

# OMEGA LUM™ G Imaging System

User Manual



aplegen™

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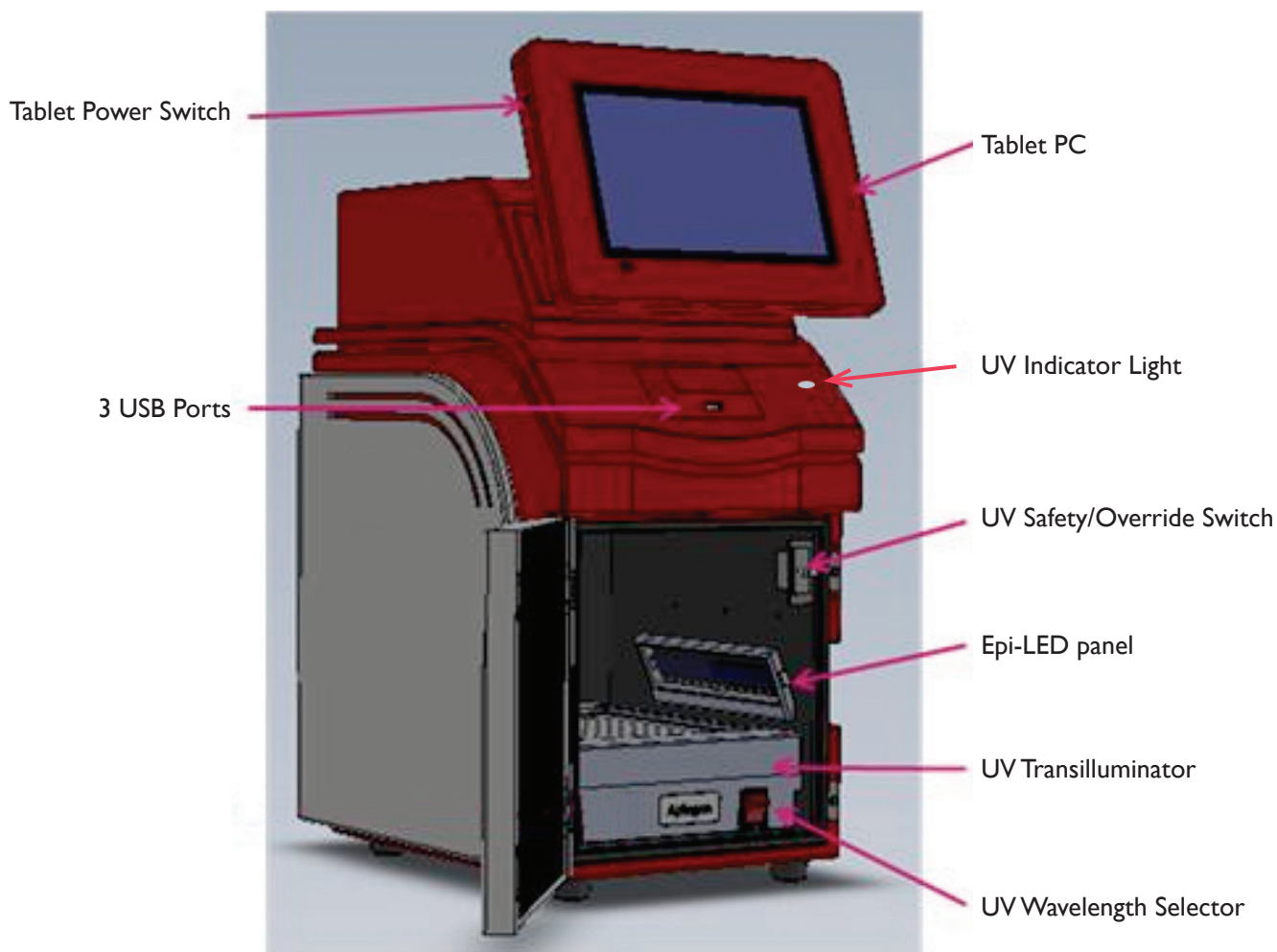


## System Overview

Congratulations on purchasing your new Aplegen Omega Lum G imaging system! The Omega Lum G is a powerful tool for gel documentation and chemiluminescent imaging. It generates publication quality 16 bit tiff images and comes completely assembled for quick installation. The Omega Lum G acquisition software has a clean user interface for imaging acquisition and viewing. With the superior optical design, the Omega Lum G captures high quality images without the need of focus or aperture adjustment. Images generated from the Omega Lum G are ideal for downstream quantitative analysis.

The Omega Lum G system includes the following key components:

- **Cabinet** – The cabinet is a light tight imaging station.
- **Camera** – Integrated with the cabinet, it is a 6 megapixels cooled scientific grade CCD camera.
- **UV Trans-illuminator** – The UV transilluminator offers both 302nm and 365nm transillumination. The UV lights are controlled via the software, and switch off automatically with image capture.
- **Epi-LED lighting** – The cabinet contains epi-white and blue LED panels for multiple imaging options.
- **Tablet PC** – A touch screen PC for system control and image acquisition.



## System Setup

**Warning! Excessive Weight Hazard** – Please use two or more people to lift the system. Failure to do so may result in personal injury and/or system damage.

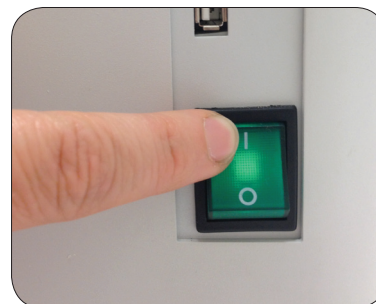
As with all electrical instruments, the Omega Lum G imaging system should be located away from water, solvents, or corrosive materials. Place the unit on a flat, stable surface with adequate clearance, and at least 4 inches, on all sides. Further, the system should be placed away from interfering electrical signals and magnetic fields. If possible, a dedicated electrical outlet should be used to eliminate electrical interference from other instruments in your laboratory. Aplegen recommends employing a surge protector to ward against potential electrical component damage from power surges.

Remove the system from the packaging and place on the work surface. The accessories are packaged separately in a smaller box. Remove the accessories, packaging, and protective films.

- The Omega Lum G has two power cables, one which powers the system components and one to power the onboard tablet. Locate the power cables and plug them into the back of the system.



- Once you have plugged in the power cords turn on the system power. The power switch is located on the lower right side of the cabinet.



- Turn on power to the tablet, the software will launch automatically upon startup. You are now ready to use the Omega Lum G.



## Adjust Tilt of the Tablet PC

To change the angle of the tablet PC, with one hand hold the tablet frame, loosen the locking knob slightly and adjust the tilt to the desired angle. Then retighten the locking knob.



## UV Safety Switch

The UV safety interlock switch is located on the inner door frame. Opening the door when the UV transilluminator is in use will trip the safety switch. Always exercise caution when working with UV. For more information see Appendix A.

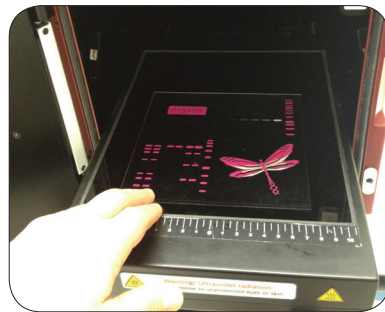
Remember to observe all standard UV safety precautions when overriding the UV Safety Switch. These include, but are not limited to UV protective face shield, gloves, lab coat, etc.



## UV Override

To override the UV switch to visualize or cut out bands take the following steps:

- Open the door, pull out the UV tray, and position your sample.



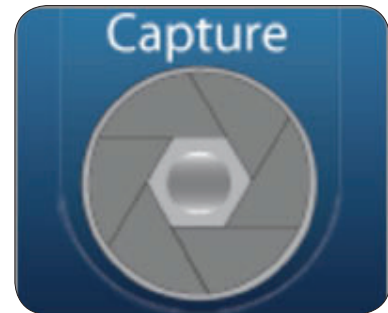
- Pull out the UV switch.



- Select the EtBr application. Uv override
- Select the manual option and set the time to between 5 and 10 minutes.



- Select capture, the UV light will come on.



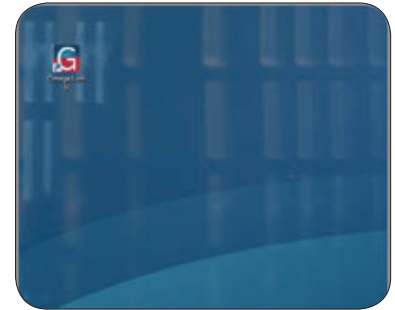
# Software

## Introduction

The Omega Lum G Image Capture Software comes already installed on the system tablet. The Aplegen USB drive in the accessory package contains a copy of the analysis software, three analysis software registration keys, copies of the user manuals for both the acquisition and analysis software, the quick installation guide. Aplegen recommends that the USB software drive be kept in a safe place for reference.

## Starting the Software

The acquisition software will launch automatically on startup. If it does not launch, or, if the software has been closed to the desktop, it can be launched by double clicking on the desktop icon. It can also be run from the program files folder.



- The software starts at the User Login Screen.
- Select a user, enter the password, and click the login button.
- The default Admin password is: admin

Aplegen recommends that the system administrator change the administrator password, and saving the new password in a secure location.

There is no default password for the Guest user. To login as a guest, select the guest User icon, leave the password box blank and click Login.



To create additional user profiles please see User Profiles on page 11.

## Taking an Image

Taking an image begins in the Imaging Studio Tab. The Omega Lum G has eliminated the need for focusing or aperture settings, simply place your sample in appropriate gel tray, select the application, and click acquire.

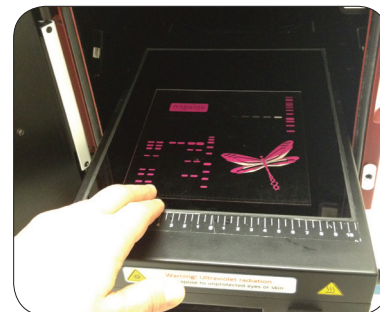
Basic Imaging involves:

1. Positioning your sample
2. Selecting your application
3. Capturing your image



## Positioning Your Sample

Place your gel either directly on the UV transilluminator or in one of the optional sample trays available from Aplegen. Use the positioning markers as a guide. The Omega Lum G captures the entire imaging area so you can place your sample on any part of the imaging surface. For ease of use, Aplegen recommends that you place your sample towards the front of the transilluminator.



## Selecting Your Application

The Omega Lum G has a dual wavelength transilluminator, epi white lights, epi blue lights, as well as a white light conversion screen, and chemi tray. Use the table below to select the correct combination for your application.

Sample Dye	Excitation	Conversion	Omega Lum G Application
Ethidium Bromide	UV Light		EtBr
SYBR® Green	Epi Blue		Syber Safe
SYBR® Safe	Epi Blue		Syber Safe
Coomassie Blue	UV Light	White Light Conversion Screen	Coomassie
Visible Light Gels	UV Light	White Light Conversion Screen	Coomassie
Chemiluminescent Blots	None		Chemi /Chemi (Faint Bands)

The White Light Conversion Screen should be used with the 365nm UV wavelength.

## Capturing Your Image

### Imaging with Default Applications

Once you have selected the appropriate light source and sample tray or conversion screen, launch the GelMan Acquisition Software.

- Select an application from the Application menu.



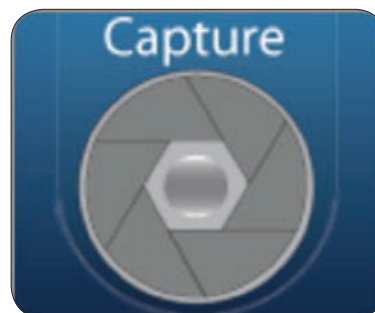
- Select auto or manual exposure.



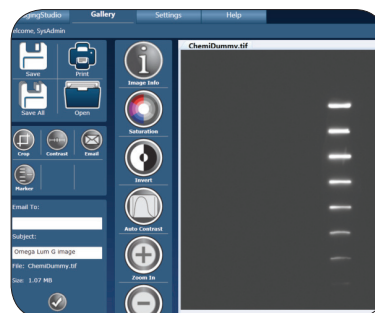


- Select Capture.

To stop capture for any reason, simply select the Capture button again.



Your image will appear in the Gallery Tab. Here you can make visual adjustments to the image and save or send the image to the desired location.



## Custom Applications

The Omega Lum G software has the option to create custom applications, allowing the user to tailor the imaging parameters. While the parameters can always be modified prior to capturing your image, creating a custom application saves these changes. To create a custom application:

- Select the default application you wish to modify.



- Then select the custom option from the same menu.



For example, if you are using an alternative dye and emission filter combination, select the EtBr application, select custom, modify the lighting, filters, or display settings as desired. Name the application, and save.

## Creating Custom Applications

The Custom Application option builds the application based on the original applications parameters, which have defined sensitivity levels, darkmaster correction, and auto-exposure methods.

Gel Applications use standard sensitivity, simplified bias and darkmaster corrections, and normal auto-exposure methods.

Chemi Applications use enhanced sensitivity, full bias and darkmaster corrections, and normal auto-expose methods.

Chemi (Faint Band) Applications use high sensitivity, full bias and darkmaster corrections, and enhanced auto-expose methods.

The sensitivity mode is based on the original application, while bias file and darkmaster correction as well as the auto-expose method are determined by the final application name. To use full bias file and darkmaster correction ensure that “Chemi” is included in the application name. To ensure that enhanced auto-expose is used, include “(Faint Bands)” in the application name. See the examples below for illustration.

**Example 1**, to create a custom application with standard sensitivity and full bias file and darkmaster correction:

Select a gel application.

Select Custom application.

Adjust the lighting, exposure, and display options as desired.

Save and name the application “Chemi Example 1.”



**Example 2**, to create a customer application with enhanced sensitivity, and simplified bias file and darkmaster correction:

Select a chemi application.

Select Custom application.

Adjust the lighting, exposure, and display options as desired.

Save and name the application “Example 2.”



**Example 3**, to create a custom application with enhanced sensitivity, simplified bias file and darkmaster correction, and enhanced auto-expose options:

Select a chemi application.

Select Custom application.








Adjust the lighting, exposure, and display options as desired.

Save and name the application “(Faint Bands) Example 3.”
















## Software Features

### Imaging Studio

-  • Live Mode – A quick display of what is inside the cabinet, using the epi white lights for illumination. This is not a preview of the image.
-  • Saturation – Oversaturated pixels appear in red.
-  • Invert – Inverts the black and white values of the image in the display.
-  • Auto Contrast – Calculates a balanced contrast ratio.
-  • Zoom in – Zooms in on the image.
-  • Zoom out – Zooms out on the image.
-  • Capture – Use this button to start the acquisition process.

### Gallery

The Omega Lum G Image Capture Software allows the user to take images and modify the visual aspects such as contrast and saturation. The user can also open and modify previously acquired images.

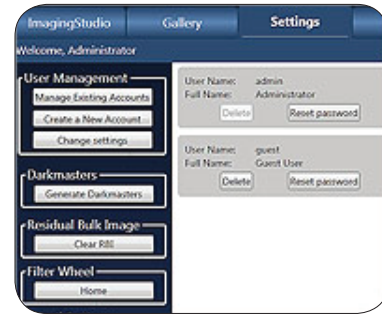
-  • Save – Opens the Save or Save As dialogue boxes.
-  • Save All – Allows the user to save multiple images at the same time.
-  • Print – Print the open image.
-  • Open – Open an image from a saved file location.
-  • Crop – Opens the Crop Image tool. To crop, select the icon. A + sign will appear in place of the mouse arrow when hovering over the image. Click and drag the mouse across the desired area. A new image will open in a new tab.
-  • Contrast – Use the slide bars to adjust the image contrast.
-  • E-mail – Use to send image files.
-  • Marker – Only available for use with chemi images, creates a new image that overlays the marker file and the chemi image.
-  • Image Info –Displayed Information: Image Width, Image Height, Bit Depth, Exposure Time (ms), Date Taken, Taken By, Comment.
-  • Invert – Gives the inverse of the image.
-  • Auto Contrast – Calculates a balanced contrast ratio.
-  • Zoom in – Zooms in on the image.
-  • Zoom out – Zooms out on the image.

## Administrator

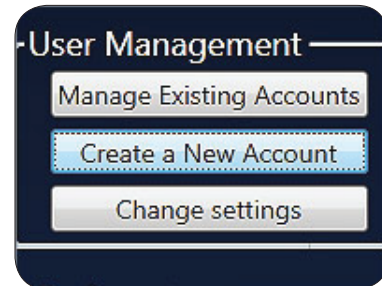
The Administrator user can create and manage user accounts, generate new bias and darkmaster files, and edit the e-mail preferences. The default password for this user is admin. It is recommended that the administrator change the password once the system is set up and keep the new password in a safe location.

## User Profiles

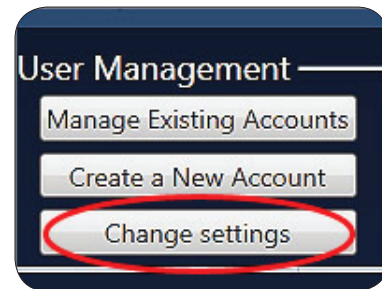
- The Omega Lum Acquisition Software allows you to create individual user profiles.
- To create a new user profile, login as the Administrator user, you will be redirected to Administrator Settings tab.



- Select the Create a New Account option and enter the requested information.
- If no password is entered, then no password will be required to login.



- To change the admin password and other admin settings, select change settings.

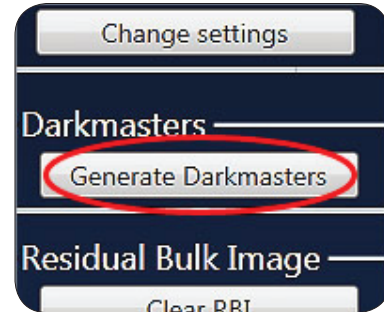


## Bias and Darkmaster Files

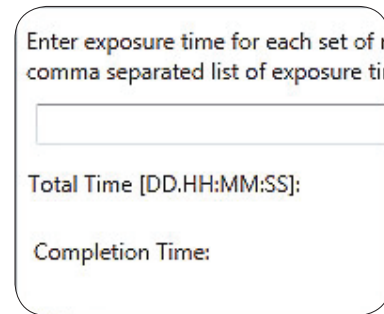
Bias and darkmaster files provide for automatic background correction during long exposures. They are unique for each camera. Bias and darkmaster files have already been created for your system for 1, 3, and 9 minute exposure times. If you anticipate taking longer exposures you may want to create a new set of darkmaster files.

- To create darkmaster files, login as an administrator, and navigate to the Settings tab.

Select Generate Darkmasters.



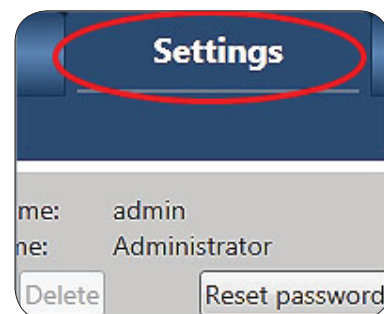
- Enter the desired exposure times in the popup window. The exposure times would be comma separated only.
- Click generate. The total time remaining for the completion of the darkmasters will show on the screen. Do not interrupt this process.
- The new set of bias and darkmaster files will overwrite any previously generated files.



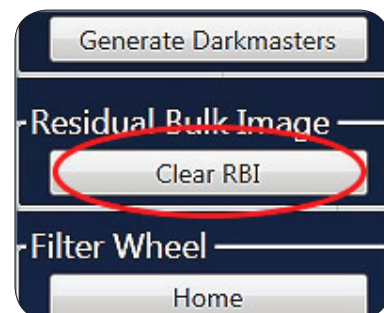
## Residual Bulk Image Utility

To ensure an optimal imaging environment during chemi imaging the Omega Lum G offers the Residual Bulk Image (RBI) Utility.

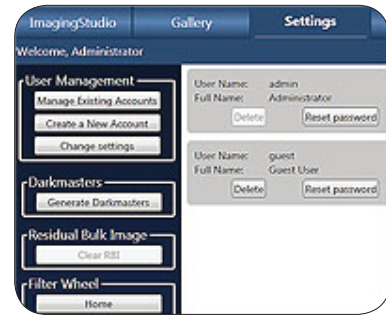
- Select the Settings Tab.



- Select the Residual Bulk Image Utility. It will take two (2) minutes to run.

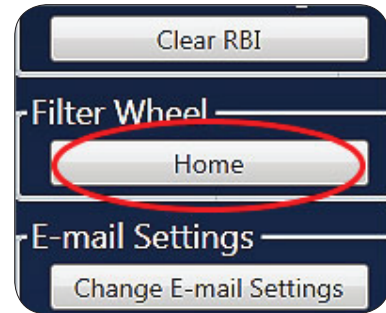


- Once the utility has completed image your chemi sample as normal.



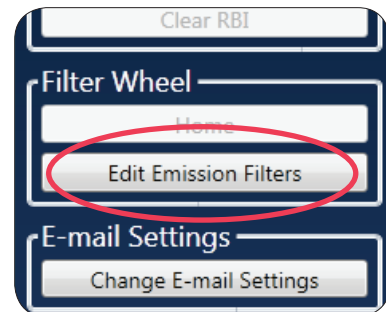
### Filter Wheel Home

- The filter wheel of the Omega Lum G homes automatically on startup. If you are uncertain of the filter wheel's position use the Filter Wheel Home Utility to return to the home position.



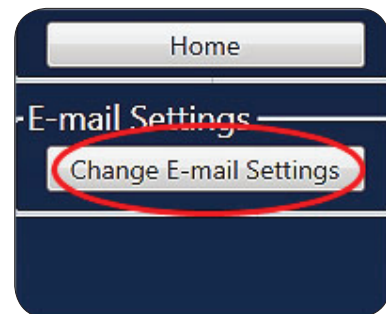
### Edit Emission Filters

- Use this feature to name emission filters that are added later.



### E-mail Settings

- The e-mail settings must be entered first in order to enable files to be sent by e-mail. You will need your STMP server information. If you do not know this information check with your system administrator or IT department.



### Remove Custom Applications

- The administrator can remove applications that are no longer useful.

## Appendix A

### Omega Lum G System Specifications

Camera resolution	6M pixels
Epi-illumination	White& Blue LED
Trans-Illumination	302 nm/365nm
Lens	Fixed Focus (f=18mm)
Maximum Field of View	21 cm x 27 cm
Image output	16-bit Tiff, Jpeg
Power requirement	110-240V, 50/60Hz, 72W
Dimensions (W x D x H)	33cm x 48cm x 74cm
Weight	31.2 kg

### Copyright and Trademark Information

All goods and services are sold subject to the terms and conditions of sale of the company within Aplegen Inc. which supplies them. Aplegen Inc. reserves the right, subject to any regulatory and contractual approval, if required, to make changes in specifications and features shown herein, or discontinue the product described at any time without notice or obligation. Contact Aplegen Inc. representative for the most current information. Omega Lum™, UltraQuant™, the Aplegen workmark are a trademark of Aplegen, Inc. All other trade names are the property of their respective owners.

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## Appendix B – Safety

### CE/CSA Conformity

The following Omega Lum G Imaging Systems,

Models: **Omega Lum G**

Are in conformity with the provisions of the following EC Directives, including all amendments, and national legislation implementing these directive:

Low Voltage Directive 2006/95/EC

EMC Directive 2004/108/EC

And that the following harmonized standards have been applied:

EN61010-1: 2001

EN61326-1: 2006: Class A

EN61000-4-2, EN61000-4-3, EN61000-4-4, EN61000-4-5, EN61000-4-6, EN61000-4-11

### UV Safety Precautions



The Omega Lum G system comes with a built-in Ultra-Violet (UV 200-400nm) Trans-illuminator inside the system. Exposure to UV radiation can cause permanent damage to the eyes and skin. The system enclosure confines the radiation within the system and shields the user from exposure. The system is also equipped with a two-way safety interlock switch which automatically cuts off the power to the trans-illuminator when the door is open during normal use.

The Omega Lum G imaging system belongs to Class A equipment, and fulfills the limit values of table 3 but not table 4 of EN 61326:1997+A1+A2+A3.

It may become necessary to defeat the safety lock or operate the transilluminator outside the system for service. In this case, be sure to use the following safety precautions:

- Always wear UV-protected eyewear that is specified by the manufacturer as providing protection at the wavelength(s) used, making sure that the eyewear protects any areas wear radiation may come through (UV sunglasses may not prevent UV radiation from coming in through the sides or around the lenses).
- Always cover all skin that may be exposed to UV light, especially the face, neck, hands, and arms.
- Always make sure that any UV protection devices (such as the safety switch on the light cabinet apparatus) are working properly. If not, discontinue use until the device(s) are properly repaired.
- Please use only UV lamps in the trans-illuminator.



## Electrical Safety Precautions

Be sure to take proper precautions when handling any electrical equipment. NEVER work on any live circuit, fixture, receptacle, or switch. Safety rules you should follow whenever working with any electrical appliance include:

- Always shut off power at the main disconnect before changing a fuse.
- Always shut off power to the circuit before repairing or replacing a switch, receptacle, or fixture.
- Always tape over the main switch, empty fuse socket, or circuit breaker you are working on.
- Always check that the circuit is dead before beginning work on it. Using a circuit tester or voltmeter can help you determine this.
- Always unplug any appliance before repairing it.

The earth terminal, intended for connection to an external protective conductor for protection against electric shock in case of a fault, is located on the inside of the back panel.

## Hot Surface Warning



Under normal conditions, the temperature of glass surface of UV transilluminator is below 50 °C and safe to touch. However, if the system malfunctions, it is possible that the glass surface temperature exceeds 80°C. Please exercise caution when touch the glass surface with hand when this occurs.

## Waste Electrical and Electronic Equipment (WEEE)

ENG		This symbol indicates that the waste of electrical and electronic equipment must not be disposed as unsorted municipal waste and must be collected separately. Please contact an authorized representative of the manufacturer for information concerning the decommissioning of your equipment.
FRA		Ce symbole indique que les déchets relatifs à l'équipement électrique et électronique ne doivent pas être jetés comme les ordures ménagères non-triées et doivent être collectés séparément. Contactez un représentant agréé du fabricant pour obtenir des informations sur la mise au rebut de votre équipement.
GER		Dieses Symbol kennzeichnet elektrische und elektronische Geräte, die nicht mit dem gewöhnlichen, unsortierten Hausmüll entsorgt werden dürfen, sondern separat behandelt werden müssen. Bitte nehmen Sie Kontakt mit einem autorisierten Beauftragten des Herstellers auf, um Informationen hinsichtlich der Entsorgung Ihres Gerätes zu erhalten.
ITA		Questo simbolo indica che i rifiuti derivanti da apparecchiature elettriche ed elettroniche non devono essere smaltiti come rifiuti municipali indifferenziati e devono invece essere raccolti separatamente. Per informazioni relative alle modalità di smantellamento delle apparecchiature fuori uso, contattare un rappresentante autorizzato del fabbricante.
SPA		Este símbolo indica que el equipo eléctrico y electrónico no debe tirarse con los desechos domésticos y debe tratarse por separado. Contacte con el representante local del fabricante para obtener más información sobre la forma de desechar el equipo.
SWE		Denna symbol anger att elektriska och elektroniska utrustningar inte får avyttras som osorterat hushållsavfall och måste samlas in separat. Var god kontakta en auktoriserad tillverkarrepresentant för information angående avyttring av utrustningen.

## Appendix C – Basic Tablet Operations

The Omega Lum G uses a touch screen tablet PC to run the imaging station. For in depth directions refer to the Acer Tablet User Manual. However, here are some basic navigation tips to help you get started.

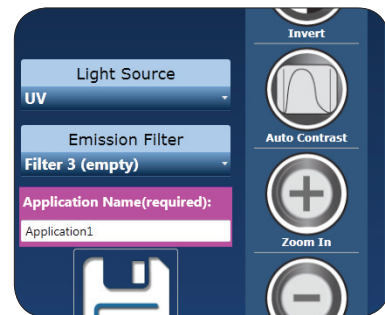
- Use your finger as you would a mouse.
- One touch or tap to select.
- To Scroll tap once, then drag the scroll bar as desired.
- Double tap an icon to launch an application.
- To “right click” touch and hold your finger to the screen. A circle will appear around the point, when it completes, lift your finger and the options menu will appear.
- To exit the menu, tap anywhere on the desktop.
- To enter text information touch and hold on the far left side of the screen. This will cause the virtual keyboard to appear as a tab. Touch the tab to select.
- The windows button on the lower left side of the tablet can be used to open the Windows Main Menu.
- For ease of installation printer drivers for the Mitsubishi P93D Thermal Printer have been pre-installed. To complete the installation simply plug in the USB cable and follow the prompts on the screen.

## Appendix D – Routine Maintenance

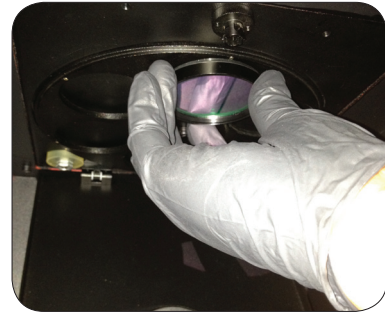
The Omega Lum G system is robust and there is minimal routine maintenance. The system should be kept clean and any spills cleaned up immediately. Simple green or ethanol can be used to remove dried spills. Use only a soft cloth to clean the UV transilluminator glass, as harsh clothes can leave scratches. Replace UV bulbs and the rubber camera gasket as needed. In the event of condensation or frost appearing in an image it may be necessary to replace the desiccant plug in the camera.

### Adding or Replacing Filters

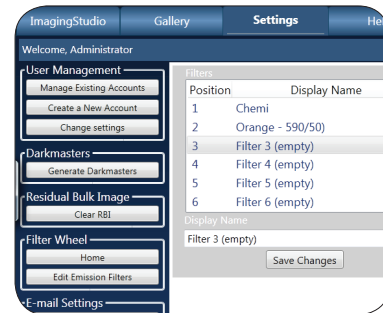
- To add or replace a filter it must be physically added to the system as well as loaded into the software.
- To add a filter:
  - Create a custom application and select the filter position you wish to add.
  - Select capture. This will rotate the filter wheel into the desired location.
  - Open the filter wheel shield.



- Screw in the new filter.
- Close the filter shield.



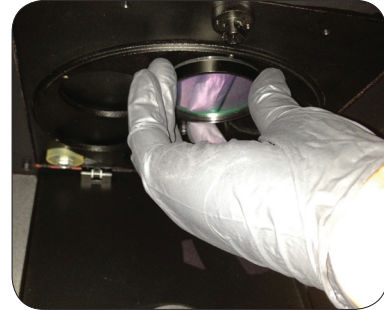
- Under the administrator settings enter the correct filter name for the new filter's location.



- To replace a filter:
  - Select an application with the filter in question.
  - Select capture to move the filter into place.
  - Open the filter wheel shield.



- Remove the old filter and screw in the new filter.
- Close the filter shield.

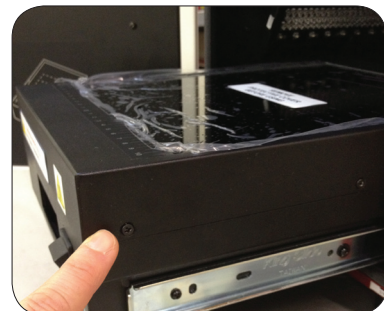


## Replacing UV bulbs

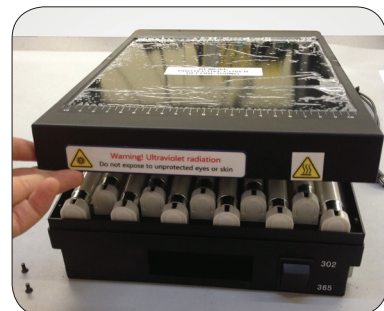
- The UV bulbs can be replaced without removing the UVT from the system.
- Open the door.
- Pull out the UVT.



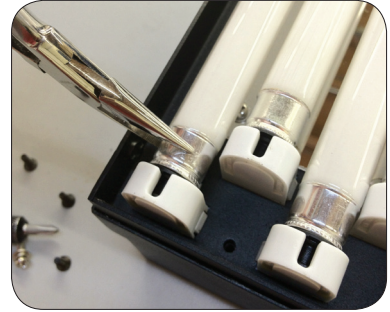
- Remove the 4 screws (2 on each side) from the UV glass assembly.



- Lift the UV glass assembly off to reveal the bulbs.



- Using a pair of needle nose pliers with grip as an aid, rotate the bulb and lift it out of the ballast housing.



- Replace the bulb and rotate the bulb to the locked position.
- Replace the UV glass assembly and screws.

