exposure time, and the total number of images. Each file is automatically saved to your hard drive.



— The *Exposure Time* defines the exposure. The minimum and maximum exposure times are 0.001 seconds per frame and 16 seconds per frame, respectively. The minimal increment is 0.001 second.

— The *Coarse* and *Fine Exposure* arrows allow you to adjust the exposure time in either coarse or fine increments. This eliminates the need for you to use your keyboard.

— The *Interval* is the time interval between the beginning of one exposure and the beginning of the next exposure. The minimum and maximum intervals are 5 seconds and 24 hours, respectively.

— *Stop After* determines when to stop time lapse captures. You can set stop criteria based on experimental duration or by the number of frames. The maximum duration time is 200 hours. The maximum number of image frames that may be captured is 100.

7 To capture an image—click Capture or Quick Print.

The *Capture* button initiates image acquisition. Once acquired, files can be analyzed, annotated and printed.

The *Quick Print* button sends the image directly to your printer and no copy of the image is saved.

Custom Capture Settings

You can speed up the capture process by creating custom capture settings for the various types of experiments or specific personal preferences. Once saved, Carestream MI remembers the camera settings which include:

- ✔ Type
- ✔ Exposure time
- ✔ Number of exposures
- ✔ Illumination correction
- ✔ Image orientation
- ✔ Preferences selections

☞ IMPORTANT: Settings will NOT save the Aperture, Field of View, Focus, or User Name or Annotations.

Saving Custom User Settings

1. Make all your selections from within the GL212 PRO Acquire window.
2. Choose the Save Settings from the Settings pop-up menu. A File Name dialog box appears.
3. Enter a name to describe your custom settings.
4. Click OK. The settings are saved and will appear in the list of available settings.

☞ NOTE: If you choose a custom acquire setting, and then make modifications to the custom settings, they will not be saved unless you update the custom setting by selecting Update Settings from the Settings pop-up menu.

☞ NOTE: Custom settings are saved as individual files in C:\Program Files\Molecular Imaging\ MI\Application\GL_212_\GL_212_Settings (Windows) or in the Molecular Imaging\MI\Application\MI Extensions\GL_212_Settings (Macintosh) subfolders.

Updating Custom User Settings

1. Select a custom setting from the Settings pop-up menu.
2. Modify settings as desired.
3. Choose Update Settings in the Settings pop-up menu.

☞ NOTE: The GL212 PRO factory defaults cannot be updated.

Deleting Custom User Settings

1. Select a custom setting from the Settings pop-up menu.
2. Choose Delete Settings.

☞ NOTE: The GL212 PRO factory defaults cannot be deleted.

Using the Focusing Tool

The GL212 PRO Imaging Cabinet has been designed to maintain the proper focal distance from the camera to your sample to minimize the need to focus. If you should you need to adjust the focus, use the Focus buttons.

If your samples vary in thickness, the software-assisted focusing tool is available for use. The software determines camera focus by using the sharpness of edges within the image.

To adjust focus:

1. Place the focus target or your sample in the GL212 PRO Imaging Cabinet.
2. Select the Focus checkbox.
3. Adjust the exposure time and *f*-stop to best represent your image in the Preview.
4. Adjust the F.O.V. to fill the field of view with the focus target or your sample.
5. Click the Focus Camera checkbox. A selection rectangle appears on-screen, in the center of the image.
6. Adjust the Focus ring to maximize the numerical value appearing in the text box.
   - ✔ Increasing values indicate focus is sharpening, whereas, decreasing values indicate blurring of the image.
   - ✔ A green or red indicator light provides a visual indicator. As you are improving focus the indicator light signals green. Moving the focus in the wrong direction, the indicator light signals red.
7. To exit the Focusing mode, uncheck the Focus Camera.

Applying an Illumination Reference

Improve the quality of your data by applying field illumination correction to images captured. The illumination non-uniformity is highly reproducible and may be corrected by dividing the sample image by an illumination reference image. It is important to capture a reference image of the illumination field using the same camera settings (*f*-stop, zoom) used at the time you are capturing the image to be corrected.

1. Prior to capturing the image select the Illumination Reference checkbox.
2. Capture an image as described in *Capturing Images*, earlier in this chapter.

   ☞ NOTE: Do not adjust the *f*-stop, zoom, exposure time, or placement of the Epi-Illumination pads.

3. Upon completion of the capture the illumination correction dialog box appears.
4. Remove the sample from the imaging cabinet and clean the surface.
5. Enter a name in the Output Name text edit box.
6. Click Continue. The illumination reference is applied and the output file opens as a new Carestream MI project.

   ☞ NOTE: You can not do an illumination reference correction if you have saturated pixels in your images. Reduce the exposure time of your image to eliminate the risk of saturating the illumination reference image.

Adding an Annotation Bar to the Printed Image

You can tag your image with an Annotation bar which contains the time and date of the capture of the image, the exposure setting, sample type, and up to 48 characters of text. The text will appear on the long axis at the top of the image in 12 point Helvetica Bold as white text on a black background.

☞ NOTE: All items in the Annotation bar are separate objects once submitted to Carestream MI and displayed in the Annotations window. You can change the font style, color, or size prior to printing, however, the items are grouped. You must ungroup the items prior to editing.

1 Type text (up to 48 character) in the Add Annotation text edit box.

2 The Annotations bar is appended to the image upon printing.

☞ NOTE: Each time you take a picture the Add Annotation text edit box are cleared.

☞ NOTE: You can display or hide the Annotation bar by selecting the Show/Hide Annotation bar from the Annotations menu.

Using the Transilluminator for Non-Imaging Applications

The UV Transilluminator provides broadband UV ideal for visualizing or cutting out bands from fluorescent samples like ethidium bromide stained gels.

1 Place the sample on the UV transilluminator Platen.

✔ For UV transillumination—place the sample on the Platen.

2 Insert the UV Safety Shield into the Safety Shield slots in the front of the UV transilluminator.

3 Press the UV transilluminator button located on the front of the transilluminator.

DANGER—Ultraviolet radiation emitted from this product. Avoid exposure. ALWAYS WEAR PROTECTIVE CLOTHING. EXPOSURE MAY CAUSE PREMATURE AGING OF THE SKIN AND CANCER. ALWAYS WEAR PROTECTIVE EYEWEAR; FAILURE TO DO SO MAY RESULT IN SEVERE BURNS OR LONG TERM INJURY TO EYE. Never look directly into the lamp. Exposure can cause eye and skin allergy and allergic reactions. Medications or cosmetics may increase your sensitivity to ultraviolet radiation. Consult physician before operating this product if you are using medications or have a history of skin problems or believe yourself especially sensitive to sunlight. For Laboratory Use Only.

The Safety Shield must be in place when the door is open and the UV Transilluminator is activated. UV will not be emitted at the Platen surface if the UV Safety Shield is not in place. Replace the UV Safety Shield if cracked or damaged.

Personal Protective Wear. If your hands are in close contact with the Platen surface or anywhere behind the UV Safety Shield, to prevent injury it is imperative that appropriate gloves be worn (i.e., nitrile). Latex gloves are also effective, however latex may present an allergic reaction in some individuals. In addition, long-sleeved lab coat or other tightly woven material will be effective in reducing UV exposures.

Protective eye wear should be worn by users when the Platen surface is pulled out.

4 When finished, remove the UV Safety Shield to disengage the UV transilluminator and turn off UV illumination.

5 Remove the sample from the cabinet or proceed with an imaging protocol.

Maintaining Your System

Your Carestream Gel Logic 212 PRO Imaging System (GL212 PRO) is a delicate piece of photographic equipment, requiring care and maintenance.

✔ To keep from damaging your GL212 PRO Camera Assembly, avoid exposure to moisture and extreme temperatures

WARNING: The power cord is the primary disconnect device from the AC (MAINS) outlet. Always turn the main power switch off and disconnect the unit from the AC (MAINS) outlet before performing any service.

WARNING: When handling or using ammonia based spray cleaner, follow instructions noted in the Material Safety Data Sheet (MSDS).

WARNING: When cleaning your GL212 PRO, we recommend that you wear impervious gloves, e.g., latex or nitrile.

Maintaining Your Carestream Gel Logic 212 PRO Imaging Cabinet

The GL212 PRO Imaging Cabinet is fabricated to facilitate easy cleaning. We recommend that you clean your cabinet and accessories regularly to keep them in good working order.

WARNING: The power cord is the primary disconnect device from the AC (MAINS) supply. Always turn the switch the cabinet off and disconnect the unit from the AC (MAINS) outlet before performing any maintenance.

Cleaning the Cabinet

The cabinet is designed for easy care.

- ✔ For material not contaminated with biological or radiological substances, wipe with a non-abrasive cleaner.
- ✔ For materials contaminated with biological substances, prepare a 5% bleach solution in water. Wipe down the cabinet with the bleach solution using a clean cloth or sponge. Wipe clean with water.
- ✔ For materials contaminated with radiological substances, decontaminate with a radioactive decontamination detergent, following manufacturer's instructions and your institutional safety protocols for decontaminating and handling radioactive waste.

WARNING: Never use harsh or abrasive cleaners or organic solvents on the any parts of the system.

WARNING: When handling or using ammonia based spray cleaners, follow instructions noted in their Material Safety Data Sheet (MSDS).

WARNING: When cleaning your GL212 PRO, we recommend that you wear impervious gloves, e.g., latex or nitrile.

- ✔ To dry, use a soft cloth, paper towel or allow to air dry.

Cleaning Filters

1. Open the cabinet door
2. Select Preferences from the GL212 PRO Acquire window. The Preferences window appears.
3. Click the Emission Filter Change button. The Edit Filters dialog box opens.
4. Click Load button for the filter you want to remove to clean.
5. Using the Filter Tool provided with your instrument, insert the filter in the filter wheel with the open end of the tool.
6. Retrieve the filter by pressing firmly on the handle of the tool.
7. Continue pressing as you lift the filter out of the filter wheel and release your grip as you gently place the filter onto a flat surface.
8. Wipe gently with a soft, lint-free cloth or an untreated lens-cleaning tissue.

   ☞ WARNING: Do not use cleaning solutions unless they are designed specifically for camera lenses. Do not wipe the camera lens with chemically treated eyeglass lens tissue because it may scratch the lens.

9. Reinstall the filter. See *Installing Emission Filters* in Chapter 3: *Setting up Your System.*

Cleaning the White/Black Epi-illumination Pads

The White/Black Epi-illumination Pads are easy to clean:

- ✔ For material not contaminated with biological or radiological substances, the pads may be washed with a non-abrasive detergent and rinsed with deionized water.
- ✔ For materials contaminated with biological substances, prepare a 5% bleach solution in water. Wipe down with the bleach solution using a clean cloth or sponge. Rinse thoroughly with deionized water.
- ✔ For materials contaminated with radiological substances, decontaminate with a radioactive decontamination detergent following manufacturer's instructions and your institutional safety protocols for decontaminating and handling radioactive waste.
- ✔ To dry, use a soft cloth, paper towel or allow to air dry.

Repairing Your Carestream Gel Logic 212 PRO Imaging System

Periodically, some parts of the GL212 PRO may need to be replaced. This section details the user serviceable repairs.

WARNING: The power cord is the primary disconnect device from the AC (MAINS) outlet. Always turn the switch the cabinet off and disconnect the unit from the AC (MAINS) outlet before performing any service.

Replacing the UV Transilluminator Bulbs

In order to determine if a bulb is not functioning, move the filter wheel to an open position and capture a short duration image with the UV Transilluminator turned on. The resultant image shows bright bands of light at the location of each of the four (4) bulbs. If a bulb is not working, there will be a bright band missing.

☞ NOTE: The transilluminator consists of four (4) bulbs. We recommend replacing all all four (4) bulbs when servicing the light source.

Tools required:

✔ No. 2 Phillips screwdriver

Replacement parts:

✔ GL212 UV Transilluminator Bulb Kit (4 bulbs)

1 Turn off the cabinet switch.

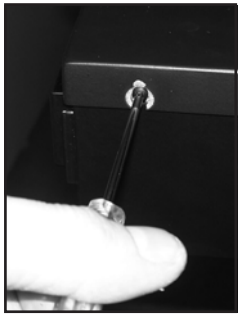
2 Remove the power cord from the AC (MAINS) outlet.

WARNING: The power cord is the primary disconnect device from the AC (MAINS) outlet. Always turn the Illumination Selector off and disconnect the unit from the AC (MAINS) outlet before performing any service.

3 Open the GL212 PRO Cabinet door.

4 Pull the transilluminator drawer out far enough to allow access to the four (4) Phillips head screws on the sides of the Platen top.

5 Remove the four (4) screws that attach the Platen top.



6 Lift the Platen from the UV Transilluminator and carefully set it aside.

7 Remove all the bulbs from the housing by rotating 90 degrees in either direction. This allows the pins to be lifted out of the slots at the top of the bulb holder.

8 Insert a new bulb into the slots and rotate the bulb until a click is heard, which locks the bulb in place.

9 Proceed with steps 7 and 8 above for the other bulbs.

10 Replace the top Platen on the transilluminator base and reinstall the four (4) screws.

11 Plug the power cord into the AC (MAINS) outlet and turn on the cabinet switch.

Replacing the White Light Epi-Illumination Bulbs

Tools required:

✔ 2.5 mm Allen wrench

Replacement parts:

✔ GL212 PRO White Light Bulb Kit (1)

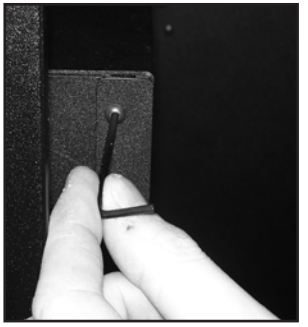
1 Turn off the cabinet switch.

2 Remove the power cord from the AC (MAINS) outlet.

WARNING: The power cord is the primary disconnect device from the AC (MAINS) outlet. Always turn the switch the cabinet off and disconnect the unit from the AC (MAINS) outlet before performing any service.

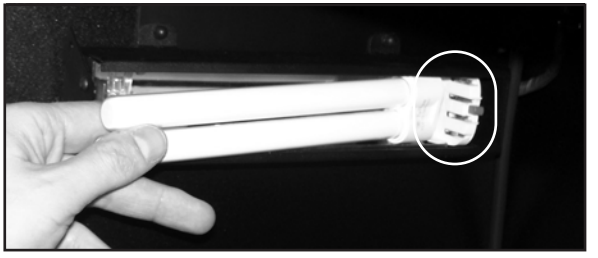
3 Open the GL212 PRO Imaging Cabinet door.

4 Remove the bottom screw on the side of the bulb housing and rotate the retaining plate 180° clockwise.



5 Slide the white diffuser cover towards the front of the cabinet to remove.

6 Push the red button while simultaneously rotating the bulb counter clockwise and lift out to remove it from the bulb holder.



7 Install a new bulb by pushing the base into the bulb holder until it snaps into place.

8 Reinstall the diffuser cover by sliding it back into the frame.

9 Rotate the retaining plate back into position.

10 Install the retaining screw on the side of the housing.

11 Repeat Steps 4 through 10 to replace the bulbs in the second light fixture.

12 Plug the power cord into the AC (MAINS) outlet.

13 Turn on the cabinet power switch.

Replacing the UV Epi-illumination Module Bulbs (Optional Accessory)

The transilluminator consists of two (2) bulbs. We recommend replacing all bulbs when servicing the light source.

Tools required:

✔ 2.5 mm Allen wrench

Replacement parts:

✔ GL212 UV Epi-illuminator Bulb Kit (2 bulbs)

1 Turn off the cabinet switch.

2 Remove the power cord from the AC (MAINS) outlet.

WARNING: The power cord is the primary disconnect device from the AC (MAINS) outlet. Always turn the switch the cabinet off and disconnect the unit from the AC (MAINS) outlet before performing any service.

3 Open the GL212 PRO Imaging Cabinet door.

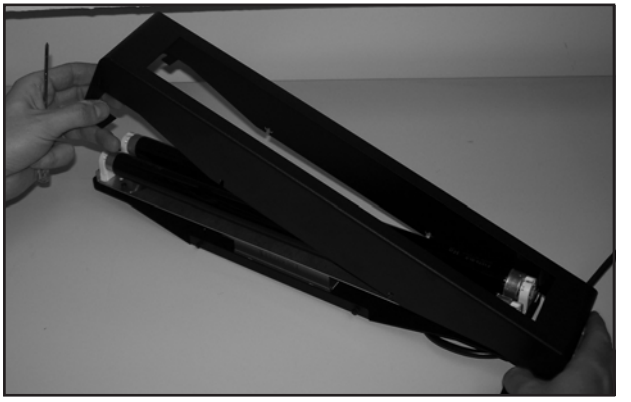
4 Unplug the power connector from the receptacle inside the cabinet above the door on the left side.

5 Loosen the thumbscrews that are holding the Epi-illumination Module in the cabinet door.

6 Remove the Epi-illumination Module from the door and place on a flat surface.

7 Remove the four (4) screws from the bottom and sides of module.

8 Remove the cover plate.



9 Remove the bulb by rotating 90 degrees in either direction. This allows the pins to be lifted out of the slots at the top of the bulb holder.

10 Insert a new bulb into the slots and rotate the bulb until a click is heard, which locks the bulb in place.

11 Proceed with steps 9 and 10 above for the second bulb.

12 Reinstall the cover plate with the retaining screws.

13 Reinstall the module in the cabinet door (see *Installing the UV Epi-illumination Module* in Chapter 3: *Installing Your System).*

14 Tighten the thumbscrews.

15 Plug the power connector into the receptacle inside the GL212 PRO Imaging Cabinet above the door on the left side.

16 Close the door making sure that the door is not pinching the power cord when it is closed. If it is being pinched, unplug the cable and rotate the connector 360 degrees to eliminate any twist that is in the cable.

☞ NOTE: The UV Epi-illumination Module illuminates when UV Epi is selected in the GL212 PRO Acquire window.

17 Unplug the power connector from the receptacle inside the cabinet above the door on the left side.

18 Plug the power cord into the AC (MAINS) outlet.

19 Turn on the cabinet power switch.

Replacing the UV Transilluminator Platen

Tools required:

✔ No. 2 Phillips screwdriver

Replacement parts:

✔ GL212 PRO UV Transilluminator Platen Kit

1 Turn off the cabinet power switch.

2 Remove the power cord from the AC (MAINS) outlet.

WARNING: The power cord is the primary disconnect device from the AC (MAINS) outlet. Always turn the Illumination Selector off and disconnect the unit from the AC (MAINS) outlet before performing any service.

3 Open the GL212 PRO Imaging Cabinet door.

4 Pull the transilluminator drawer out far enough to allow access to the four (4) Phillips head screws on the sides of the Platen top.

5 Remove the four (4) screws that attach the Platen top.

6 Lift the Platen from the UV Transilluminator and carefully set it aside.

7 Position the new Platen on the transilluminator base and reinstall the four (4) screws.

8 Plug the power cord into the AC (MAINS) outlet.

9 Turn on the cabinet power switch.

Troubleshooting the System

In this chapter, common questions are addressed. The questions are divided into three sections: Instrument, Image, and Software. If you still have questions after reading this section and the corresponding information in the User's Guide, contact Carestream Molecular Imaging Technical Support. Please have your serial number and any technical information available.

Technical Support

For technical support, contact Carestream Molecular Imaging Technical Support or your Carestream Molecular Imaging dealer. For up to date dealer information, visit our WEB site at mi.carestreamhealth.com. When contacting technical support, please have the following information available:

- ✔ The serial number of your GL212 PRO located on the back of the unit.
- ✔ The serial number of your GL212 PRO Camera—press Control and T buttons simultaneously when the GL212 PRO Acquire window is displayed.
- ✔ The serial number and version number of your Carestream MI.

  ☞ NOTE: With the software running, select About MI under the Help menu (Windows) or select About MI under the Apple menu item (Macintosh).
- ✔ The type of computer you are using (make, model).
- ✔ Operating system software version.

  ☞ NOTE: Check your operating system version by right-clicking on the My Computer icon and then on Properties (Windows) or select About This Mac under the Apple menu item (Macintosh).
- ✔ The type of image you are capturing or analyzing.
- ✔ The problem you are having and what you were doing when the problem occurred. Please note the exact wording of any error messages, including any error numbers displayed.

Carestream Molecular Imaging Technical Support

Contact Carestream Molecular Imaging Technical Support by:

- ✔ Utilizing our World Wide Web support pages at:

  mi.carestreamhealth.com
- ✔ Calling Carestream Molecular Imaging Technical Support at:

  In US and Canada 877-747-4357 or world wide 203-786-5657, between the hours of 8:00 a.m. and 6:00 p.m. (Eastern Standard Time) Monday through Friday
- ✔ E-mailing Carestream Molecular Imaging Technical Support at:

  molecular-support@carestreamhealth.com
- ✔ Faxing Carestream Molecular Imaging Technical Support at:

  203-786-5656

Common Instrument Problems

Problem	Probable Cause	Solution
Cannot access the camera capture system.	Camera/Computer Interface Cable and/or Serial Cable are not properly connected.	Check the connections on the back of the GL212 PRO and the computer.
	The Camera/Computer Interface Cable and Serial Cable that came with the system was not used.	Make sure that the cables being used is the one you received with your GL212 PRO.
	No power to the camera.	Verify that the port is a 6-pin IEEE 1394 (FireWire). If you are using a laptop computer, the 6-pin PMCIA Card Adaptor must be powered by an external power source.
	No power to the system.	Verify that the Line Cord is connected to the AC (MAINS) and that the power switch is in the ON Position. The green light on the front panel should be illuminated.
	Wrong camera selected.	Verify that you selected GL212 PRO from the Digital Camera pop-up menu in Digital Camera submenu of the File menu.
The on-screen image is fractured or split into parts.	IEEE 1394 (FireWire) port malfunctioning, the Add-on FireWire card is improperly seated or the camera is defective.	Move the Camera/Computer Interface Cable to another FireWire port if available. Reseat Add-on FireWire card.
UV Transilluminator lights are flickering.	Either the bulbs need replacement or a ballast problem.	Test whether the bulbs or the ballast needs replacement, replace the UV bulbs with similarly sized white light bulbs. If the bulbs flicker, the ballast needs changing. If the bulbs don't flicker, the UV bulbs need replacement.

Problem	Probable Cause	Solution
UV Transilluminator/ UV Epi lights are not operating.	No power.	Check that the power cord on the back of the instrument is properly attached and that the outlet is supplying power.
		Check that the main power switch on the back panel is set to the ON position.
	The cabinet door safety switch is not engaging.	Verify that the door is firmly closed and safety switch is engaged.
	Either the bulbs need replacement or a ballast problem.	Test whether the bulbs or the ballast needs replacement, replace the UV bulbs with similarly sized white light bulbs. If the bulbs flicker, the ballast needs changing. If the bulbs don't flicker, the UV bulbs need replacement.

Common Image Problems

Problem	Probable Cause	Solution
Image is black or too dark.	Not enough light for a good contrast exposure.	Increase the aperture setting using the Aperture button or increase the exposure time. See Chapter 4: *Capturing Images.*
Image is white or too light.	Too much light during the exposure.	Decrease the aperture setting using the Aperture button or decrease the exposure time. See Chapter 4: *Capturing Images.*
Image is blurred.	Image is not in focus.	Adjust the focus using the Focus buttons.
		Run the Autofocus procedure See *Using the Focusing Tool* in Chapter 4: *Capturing Images.*
	Dirty or cracked filter.	Capture an image with a different filter selected.
	Contaminated optics.	Contact Carestream Molecular Imaging Technical Support.
Image appears with many speckles in a UV illuminated image.	Dust or dirt on the Platen.	See *Preparing for Imaging* in Chapter 4: *Capturing Images.*
Image partially blocked.	Filter not centered over the lens properly.	Check that the filter is lined up properly.
Lines on the image.	Scratched Platen.	Contact Carestream Molecular Imaging Technical Support for further instructions.
The background intensity of the image is uneven in the Project window.	Improper Illumination Reference File was used for correction.	Be sure the proper Illumination Reference File is used. See *Applying an Illumination Correction* in Chapter 4: *Capturing Images.*
Bright imaging artifacts not coming from the sample.	Light leak.	Ensure that the door is securely closed.

Problem	Probable Cause	Solution
Sample is not visible.	Sample not in field of view.	Adjust FOV to find sample. To aid in positioning use the White Epi-Illumination source while previewing.
	Appropriate Illumination source not selected.	Select the correct illumination source in the GL212 PRO Acquire window.
	Wrong filter is being used.	Check filter.
	Insufficient sample loaded.	Increase sample loaded.
	Sample overstained (EtBr/ SYBR).	Follow the destaining protocol of your dye's manufacturer or use $MgSO_4$ (1mM) to detain gel.
	Sample not sufficiently stained.	Follow the manufacturer's staining and destaining protocol.
	Fluorescent dye/stain is expired or has been photobleached.	Check by placing a drop of the dye/stain on the platen and preview with appropriate illumination source.
	Exposure time not sufficient.	Increase Exposure Time.
	Camera aperture too low.	Increase Aperture.
	Sample overexposed (all pixels are white or appear red on screen (of saturation checkbox is selected).	Decrease Exposure Time and/or Aperture.

Common Software Problems

Problem	Probable Cause	Solution
iChat opens when the Gel Logic camera is connected	iChat preferences designate that iChat should automatically open when cameras are connected.	Open iChat from the Dock or by clicking Applications from the Go menu bar item and the iChat icon in the iChat folder. Click Preferences from the iChat menu item. Click the Video tab and uncheck the Automatically open iChat when camera is turned on checkbox.
My Macintosh computer is going to sleep mode.	System/Display sleep mode set incorrectly.	Under Control Panel/Energy Saver, set the sleep setting to Never.
My Windows computer is going to sleep mode.	System/Display sleep mode set incorrectly.	Click the Power Options icon from the Start menu and the Control Panel. Click Power Schemes tab and select *Always On* from the Power Schemes pop-up menu. The settings for Turn off monitor, Turn off hard disks, System standby and System hibernates functions become *Never.*
The Gel Logic camera appears as an Unknown Device in Windows Device Manager.	The Gel Logic driver must be replaced.	Right-click My Computer➔ Properties. Hardware tab➔Select the Device Manager. Find and expand imaging devices or camera. Right-click on Gel Logic Imaging System and click Uninstall. Close windows and restart machine. On restart, Found New Hardware Wizard appears. Select “No, not this time.” Select “Install from a list or specific location.” Select “Don’t search, I will choose driver to install.” Select Gel Logic system. Click Finish when wizard finishes copying files.

Problem	Probable Cause	Solution
Cannot capture images using Macintosh system.	Older version of Quicktime software not compatible.	Update the Quicktime software to the most recent version.
Error communicating with GL212 PRO camera using Macintosh OS X	Serial connection problem.	Make sure that the serial cable is connected through the serial to USB cable accessory.
Error # 20005	The copy protection device is not found.	Connect the copy protection device and restart your computer.
Error # 12001	The copy protection device is configured for a newer version of MI.	You are using an older version of MI, you may want to use a newer version instead.
Error # 12002	The copy protection device is from an older version of MI.	Shut down your computer and attach the copy protection device that came with the newest version of Carestream MI. Restart your computer.
Error # 12002	A new copy protection device was expected, but not found.	Shut down your computer and attach the copy protection device that came with the newest version of Carestream MI. Restart your computer.
Error # 12003	The copy protection device was disabled during the upgrade process.	Shut down your computer and attach the upgrade copy protection device that came with the upgrade package. Restart your computer. Return the disabled copy protection device for recycling.
Error #12004	Upgrading your MI requires both your existing and new copy protection devices.	Connect both your existing copy protection device and the upgrade copy protection device to your computer and restart the computer.

Warranty

Warranty Time Period

Carestream Health, Inc. warrants the Carestream Gel Logic 212 PRO Imaging System (GL212 PRO) to be free from malfunctions and defects in both materials and workmanship for one year from the date of purchase. If a computer was purchased with the GL212 PRO, it is covered under separate warranty provided by the computer manufacturer.

Days and Hours of Coverage

Arrangements for service through Carestream Molecular Imaging Technical Support can be made Monday through Friday 8:00 a.m. to 6:00 p.m. EST in the United States, except for locally observed holidays. Hours of coverage outside the United States may vary. Contact your local Carestream Molecular Imaging dealer for hours of coverage.

Warranty Repair Coverage

If the equipment does not function properly during the warranty period due to defects in either materials or workmanship, Carestream Health, Inc. will, at its option, either repair or replace the equipment without charge, subject to the conditions and limitations stated herein. Such repair service will include all labor as well as any necessary adjustments and/or replacement parts.

If replacement parts are used in making repairs, these parts may be remanufactured, or may contain remanufactured materials. If it is necessary to replace the entire system, it may be replaced with a remanufactured system.

Carestream Health, Inc. will also provide telephone assistance during the warranty period.

Limitations

WARRANTY SERVICE WILL NOT BE PROVIDED WITHOUT DATED PROOF OF PURCHASE. PLEASE RETURN THE WARRANTY REGISTRATION CARD WITHIN 30 DAYS OF PURCHASE.

THIS WARRANTY BECOMES NULL AND VOID IF YOU FAIL TO PACK YOUR INSTRUMENT IN A MANNER CONSISTENT WITH THE ORIGINAL PRODUCT PACKAGING AND DAMAGE OCCURS DURING PRODUCT SHIPMENT.

THIS WARRANTY DOES NOT COVER: CIRCUMSTANCES BEYOND CARESTRAM HEALTH'S CONTROL; SERVICE OR PARTS TO CORRECT PROBLEMS RESULTING FROM THE USE OF ATTACHMENTS, ACCESSORIES OR ALTERATIONS NOT MARKETED BY CARESTREAM HEALTH, INC.; SERVICE REQUIRED AS THE RESULT OF UNAUTHORIZED MODIFICATIONS OR SERVICE; MISUSE, ABUSE; FAILURE TO FOLLOW CARESTREAM HEALTH'S OPERATING, MAINTENANCE OR REPACKAGING INSTRUCTIONS; OR FAILURE TO USE ITEMS SUPPLIED BY CARESTREAM HEALTH, INC. (SUCH AS ADAPTERS AND CABLES).

CARESTREAM HEALTH, INC. MAKES NO OTHER WARRANTIES, EXPRESS, IMPLIED, OR OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE FOR THIS EQUIPMENT OR SOFTWARE.

REPAIR OR REPLACEMENT WITHOUT CHARGE ARE CARESTREAM HEALTH'S ONLY OBLIGATION UNDER THIS WARRANTY. CARESTREAM HEALTH, INC. WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES RESULTING FROM THE PURCHASE, USE, OR IMPROPER FUNCTIONING OF THIS EQUIPMENT REGARDLESS OF THE CAUSE. SUCH DAMAGES FOR WHICH CARESTREAM HEALTH, INC. WILL NOT BE RESPONSIBLE INCLUDE, BUT ARE NOT LIMITED TO, LOSS OF REVENUE OR PROFIT, DOWNTIME COSTS, LOSS OF USE OF THE EQUIPMENT, COST OF ANY SUBSTITUTE EQUIPMENT, FACILITIES OR SERVICES, OR CLAIMS OF YOUR CUSTOMERS FOR SUCH DAMAGES.

Depending on your geographical location, some limitations and exclusions may not apply.

How to Obtain Service

If the instrument does not function properly during the warranty period, contact Carestream Molecular Imaging Technical Support or your local dealer to arrange for service. If your unit needs to be returned for any reason, please contact your local dealer to obtain a return authorization. All returned units must be decontaminated prior to their return, as described below. No returns will be accepted without a return authorization and proper decontamination documentation.

When contacting technical support, please have the following information available:

- ✔ The serial number of your GL212 PRO located on the back of the unit.
- ✔ The serial number and version number of your Carestream MI.

  ☞ NOTE: With the software running, select About MI under the Help menu (Windows) or select About MI under the Apple menu item (Macintosh).
- ✔ The type of computer you are using (make, model).
- ✔ Operating system software version.

  ☞ NOTE: Check your operating system version by right-clicking on the My Computer icon and then on Properties (Windows) or select About This Mac under the Apple menu item (Macintosh).
- ✔ The type of image you are capturing or analyzing.
- ✔ The problem you are having and what you were doing when the problem occurred. Please note the exact wording of any error messages, including any error numbers displayed.

Contact Carestream Molecular Imaging Technical Support by:

- ✔ Utilizing our World Wide Web support pages at:

  mi.carestreamhealth.com
- ✔ Calling Carestream Molecular Imaging Technical Support at:

  In US and Canada 877-747-4357 or world wide 203-786-5657, between the hours of 8:00 a.m. and 6:00 p.m. (Eastern Standard Time) Monday through Friday
- ✔ E-mailing Carestream Molecular Imaging Technical Support at:

  molecular-support@carestreamhealth.com
- ✔ Faxing Carestream Molecular Imaging Technical Support at:

  203-786-5656

General Instructions for Cleaning and Decontamination For Return of the GL212 PRO

All returned material must be cleaned and decontaminated prior to shipping. To meet Federal and State Regulatory and Safety standards, please follow the decontamination procedure given here if radioactive materials are used with this product or are used in the vicinity of where this apparatus has been used or stored.

General Cleaning Procedure

For materials not contaminated with biological or radiological substances, components may be gently washed using water or an ammonia based spray cleaner using soft lint-free cloth or lens paper.

WARNING: Do not expose Platen to strong chemical solvents such as ketones and hexanes. This may permanently damage the Platen and will void your warranty.

Radiological Decontamination Procedure

WARNING: We cannot accept return of products which are contaminated with any radioactivity.

For beta emitting isotopes such as ^{32}P, use a GM-type radioactivity meter calibrated in counts per minute (CPM) to determine the background readings for your work area. Wearing latex gloves, survey the unit to be returned with the GM meter. If any part of the unit is found to show readings higher than background, wash the area using Count Off™ (PerkinElmer Life Sciences) or another similar commercially available detergent and paper towels. If none are available, a Formula 409™-like solution or a mild detergent will do. As you clean, discard liquid and solid waste (gloves and paper towels) according to your local and institutional regulations for radioactive material disposal. Continue washing until the GM meter reading for the contaminated area(s) is equal to or below background.

To decontaminate units where a GM-meter is not useful for detection, such as with ^{3}H or ^{35}S, it will be necessary to perform swipes of the unit and detect using a scintillation counter. The unit should be dry. Wipe surfaces with dry paper circles (these are commercially available or you can make your own). Areas can be charted, so that individual swipes can be done on different surfaces to better isolate areas of contamination. These swipes are then placed into individual scintillation vials with an appropriate fluor and then analyzed on a properly programmed scintillation counter. If contamination above 200 disintegrations per minute dpm/200 cm^2 (dpm = CPM/ efficiency) is found, wash the area as described above for beta emitting isotope decontamination. After cleaning the area, swipe it a second time to determine the amount of contamination remaining. If the area still has a greater than 200 dpm/cm^2, continue the cycle of swipes and washing until you achieve a reading of less than 200 dpm/$cm.^2$

Once the unit has been determined to be radiation free (< 200 dpm/cm^2), remove all the hazardous and radioactive labels from the unit. If the labels cannot be removed, deface them. Failure to do so may result in significant delay or a refusal of repair.

If your unit has unremovable decontamination (detectable with a GM-meter and not with paper swipes, or detectable with paper swipes but after continued washing the dpm/cm^2 remains constant above 200) of a short half life isotope such as ^{32}P, the unit may be stored for 10 half lives of isotopic decay and the decontamination procedure repeated.

☞ NOTE: Units contaminated with unremovable, long half life isotopes may not be returned.

Repackaging the GL212 PRO

Inappropriate packing will void the GL212 PRO warranty. Follow these directions when packing the GL212 PRO for shipment.

1. Decontaminate the GL212 PRO as described above.
2. Remove the power cord, Camera/Computer Cables and Serial communication from the rear of the GL212 PRO.
3. Remove the Filters, optional White Light Transilluminator and/or UV Epi-illumination Modules from the imaging cabinet.
4. Unscrew and remove the Camera Assembly from the imaging cabinet.
5. Package the Camera Assembly in foam padding.
6. Place the components in their original plastic wrapping.
7. Repack the GL212 PRO components in their original boxes. If you have discarded the original packing material, call Carestream Molecular Imaging Technical Support to arrange for delivery of new packing material.

Regulatory Information

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Any changes or modifications not expressed by the party responsible for compliance could void the user's authority to operate the equipment. Where shielded interface cables have been provided with the product or specified additional components or accessories elsewhere defined to be used with the installation of the product, they must be used in order to ensure compliance with FCC regulation.

Disposal of these materials may be regulated due to environmental considerations. For disposal or recycling information, please contact your local authorities, or in the U.S.A., contact the Electronics Industry Alliance web site at www.eiae.org.

The sound pressure level (LA) is less than 70 dB.

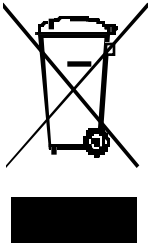
This Class A digital apparatus meets all requirement of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Réglement sur le matériel brouilleur du Canada.

For Use in European Union

WARNING

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.



In the European Union, this symbol indicates that when the last user wishes to discard this product, it must be sent to appropriate facilities for recovery and recycling. Contact your local representative or refer to http://recycle.carestreamhealth.com for additional information on the collection and recovery programs available for this product.

For Use in Japan

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波障害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

For Use in Taiwan

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Appendix A: Parts and Accessories

The following is a listing of parts and accessories related to your Carestream Gel Logic 212 PRO Imaging System (GL212 PRO). For information, contact Carestream Molecular Imaging Sales or your Carestream Molecular Imaging dealer. Contact Carestream Molecular Imaging Sales by:

- ✔ Utilizing our World Wide Web support pages at:

  mi.carestreamhealth.com

- ✔ Calling Carestream Molecular Imaging Sales at:

  In US and Canada 877-747-4357 or world wide 203-786-5657, between the hours of 8:00 a.m. and 6:00 p.m. (Eastern Standard Time) Monday through Friday.

For up to date dealer information, visit our WEB site at mi.carestreamhealth.com.

Catalog Number	Description
Gel Logic 212 PRO Emission Filters	
8103004	440 nm Filter, 52 mm
8456998	535 nm Filter, 52 mm
8420325	570 nm Filter, 52 mm
1192871	590 nm Filter, 52 mm
8519027	670 nm Filter, 52 mm
Accessories	
8056244	Gel Logic PRO 306 nm UV Epi-Illumination Module, 110VAC
1672450	Gel Logic PRO 306 nm UV Epi-Illumination Module, 220-240VAC
8257222	Gel Logic PRO 254 nm UV Epi-Illumination Module, 110VAC
8034662	Gel Logic PRO 254 nm UV Epi-Illumination Module, 220-240VAC
8105777	Gel Logic PRO 370 nm UV Epi-Illumination Module, 110 VAC
1282466	Gel Logic PRO 370 nm UV Epi-Illumination Module, 220-240VAC
8737678	Gel Logic 212 Pro White Light Table

Catalog Number	Description
Accessories, continued	
1661669	Gel Logic 212 Pro UV Shield
8406761	Gel Logic Gel Tray Accessory
1941442	Gel Logic Fluorescent Ruler
1411701	Gel Logic Field Flattening Screen
1693803	Mobile WorkStation, 4 foot
Computer & Printing Accessories	
1903426	Desktop PC w/17" Flat Panel Monitor & FireWire
8683336	Desktop Macintosh w/ 20" Flat Panel Monitor & FireWire
1296409	Sony UP-D897 Thermal Printer
8650582	High Density Glossy Thermal Black and White Paper
User's Guides	
8848137	Gel Logic 212 PRO User's Guide - English
1865476	Gel Logic 212 PRO User's Guide - French
8701419	Gel Logic 212 PRO User's Guide - German
Software Upgrades	
8177446	Molecular Imaging Software Standard 5.X to Network Upgrade
1537893	Molecular Imaging Software Standard 5.X to Regulatory Upgrade
1274596	Molecular Imaging Network Licenses, 5.X
Service Contracts	
1624923	Gel Logic 212 On-Site Premium Service Contract, 1 year
1892884	Gel Logic 212 On-Site Basic Service Contract, 1 year
8903601	Gel Logic 212 Depot Service Plan, 1 year
1091958	Gel Logic 212 Preventative Maintenance Service Plan, 1 year
Replacement Parts	
1861848	Gel Logic PRO Epi White Light Bulb Kit(1/pk)
1920362	Gel Logic 306 nm UV Transillumination Bulb Kit (4/pk)
8295727	Gel Logic 365 nm UV Transillumination Bulb Kit (4/pk)
1125632	Gel Logic PRO Platen Replacement Kit
8480899	Gel Logic PRO Filter Tool
1209964	Gel Logic PRO Leveling Feet (4/pk)
1573054	Gel Logic PRO FireWire Cable
1733823	Gel Logic PRO Serial Communication Cable

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