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Glossary
Thank You and Welcome

Dear Researcher:

We thank you for your investment in our Thermo Scientific™ myECL™ Imager. We have worked to design a highly functional, yet intuitive, imager that will provide you with valuable images and data of high-resolution and quality.

This manual has been written as a concise guide for the start-up, use and customization of your myECL Imager unit and acquisition software. Detailed sections covering the imager, image acquisition, file management, maintenance and troubleshooting provide comprehensive information. We encourage you to read the entire manual for a full understanding of the imager, but a Quick Start guide is provided if you want to begin using your new imager immediately.

Thermo Scientific products are always at the forefront of scientific instrument design, and we strive to design and produce instruments that can help you achieve your research goals. Your feedback is a valuable tool that we use for future product development, so please contact us if you have any questions, comments or suggestions.

**IMPORTANT** Review and implement guidelines for proper set-up before installation. Locate the imager away from water, solvents, corrosive materials, strong magnetic fields and vibration sources.

**IMPORTANT** The imager weighs 65lbs (29.5kg). Please use two people to lift it by grasping the bottom and the handle at the rear of the imager. Using two people, place the imager onto the benchtop given proper space, electrical and environmental requirements. Remove the outer packaging materials.

**IMPORTANT** Imager use outside of the workflows described in this manual may put the operator at risk of dangerous exposure to electrical shock or radiated emissions. Do not use this instrument for any purposes or in any configurations not described in this manual.
Contacting Us

For technical or service assistance on the MYECL Imager:

- U.S. Customers: 1-800-874-3723
- International Customers: 1-815-968-0747
- European Customers: +49-228-8502820
- Asia/Pacific Customers: +81-3-5826-1659

Technical Support email for U.S. and international customers: pierce.ts@thermofisher.com

Technical Support email for European customers: perbio.eurotech@thermofisher.com

Technical Support email for Asia/Pacific customers: Info.bid.jp@thermofisher.com

For more information about the Thermo Scientific Protein Biology product line, please visit our website: www.thermoscientific.com/pierce

Imager Overview

The MYECL Imager is designed to be a useful tool for the researcher needing intuitive equipment and software with fast imaging capabilities.

Included Accessories

Your imager purchase includes the following accessories (each quantity 1):

- Thermo Scientific MYImageAnalysis Software
- MYECL Imager User Manual CD
- Chemiluminescence exposure screen
- White light conversion screen
- UV exposure screen
- Imaging reference target
- Quick start guide
- USB memory device
- Stylus
- Stylus holder
- Power cord with C13 connector

Optional items, including additional filters and UV bulbs (365nm), may be added to the above list depending on the items ordered with the imager.

Note: Upon receiving your imager, please verify you have received all of the items listed above. Please contact Thermo Scientific Technical Support for assistance.
Functionality

The myECL Imager provides:

- UV and white light illumination source for imaging of samples
- Acquisition of chemiluminescent Western blot and electrophoresis gel images with varying resolution (1×1, 2×2, 3×3, 4×4 and 8×8 binning)
- Low-noise, high-dynamic range CCD camera detection
- Hardware and software optimized for image acquisition
- One-touch image acquisition
- Multiple image acquisition with pre-set and user-defined settings

myECL Imager Acquisition Software

Each imager arrives loaded with the myECL Imager Acquisition Software. This manual gives detailed information on using all software functions and modes.

The acquisition software allows you to acquire images using three different modes:

Chemiluminescence (Chemi) mode for image acquisition of self-emitting, chemiluminescent light

Ultraviolet (UV) mode for image acquisition of UV-transmitted light

Visible (Vis) mode for image acquisition of reflected and/or transmitted light
MYImageAnalysis™ Software

The MYImageAnalysis Software is supplied with the MYECL Imager as a vital tool for extracting information from your captured images. The analysis software features:

- Identify lanes and bands automatically
- View and compare up to six images simultaneously
- Open multiple image formats (e.g., .tif, .jpeg, .png, etc.)
- Export images and data reports directly to Microsoft™ Excel™, Word™ and PowerPoint™ software for further analysis and presentations
- Analyze molecular weight – determine the Rf and molecular weight of protein or nucleic acid bands using installed or custom added molecular weight markers
- Edit digital images – image editing tools include contrast adjustment, image rotation, cropping, de-speckling, false color application and text annotation
- Calculate sample purity automatically based on band and lane intensity
- Perform lane profile densitometry
- Quantitate bands or regions relatively or absolutely

Acquired images are saved and exported as .tif files, which can be directly opened in the analysis software.
Chapter 2  Imager

Installation Guidelines

IMPORTANT Review and implement guidelines for proper set-up before installation. Locate the imager away from water, solvents, corrosive materials, strong magnetic fields and vibration sources.

IMPORTANT The imager weighs 65lbs (29.5kg). Use two people to lift it by grasping the bottom and the handle at the rear of the imager. Using two people, place the imager onto the benchtop given proper space, electrical and environmental requirements. Remove the outer and inner packaging materials.

Space Requirements

The imager requires a stable laboratory bench or table capable of supporting 65lbs (29.5kg). Provide a minimum clearance of 3 inches (7.62cm) at the rear of the imager to allow adequate ventilation for camera cooling and access to the power cord and switch. In addition, allow sufficient space to open the front-facing imager door to place sample within the imager. Instrument dimensions are listed in Table 2-1.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Inches</th>
<th>Centimeters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>12.25</td>
<td>31.1</td>
</tr>
<tr>
<td>Depth</td>
<td>22</td>
<td>55.9</td>
</tr>
<tr>
<td>Height</td>
<td>21</td>
<td>53.3</td>
</tr>
</tbody>
</table>

Electrical Requirements

A grounded circuit capable of delivering the appropriate current and voltage is required for installation. Electrical requirements can be located on the imager label on the rear panel of the imager and in Table 2-2. The imager electrical system adjusts to the proper voltage for the respective country (Table 2-3). Connect the imager power cord to the rear left side panel of the system and plug into a grounded power outlet.
Table 2-2. Imager electrical ratings.

<table>
<thead>
<tr>
<th>Electrical Parameter</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Voltage (VAC)</td>
<td>120-240</td>
</tr>
<tr>
<td>Frequency (Hz)</td>
<td>50-60</td>
</tr>
<tr>
<td>Power Rating (W)</td>
<td>120</td>
</tr>
<tr>
<td>Fuse (power center)</td>
<td>T4AL, 250V, 4A</td>
</tr>
</tbody>
</table>

Table 2-3. Imager electrical requirements for major countries.

<table>
<thead>
<tr>
<th>Region</th>
<th>Voltage (VAC)</th>
<th>Frequency (Hz)</th>
<th>Amps (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>US and Canada</td>
<td>120</td>
<td>60</td>
<td>1.0</td>
</tr>
<tr>
<td>Europe</td>
<td>220</td>
<td>50</td>
<td>0.5</td>
</tr>
<tr>
<td>UK</td>
<td>240</td>
<td>50</td>
<td>0.5</td>
</tr>
<tr>
<td>Japan</td>
<td>100</td>
<td>50</td>
<td>1.2</td>
</tr>
<tr>
<td>China</td>
<td>220</td>
<td>50</td>
<td>0.5</td>
</tr>
<tr>
<td>India</td>
<td>230</td>
<td>50</td>
<td>0.5</td>
</tr>
<tr>
<td>South Korea</td>
<td>220</td>
<td>60</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Environmental Requirements

For optimal performance, maintain a constant laboratory temperature range of 15-25°C (59-77°F) with relative humidity between 15-70%. To allow adequate camera cooling, do not place the imager in direct sunlight.

Computer Requirements

The imager is operated by an integrated computer, which is accessed through the touchscreen.

The MYImageAnalysis Software program is included with the imager purchase. To run the MYImageAnalysis Software properly, workstations must meet the minimum performance requirements listed in Table 2-4.

Table 2-4. Recommended computer requirements for MYImageAnalysis Software.

<table>
<thead>
<tr>
<th>Description</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating System</td>
<td>Windows 7, Vista*, or XP*</td>
</tr>
<tr>
<td>Processor</td>
<td>Pentium* 4 @ 2.4GHz</td>
</tr>
<tr>
<td>Memory (RAM)</td>
<td>512MB</td>
</tr>
<tr>
<td>Hard Drive</td>
<td>2GB</td>
</tr>
<tr>
<td>Screen Resolution</td>
<td>1280 x 1024†</td>
</tr>
</tbody>
</table>

†Refer to the MYImageAnalysis Software User Manual for more information.
Imager Images with Feature Locations

Imager Front View

Figure 2-1. Imager front and side views detailing main components.
Imager Front View with Sample Door Open

Figure 2-2. Imager view with the sample door open and the transilluminator extended.
Imager Rear View

Figure 2-3. Rear imager view.
Start Up

IMPORTANT Allow the imager to equilibrate for 20-30 minutes after each initial hard power up. This ensures that the camera is optimally cooled before image acquisition.

Hard Start Up

To perform the Hard Start Up procedure:

1. Turn on the hard power switch located at the bottom of the rear imager panel. The hard power switch provides power to all of the imager components.

2. Turn on the soft power switch on the front of the imager. This switch activates the internal computer, touchscreen and thermoelectric camera cooler.

3. The computer boots up.

4. The user is prompted to enter the current date, time and time zone. Upon completion, the screen automatically moves to the default Chemi acquire screen.
Soft Start Up

If the imager is powered down by the Soft Shut Down procedure, then a Soft Start Up can be done using the front, soft power switch. The soft power switch is the blue lighted switch located just above the front door and below the touchscreen. This switch allows the user power down the imager computer and touchscreen, while maintaining power to the camera cooling unit. This feature allows the user to power down the imager, but, once needed, quickly restart the imager without having to wait for the camera temperature to re-equilibrate.

1. Turn on the front soft power switch. The computer restarts and the touchscreen initiates with the default Chemi screen.

2. Begin normal operation of the imager.

Shut Down

Note For extended periods of inactivity, the imager can be hard powered off; however, for typical daily use, optimal camera temperature, and best image quality, avoid hard powering on and off the imager.

Soft Shut Down

The Soft Shut Down procedure uses only the front soft power switch.

1. Save any current image analyses.

2. Safely remove any USB flash drives.

3. Turn off the soft power switch.

4. The computer and touchscreen shut down and turn off. The fans continue running as needed. The camera cooler remains powered and continues to maintain the camera at the optimal -25°C.

5. The transilluminator and epi-white lights turn off.

Hard Shut Down

The Hard Shut Down procedure uses the hard power switch on the rear of the imager. This turns off all power to the imager, including the computer and camera cooler.

1. Follow the Soft Shut Down procedure.

2. Turn off the hard power switch at the rear of the imager.
**USB Features**

The three external USB ports on the right side of the imager can be used for flash drives, which can be connected through any of the USB ports for easy file management.

**Note** The Export button always exports files to the E:\ drive, which is automatically the first additional drive connected to the imager. When connecting an external hard drive to the imager, assign the external drive to a letter other than C, D or E.

![Figure 2-3. Location of upper USB port.](image)

![Figure 2-4. Location of lower USB ports.](image)
Imager Settings

The **Tools** button in the top right corner of the acquisition software screen allows access to basic imager settings and functionality.

**Tools**

Select the **Tools** button to open the **Tools** screen.

The **Tools** screen displays the serial number of the system and the current software version installed in the system. Large buttons for **Date and Time**, **Printer**, **Filters**, and **Administrator Settings** are displayed on the screen. Select the appropriate button to enter setup for each item.
**Date and Time**

To correct the date, time or time zone:

1. Select the **Date and Time** button. A Windows clock and calendar is displayed.

2. Choose the correct settings as needed.

3. Select the **Apply** button, followed by the **OK** button to save the settings.
To select a default printer for imager exporting:

1. Select the Printer button. A Printers and Other Devices screen is displayed.

2. Choose the appropriate printer from the listed selections. Plug-and-play printers automatically populate the list. Select Add a Printer from the left column if the printer is not a local printer or plug-and-play type. A network printer can also be selected as a default printer.

Note Consult your facility’s IT department for assistance in setting up network printers.
Filters

The imager has four default filter positions:

Position 1: No filter (for use in Chemi applications)

Position 2: Orange filter (for use in UV and Vis applications)

Position 3: No filter

Position 4: No filter

The imager is supplied with an orange filter in Position 2, but green, red and blue filters can also be purchased for additional applications. Install additional filters into Positions 3 and 4. Assign filters to the different positions in the Filter Menu Selections in the Tools menu.

1. Select the Filters button. The following menu appears:

2. Positions 2, 3 and 4 use selectable drop-down menus to enable filter assignment: Chemi (empty), Orange, Green, Blue and Red. Select the choice for each filter position.
3. When complete, select the **Save** button at the bottom of the menu to save the changed defaults.

**Table 2-5.** Imager filter specifications and corresponding dyes.

<table>
<thead>
<tr>
<th>Filter Color</th>
<th>Wavelength Range (nm)</th>
<th>Compatible Dyes and Stains</th>
<th>Sample Screen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>445-480</td>
<td>DAPI</td>
<td>Clear screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>AMCA</td>
<td>Clear screen</td>
</tr>
<tr>
<td>Green</td>
<td>515-560</td>
<td>SYBR* Green</td>
<td>Clear screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SYBR Gold</td>
<td>Clear screen</td>
</tr>
<tr>
<td>Orange</td>
<td>545-630</td>
<td>Ethidium Bromide</td>
<td>Clear screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hoechst Blue§</td>
<td>Clear screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coomassie Blue</td>
<td>White screen†</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Imperial*</td>
<td>White screen†</td>
</tr>
<tr>
<td>Red</td>
<td>620-645</td>
<td>SYPRO* Ruby</td>
<td>Clear screen</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Deep Purple*</td>
<td>Clear screen</td>
</tr>
</tbody>
</table>

§ With the mECL Imager, the orange filter is optimal for Hoechst Blue imaging.

† Coomassie Blue and Thermo Scientific Imperial Stains do not require the orange filter; however, these stains require the white light conversion screen. UV and Vis modes use the orange filter in Position 2 by default.
Administrator Settings

Selection of Administrator Settings displays the following screen requiring a User Name and Password. Only the designated administrator should access this section.

Users do not typically need to access Administrator Settings. Only the facility administrator should have access to these functions through password access. The default user name and password are myecl and 1234, respectively. To avoid improper access, the designated administrator needs to change this username and password once the imager is installed. To change the password, select the Change User Name/Password button.
Set Image Gallery Location

The **Set Image Gallery Location** button allows the administrator to set up a default pathway for saving acquired images. The imager has a default image gallery location, “Computer – Local Disk (D:\) – Gallery_1”. The image gallery location can be changed to another folder in a local or network drive. When **Set Image Gallery Location** is selected, the program automatically creates a “Gallery_1” folder if there are no previously saved gallery folders in the selected folder.

1. Select the **Set Image Gallery Location** button.
2. Browse for the appropriate gallery location using the folder menu.
3. Select **OK** after choosing the appropriate storage location.

Allow Remote Access

Remote access for maintenance and troubleshooting is possible with the imager. After selecting the **Allow Remote Access** button, the administrator views the following screen:
Follow the instructions provided and contact our Technical Support team for questions or to troubleshoot the imager.

U.S. contact: 800-874-3723
International contact: +1-815-968-0747
Europe contact: +49-228-8502820
Asia/Pacific contact: +81-3-5826-1659

Note Remote access requires the imager to be connected to a network with internet access. Contact your facility’s IT department regarding correct set up and use of network connections.
Other OS Settings

This function allows the administrator to access the Windows Control Panel to change system and user configurations as needed.

**Note**  Only qualified administrators should have access to this area. Altering configurations can cause imager errors.

Reset Default Focus Position

The default focus position can be reset or changed by selecting the *Reset Default Focus Position* button. The focus position may need resetting if the current default focus position does not provide in-focus images. The administrator can control this position by going to *Tools > Administrator Settings > Reset Default Focus Position* and using the slider bar to focus in or out to achieve the required sharpness in Chemi, UV and Vis modes.

Update Software

This function installs and updates the acquisition software when a program update becomes available.

Change Username and Password

This function allows the administrator to change the username and password for accessing the administrator settings.
Create Dark and Bias Images

Dark current is the thermal noise generated from a CCD (charge coupled device). This thermal noise is proportional to a power law of CCD temperature. The bias noise is introduced as the analog signal is converted to a digital signal. The MYECL Imager applies dark and bias noise compensation using dark and bias masters upon image acquisition.

This function allows the administrator to create new dark and bias master files. Dark and bias masters need to be updated only when strong CCD noise appears on acquired images. It takes ~14 hours to create all of the dark and bias masters in the system; therefore, creation of new dark and bias masters is best accomplished by beginning the process at the end of the day and allowing the masters to be created overnight.

1. Select the **Tools** button.

2. Select the **Administrator Settings** button. Enter the User Name and Password. Select the **Login** button.

3. Select the **Create Dark and Bias Images** button. The following screen is displayed:

   ![Create Dark and Bias Images Screen]

   - Dark and bias masters created 2/13/2013.
   - Dark and bias image collection requires approximately 14 hours, 12 minutes, 34 seconds.
   - **Create bias masters**
   - **Create dark masters**

   **Start**

   **Cancel**

4. Select **Start**. To create only dark or only bias masters, choose the corresponding check box next to the desired selection.

   **Note** Select the **Cancel** button to return to the **Administrator Settings** screen.

5. Place the black sample screen on the transilluminator and close the door.
6. Select **OK** to begin or **Cancel** to return to the **Administrator Settings** screen.

1. Place the black sample screen on the transilluminator

2. Close the door and select **OK** to begin dark/bias master acquisition

![](image1.png)

7. Select **OK**. The following screen will appear:

![](image2.png)

**Note** To avoid inaccurate dark and bias master creation, the door must remain closed during the entire dark and bias image acquisition process.

**Note** Interruption of dark and bias master creation by opening the door or selecting the Stop button stops the process and discards all acquired masters. In this case, previous dark and bias masters are used for subsequent image acquisition.
8. Once the dark and bias image acquisition process is complete, the following screen appears:

![Dark and bias image collection is complete.]

9. Select **OK** to return to the *Administrator Settings* screen.

**Return**  Select **Return** to return to the previous **Tools** menu.
Chapter 3  Image Acquisition

Imager Settings

Upon powering up the imager, the MYECL Imager welcome screen is displayed.

Welcome to

Thermo Scientific MYECL Imager

Note  When performing the Hard Start Up procedure, the thermoelectric camera cooler is NOT at the ideal temperature of -25°C. After powering up the imager, allow 10-30 minutes for the camera to cool to the optimal temperature.

Live Camera

Enabling the Live Camera button displays the streaming image from the camera and allows access to Camera Settings (Focus, Aperture, Resolution/Sensitivity, Filter and Digital Zoom). Disabling the Live Camera button displays previously acquired images. Opening the imager door enables Live Camera and turns on the epi-white lights. Refresh rate of live image display depends on the binning setting selected in Resolution/Sensitivity (greater resolution requires more time to display).

Live Camera in Chemi Mode

Selection of Live Camera in Chemi mode turns on the epi-white lights. ChemiV images are captured and saved to the Gallery; however, they are not displayed in the image tab if Live Camera is not enabled before image acquisition in Chemi mode.
**Live Camera in UV Mode**

Selection of Live Camera in UV mode turns on the UV light. The live image is displayed with the exposure time used in the previous image acquisition in UV mode unless the user changes the exposure time or changes the mode.

**Live Camera in Vis Mode**

Selection of Live Camera in Vis mode turns on the UV and epi-white lights. The live image is displayed with the exposure time used in the previous image acquisition in Vis mode unless the user changes the exposure time or changes the mode.
Camera Settings
Available in Chemi, UV and Vis Modes

Note Camera Settings are only available with the live image display.

Focus Icon for performing minimal focusing adjustments that may be needed as varying object depths change.

Note An Imaging Reference Target is supplied with the imager. Use this target when performing camera focusing.

Digital Zoom Icon for increasing the camera zoom level. Slider bars appear after increasing the zoom level to center the image acquisition area. Image acquisition with Digital Zoom results in capture of the zoomed image.

Resolution/Sensitivity Icon for adjusting the camera image sensor’s degree of response to light; the number of camera pixels used to capture an image. To enhance detection sensitivity, the pixels, or light capturing units of the CCD chip, can be combined or binned. The process of binning bundles multiple pixels, which effectively increases the amount of light collected. Figure 3-1 illustrates the binning process using 7µm pixels as examples for 1×1, 2×2 and 3×3 binning settings.
The Resolution/Sensitivity selection allows for choosing among five different sensitivities: 1×1 (far left setting), 2×2, 3×3 (middle, default setting), 4×4 and 8×8 (far right setting) binning. Selection of 1×1 binning provides minimum sensitivity/maximum resolution, while selection of 8×8 binning provides maximum sensitivity/minimum resolution. Table 3-1 provides multiple specifications related to the varied binning sizes.

Table 3-1. Binning specifications for sensitivity settings.

<table>
<thead>
<tr>
<th>Binning</th>
<th>Size (kb)</th>
<th>PPI (pixels/inch)</th>
<th>Pixel × Pixel</th>
<th>Image size (inches × inches)</th>
<th>Image size (mm × mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 × 1</td>
<td>8197</td>
<td>300</td>
<td>2048 × 2048</td>
<td>6.8 × 6.8</td>
<td>173.4 × 173.4</td>
</tr>
<tr>
<td>2 × 2</td>
<td>2050</td>
<td>300</td>
<td>1024 × 1024</td>
<td>3.4 × 3.4</td>
<td>86.7 × 86.7</td>
</tr>
<tr>
<td>3 × 3†</td>
<td>910</td>
<td>300</td>
<td>682 × 682</td>
<td>2.3 × 2.3</td>
<td>57.7 × 57.7</td>
</tr>
<tr>
<td>4 × 4</td>
<td>513</td>
<td>300</td>
<td>512 × 512</td>
<td>1.7 × 1.7</td>
<td>43.3 × 43.3</td>
</tr>
<tr>
<td>8 × 8</td>
<td>129</td>
<td>300</td>
<td>256 × 256</td>
<td>0.9 × 0.9</td>
<td>21.7 × 21.7</td>
</tr>
</tbody>
</table>

† 3 × 3 binning in 16-bit grayscale .tiff image files are the default settings for the imager.

Reset Button used to reset all imager settings to their default values.
Settings Only Available in UV and Vis Modes

Aperture  Slider bar for adjusting the camera lens opening to control sensitivity and depth of field. The aperture can be fully closed (far right position) or fully opened (far left position) depending on the light sensitivity needed.

UV Light  Button for turning on/off the transilluminator UV bulbs.

Filter Wheel Position  Drop-down menu for moving the filter wheel position to switch filters.

Note  Filter Wheel Positions 2-4 can be set for different filter colors by accessing Tools > Filters.
**Chemiluminescence (Chemi) Mode**

Chemiluminescence (Chemi) Mode is the default mode. Chemi mode is used for the capture of sample images using sample-emitted light. A visible image of the sample is automatically captured in Chemi mode using reflected light (ChemiV image), which is useful for imaging colorimetric molecular weight markers.

**Camera Settings**

Focus, Digital Zoom and Resolution/Sensitivity camera settings are available in Chemi mode.

**Interactive Chemi**

Interactive Chemi is a patent-pending interactive tool used to evaluate and optimize imaging exposure time before acquiring a Western blot image. The Interactive Chemi button automatically calculates the exposure time of the Western blot with maximum dynamic range and minimal pixel saturation from a short exposure image. The feature displays real-time changes of the calculated Western blot image with adjusted exposure time and allows further exposure-time refinement through user input.

1. Select the Interactive Chemi button. The imager acquires a 15-second exposure.

![Interactive Chemi button](image)

**Note** A Stop button appears over the keypad area once the Interactive Chemi button is selected. Image acquisition can be stopped by selecting the Stop button.
2. The imager calculates and displays the exposure time with maximum dynamic range and minimum pixel saturation. The slider bar location and **Time Display/Input** button correspond to the calculated exposure time.

**Note** Exposure time ranges from 1 second to 99 minutes 99 seconds. If the 15-second sample image is saturated, then the imager automatically sets the calculated exposure time to 5 seconds.

3. Use the exposure time slider bar and updated image preview to obtain the desired exposure time. Drag and release the slider bar to update the image preview. Alternatively, select the **Time Display/Input** button to enter a custom exposure time that updates the image preview and slider bar location.

**Note** Once a number is selected, the **Enter** button is enabled and the **Cancel** button becomes a **Clear** button. Select **Enter** or the **Time Display/Input** button to accept the exposure time.
4. Select the **Reset Calculated Exposure** button to return to the imager calculated exposure time.

**Note** The **Invert** button is a useful tool for viewing faint gel bands. This tool inverts the standard black background with white highlights to a white background with black highlights. The inverted image can be switched back to the standard image by again selecting the **Invert** button.

**Note** The **Display Saturation** button is automatically selected in **Interactive Chemi** to highlight the image pixels that are considered saturated (a red false-color is superimposed on the pixels deemed to be saturated). Adjustment to the saturation can be done by adjusting the exposure time with the slider bar or **Time Display/Input** button. Select the **Display Saturation** button to turn off the false-color imaging.

5. (Optional) Select the point of interest on the image to display the estimated pixel intensity of the corresponding pixel coordinates. The displayed pixel intensity (estimated) is updated when the exposure time is further adjusted.

6. Select the **Acquire** button to capture an image with the indicated exposure time.

7. Select the **Cancel** button to return to **Chemi** mode.
Capture Settings

Single Image Acquisition

1. Select the **Chemi** tab on the touchscreen.

2. (Optional) Select the **Live Camera** button if the live image is not displayed.

3. The epi-white lights and live image display are activated. Open the imager door, pull out the transilluminator and install the chemiluminescence exposure screen (black) on the transilluminator glass.

4. Insert and center the sample on top of the chemiluminescence exposure screen (black) using the live image display for reference.

5. Close the imager door.

6. While viewing the live image, adjust the settings for **Focus**, **Digital Zoom** and **Resolution/Sensitivity** in the **Camera Settings**, if needed.

   **Note** Camera Settings are available only with the live image display.

7. Select a pre-set or custom exposure time.

   **Note** ChemiV images are captured and automatically saved to the **Gallery**; however, they are not displayed in the image tab if **Live Camera** is not enabled before image acquisition in **Chemi** mode. Saved ChemiV images can be displayed in **Gallery** mode along with the Chemi images.
**Pre-set Exposure Time**

1. Select one of the pre-set exposure time buttons on the touchscreen keypad. The imager takes an image as soon as the exposure time button is selected.

2. Captured images are displayed on the screen and automatically stored in the **Gallery** for further review and selection.

**Note** A **Stop** button appears over the keypad area once an exposure time button is selected. Image acquisition can be stopped by selecting the **Stop** button.

**Note** Up to six recent images can be displayed on the touchscreen.
**Custom Exposure Time**

1. Select the **Custom** exposure button using the touchscreen keypad.

2. Enter the desired time in milliseconds (ms), seconds (s) or minutes (m) using the touchscreen keypad numbers. The m : s box is used to input seconds and/or minutes and is active by default (box is gray in color). For a custom exposure time of <1 second, select the ms box to input milliseconds. The shortest exposure time that can be entered is 10 milliseconds; selecting “1” from the keypad appears as “10” in the ms box.

3. Once a number is selected, the lower **Cancel** button becomes a **Clear** button. Use this to remove entered numbers.

   **Note** Selecting the Cancel button returns the custom exposure time keypad to the pre-set exposure time keypad.

4. Select the **Acquire** button to capture the image.

5. The image displays in a tab on the touchscreen and is saved to the **Gallery**.

   **Note** A **Stop** button appears over the keypad once the Acquire button is selected. Image acquisition can be stopped by selecting the Stop button.

   **Note** Up to six recent images can be displayed on the touchscreen.
Multiple Image Acquisition

1. Select the **Chemi** tab.

2. (Optional) Select the **Live Camera** button if the live image is not displayed.

3. The epi-white lights and live image display are activated. Open the imager door, pull out the transilluminator and install the chemiluminescence exposure screen (black) on the transilluminator glass.

4. Insert and center the sample on top of the chemiluminescence exposure screen (black) using the live image display for reference.

5. Once the sample is centered, close the imager door.

6. While viewing the live image, adjust the settings for **Focus**, **Digital Zoom** and **Resolution/Sensitivity** in the **Camera Settings** menu, if needed.

   **Note** **Camera Settings** are available only with the live image display.

7. Select a pre-set or user-defined multiple exposure time.

   **Note** A **Stop** button appears over the keypad once the **Acquire** button is selected. Image acquisition can be stopped by selecting the **Stop** button.
Pre-set Multiple Exposure Settings

The five pre-set multiple exposure settings allow you to select a time series of exposures.

Multi Exposure Settings

Pre-set
Tap the button to capture images

<table>
<thead>
<tr>
<th>Pre-set</th>
<th>Exposure 1</th>
<th>Exposure 2</th>
<th>Exposure 3</th>
<th>Exposure 4</th>
<th>Exposure 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-set1</td>
<td>5s</td>
<td>10s</td>
<td>30s</td>
<td>1m</td>
<td>5m</td>
<td>0:46m</td>
</tr>
<tr>
<td>Pre-set2</td>
<td>10s</td>
<td>30s</td>
<td>1m</td>
<td>5m</td>
<td>10m</td>
<td>10:01m</td>
</tr>
<tr>
<td>Pre-set3</td>
<td>30s</td>
<td>1m</td>
<td>5m</td>
<td>10m</td>
<td>15m</td>
<td>31:30m</td>
</tr>
<tr>
<td>Pre-set4</td>
<td>1m</td>
<td>2m</td>
<td>5m</td>
<td>10m</td>
<td>20m</td>
<td>38m</td>
</tr>
<tr>
<td>Pre-set5</td>
<td>1m</td>
<td>5m</td>
<td>10m</td>
<td>15m</td>
<td>30m</td>
<td>61m</td>
</tr>
</tbody>
</table>

1. Select the Multi button from the touchscreen number keypad.

2. Select one of the Pre-set # option buttons with an appropriate time series of exposures.

3. The images are automatically acquired.

4. Captured images are displayed on the screen and stored in the Gallery for further viewing and selection.
User-defined Multiple Exposure Settings

The **User-defined Multiple Exposure** settings allow the user to set custom times in situations where the pre-set exposure times do not meet your needs.

1. Select the **Multi** button from the touchscreen number keypad.

2. To create or edit the user-defined exposure time settings, select the **Edit** button to highlight the five **Exposure** fields.

3. Choose one of the **User #** option buttons to highlight the set of cells for user input.

4. Using the pre-set or custom exposure time keypad, input the desired time into each cell. The highlighted cell moves to the right as each time is input.
5. The **Total** time is calculated and displayed as each new time is input into a cell.

6. After all desired exposure times are entered, select the **Save** button (former **Edit** button) in the top right corner of the table. This saves the **User #** time settings for further uses. All five **User #** time settings are entered and saved the same way.

7. Select the **User #** button to automatically capture the images.

8. Captured images are displayed on the touchscreen and stored in the **Gallery** for further viewing and selection.
Image Tools

Note The Image Tools only function while viewing or printing the image. Display Saturation, Invert, Auto Contrast and Adjust Image adjustments are NOT saved with the image file.

Display Saturation

In Chemi mode, after capturing an image, the Display Saturation button can be selected to highlight image areas that are considered to be saturated. A red false-color is superimposed on the areas deemed to be saturated. Adjustment to the saturation can be done by adjusting the exposure time for subsequent images. Shorter exposure times reduce the light exposure/saturation.

1. After capture of an image, select the Display Saturation button under the time keypad.

2. The screen displays the saturated pixels on the image with a red false-color.

If the image appears to be over- or under-saturated, the image exposure time may need to be increased or decreased to acquire a properly saturated image. Exposure time can be adjusted for subsequent image capture by using the number keypad.

3. The Display Saturation button can be selected again to turn off the false-color imaging.

Note The Display Saturation button is disabled when the Auto Contrast or Adjust Image functions are enabled.
**Invert Image**
The **Invert** button is a useful tool for viewing faint gel bands. This tool inverts the standard black background with white highlights to a white background with black highlights or vice versa.

1. In the active live image or acquired image, select the **Invert** button under the time keypad.

2. The inverted image can be reverted to the standard image by again selecting the **Invert** button.

**Auto Contrast**
Selecting the **Auto Contrast** button increases the contrast between the signal and the background to increase visibility. This adjustment can only be used for viewing or printing the image. The contrast adjustment is NOT saved with the image file.

*Note* Auto Contrast is disengaged when the **Adjust Image** button is selected.
**Adjust Image**

Select the Adjust Image button to modify the Black, White and Gamma levels of the image to increase sample visibility. This adjustment is only used for viewing or printing the image. Image adjustments are NOT saved with the image file.

Select the Reset button to restore Black, White and Gamma to original levels. Select the Close button to return to the previous screen.

**Note** Adjust Image is disengaged when the Auto Contrast button is selected.
### Intensity Display
Select a point of interest on the acquired image to view the **Intensity Display** containing the pixel intensity and pixel coordinates of the corresponding region. When multiple images of the same sample are acquired and displayed on the screen, the pixel intensities of the same location can be viewed and compared between multiple images by selecting the corresponding image tabs.

![Intensity Display Image]

### Zoom
A **Zoom** slider bar is located under acquired images for zooming in and out on the image. The zoom level (percentage) is displayed next to the slider bar.

### File Menu
File menu includes editing image info, exporting, printing and deleting files. All image files and image information are saved and exported in individual folders. These folders contain both the .xml file with the image information and the .tiff file containing the image.
**Image Info**

Information for each captured image is stored within the individual .xml file.

With the captured image displayed, select the **Image Info** button. A box appears with all of the relevant image information for that image. Beneath the box is a keyboard for inputting personal data into the open fields. Only the fields for **File name**, **User**, **Project** and **Notes** can be modified.

**Note** After each image capture, the imager will assign a default name to the image file. This image file name can be changed within the **Acquisition Information** screen.

![Acquisition Information](image)

**File name**  Image title (imager-generated or user-defined)

**User**  Person using the MYECL Imager (user-defined)

**Project**  Name of project (user-defined)

**Notes**  Relevant notes pertaining to image or experiment (user-defined)

**Exposure time**  Chosen exposure time for image
Mode  Single, multiple, custom, UV or Vis

Acquisition time  Time of day image was taken

Acquisition date  Date image was taken

Sensitivity/Resolution  Binning used for image acquisition

Export  Select Export to save the highlighted image to a USB flash drive. External flash drives can access the imager through three different ports on the right side of the imager.

Note  Users may need to momentarily wait for the imager to detect the external drive once it is connected to the USB port. The selected image is exported only to the first USB flash drive if there are more than two drives connected to the imager.

Print  The Print button allows the highlighted image to be printed to a selected external printer. A Print Preview window appears before printing begins.

Delete  The Delete button permanently deletes the highlighted image.
Ultraviolet (UV) Mode

Ultraviolet (UV) mode is used for the capture of images using transmitted UV light.

CAUTION: UV mode uses the UV light in the transilluminator. Long-term exposure to UV light can be harmful. Use the appropriate eye and skin personal protective equipment (PPE) if there is any chance of exposure to the UV light.

Note: The transilluminator UV light is initially on for 5 minutes. User input is requested for further use of the UV light. If the “Keep UV on” button is not selected, the UV light automatically turns off.

If the UV light is needed after opening the imager door, the white door peg can be pulled out to turn on the UV bulbs. Appropriate PPE must be worn if performing this operation. The white door peg returns to a normal position once the door is fully closed.

Note: The live image is displayed with the exposure time used in the previous image acquisition in UV mode unless the user changes the exposure time or changes the mode.

Camera Settings

UV mode uses the same functional Camera Settings as the Chemi mode, but adds the camera setting functions for Aperture, UV light and Filter wheel position.

Capture Settings

1. Select the UV tab on the touchscreen.

Image Acquisition

2. (Optional) Select the Live Camera button if the live image is not displayed.
3. Open the imager door and confirm that the UV light is off. The epi-white lights are activated once the door is opened. Pull out the transilluminator and place the UV exposure screen (clear) on top of the transilluminator.

4. Insert and center the sample on top of the UV exposure screen (clear) using the live image display for reference. Once the sample is centered, close the imager door.

5. While viewing the live image, adjust the necessary settings for Focus, Digital Zoom, Sensitivity/Resolution, Filter and Aperture to produce the desired image.

   Note  Camera Settings are only available with the live image display.

### Pre-set Exposure Time

1. (Optional) Select the Live Camera button if the live image is not displayed.

2. Select one of the pre-set exposure time buttons using the touchscreen keypad.

3. The live image with the new exposure time is displayed. If needed, modify the exposure time using the pre-set exposure time buttons.

4. Select the Acquire button to acquire an image.

5. Captured images are displayed on the screen and automatically stored in the Gallery for further viewing and selection.
**Custom Exposure Time**

1. Select the **Custom** exposure time button using the touchscreen keypad.

2. Enter the desired time in milliseconds (ms), seconds (s) or minutes (m) using the touchscreen keypad numbers. The **m : s** box is used to input seconds and/or minutes and is active by default (box is gray in color). For a custom exposure time of <1 second, select the **ms** box to input milliseconds. The shortest exposure time that can be entered is 10 milliseconds; selecting “1” from the keypad appears as “10” in the **ms** box.

3. Select the **Acquire** button to acquire an image.

4. Captured images are displayed on the screen and automatically stored in the **Gallery** for further viewing and selection.
Stop Image Acquisition

Upon selecting the Acquire button, a Stop window appears over the keypad. Selecting the Stop button stops the current image acquisition exposure and returns the screen to the current session exposure settings.

Image Tools

Note The Image Tools only function while viewing or printing the image. Display Saturation, Invert, Auto Contrast and Adjust image adjustments are NOT saved with the image file.

Display Saturation

In UV mode, while viewing the live image or after capturing an image, the Display Saturation button can be selected to highlight the image pixels that are considered to be saturated. A red false-color is superimposed on the pixels deemed to be saturated. Adjustment to the saturation can be done by adjusting the Aperture and/or exposure time for subsequent images. Shorter exposure times reduce the light exposure/saturation.

1. While viewing the live image display, select the Display Saturation button under the time keypad.

2. The screen displays the saturated areas of the image with a red false-color.

3. While viewing the live image display, in Camera Settings, use the Aperture slider bar to adjust the saturation by opening (moving slider to left) or closing (moving slider to right) the aperture. Opening the aperture increases image brightness and saturation. Closing the aperture decreases image brightness and saturation.

4. If required, the image exposure time may need to be increased or decreased to display a properly saturated live image. Exposure time can be adjusted before image capture by using the number keypad.

5. Select the Display Saturation button again to turn off the false-color imaging.

Note The Display Saturation button is disabled when the Auto Contrast or Adjust Image functions are enabled.

6. Proceed with the steps for acquiring an image.
**Invert Image**

The **Invert** button is a useful tool for viewing faint gel bands. This tool inverts the standard black background with white highlights to a white background with black highlights.

![Original UV Image](image1.png) ![Inverted UV Image](image2.png)

1. In the active live image, select the **Invert** button from under the time keypad.

2. The inverted image can be switched back to the standard image by again selecting the **Invert** button.

**Auto Contrast**

Selecting the **Auto Contrast** button increases the contrast between the signal and the background to increase visibility. This adjustment can be used only for viewing or printing of the image. The contrast adjustment is NOT saved with the image file.

*Note* **Auto Contrast** is disengaged when the **Adjust Image** button is selected.

**Adjust Image**

Select the **Adjust Image** button to modify the **Black**, **White** and **Gamma** levels of the image to increase sample visibility. This adjustment is only used for viewing or printing the image. Image adjustments are NOT saved with the image file.

Select the **Reset** button to restore **Black**, **White** and **Gamma** to original levels. Select the **Close** button to return to the previous screen.

*Note* **Adjust Image** is disengaged when the **Auto Contrast** button is selected.
Intensity Display

Select a point of interest on the acquired image to view the Intensity Display containing the pixel intensity and pixel coordinates of the corresponding region. When multiple images of the same sample are acquired and displayed on the screen, the pixel intensities of the same location can be viewed and compared between multiple images by selecting the corresponding image tabs.

Zoom

A Zoom slider bar is located under acquired images for zooming in and out on the image. The zoom level (percentage) is displayed next to the slider bar.

File Menu

The File Menu consists of buttons for Image Info, Export, Print and Delete.

Image Info

Image Info can be selected for any captured image. This lists the acquisition information for the highlighted image.

Export

Select Export to save the highlighted image to a USB flash drive. External flash drives can access the imager through three different ports on the right side of the imager.

Note Users may need to momentarily wait for the imager to detect the external drive once it is connected to the USB port. The selected image is exported only to the first USB flash drive if there are more than two drives connected to the imager.

Print

The Print button allows the highlighted image to be printed to a selected external printer. A Print Preview window appears before printing begins.

Delete

The Delete button permanently deletes the highlighted image.
Visible (Vis) Mode

Visible (Vis) mode is used for the capture of gel images using reflected and/or transmitted light.

CAUTION Vis mode uses the UV light from the transilluminator. Long-term exposure to UV light can be harmful. Use the appropriate eye and skin PPE if there is any chance of exposure to the UV light.

Note The transilluminator UV light is initially on for 5 minutes. User input is requested for further use of the UV light. If the “Keep UV on” button is not selected, then the UV light will automatically turns off.

Note The live image is displayed with the exposure time used in the previous image acquisition in Vis mode unless the user changes the exposure time or changes the mode.

Camera Settings

Vis mode uses the same functional Camera Settings as the UV mode.

Image Acquisition – Transmitted Light

1. Select the Vis tab on the touchscreen. Changing to Vis mode automatically turns on the UV light within the transilluminator and the epi-white lights.

2. (Optional) Select the Live Camera button and enable the UV button if the live image is not displayed and the transmitted light is off.

3. Open the imager door, confirm the UV light is off, pull out the transilluminator and install the white light conversion screen on top of the transilluminator.

4. Insert and center the sample on top of the white light conversion screen using the live image display for reference.

5. Once the sample is centered, close the imager door. The UV light turns on and shows as visible light transmitting through the white light conversion screen.

6. While viewing the live image, adjust the necessary settings for Focus, Digital Zoom, Sensitivity/Resolution, Filter and Aperture to produce the desired image.

7. Select a pre-set or custom exposure time.
**Image Acquisition – Reflected Light**

1. Select the **Vis** tab on the touchscreen. Changing to **Vis** mode automatically turns on the UV light within the transilluminator and the epi-white lights.

2. (Optional) Select the **Live Camera** button and enable the **UV** button if the live image is not displayed.

3. Open the imager door, confirm that the UV light is off, and install the white light conversion screen on top of the transilluminator glass.

4. Insert and center the sample on top of the white light conversion screen using the live image display for reference.

5. Once the sample is centered, close the imager door. The UV light turns on.

6. Select the **UV** light button on the right side of the screen to switch **OFF** the UV light. This produces only reflected light.

7. While viewing the live image display, adjust the **Camera Settings** for **Focus**, **Digital Zoom**, **Resolution/Sensitivity**, **Filter** and **Aperture** to produce the desired image, if needed.

8. Select a pre-set or custom exposure time.

**Pre-set Exposure Time**

1. Select one of the pre-set exposure time buttons using the keypad.

2. Select the **Acquire** button to capture an image.
3. Captured images are displayed on the screen and automatically stored in the Gallery for further viewing and selection.

   **Note** A Stop button appears over the keypad once the Acquire button is selected. Image acquisition can be stopped by selecting the Stop button.

### Custom Exposure Time

1. Select the custom exposure time button using the keypad.

2. Enter the desired time using the keypad numbers. The m : s box is used to input seconds and/or minutes and is active by default (box is gray in color). For a custom exposure time of <1 second, select the ms box to input milliseconds. The shortest exposure time that can be entered is 10 milliseconds; selecting “1” from the keypad appears as “10” in the ms box.

3. Once a value is entered into the Custom time field, the Acquire button becomes active. Select the Acquire button to capture an image.

4. Captured images are displayed on the screen and automatically stored in the Gallery for further viewing and selection.

   **Note** A Stop button appears over the keypad once the Acquire button is selected. Image acquisition can be stopped by selecting the Stop button.

### Image Tools

**Note** The Image Tools only function while viewing or printing the image. Display Saturation, Invert, Auto Contrast and Adjust Image adjustments are NOT saved with the image file.
Display Saturation

In Vis mode, while viewing the live image or after capturing an image, the Display Saturation button can be selected to highlight live and captured pixels that are considered to be saturated. A red false-color is superimposed on the pixels deemed to be saturated. Adjustment to the saturation can be done by adjusting the Aperture and/or exposure time for subsequent images. Shorter exposure times reduce the light exposure/saturation.

1. While viewing the live image display, select the Display Saturation button under the time keypad.

2. The screen displays the saturated areas of the image with a red false-color.

3. Using the Aperture slider bar in Camera Settings, adjust the saturation by opening (moving slider to left) or closing (moving slider to right) the aperture. Opening the aperture increases image brightness and saturation. Closing the aperture decreases image brightness and saturation.

4. If required, the image exposure time may need to be increased or decreased to display a properly saturated live image. Exposure time can be adjusted before image capture by using the number keypad.

5. Select the Display Saturation button again to turn off the false-color imaging.

Note The Display Saturation button is disabled when the Auto Contrast or Adjust Image functions are enabled.

6. Proceed with the steps for acquiring an image.

Invert Image

The Invert button is a useful tool for viewing faint gel bands. This tool inverts the standard white background with black highlights to a black background with white highlights in Vis mode.
Auto Contrast  Selecting the Auto Contrast button increases the contrast between most bands and the background to increase visibility. This adjustment can be used only for touchscreen viewing or printing of the image. The contrast adjustment is not saved with the image file.

Note Auto Contrast is disengaged when the Adjust Image button is selected.

Adjust Image  Select the Adjust Image button to modify the Black, White and Gamma levels of the image to increase sample visibility. This adjustment is only used for viewing or printing the image. Image adjustments are NOT saved with the image file.

Select the Reset button to restore Black, White and Gamma to original levels. Select the Close button to return to the previous screen.

Note Adjust Image is disengaged when the Auto Contrast button is selected.

Intensity Display  Select a point of interest on the acquired image to view the Intensity Display containing the pixel intensity and pixel coordinates of the corresponding region. When multiple images of the same sample are acquired and displayed on the screen, the pixel intensities of the same location can be viewed and compared between multiple images by selecting the corresponding image tabs.

Zoom  A Zoom slider bar is located under acquired images for zooming in and out on images. The zoom level (percentage) is displayed next to the slider bar.

File Menu  The File Menu consists of buttons for Image Info, Export, Print and Delete.

Image Info  Image Info can be selected for any captured image. This lists the acquisition information for the highlighted image.

Export  Select Export to save the highlighted image to a USB flash drive. External flash drives can access the imager through three different ports on the right side of the imager.
Note Users may need to momentarily wait for the imager to detect the external drive once it is connected to the USB port. The selected image is exported only to the first USB flash drive if there are more than two drives connected to the imager.

Print The Print button allows the highlighted image to be printed to a selected external printer. A Print Preview window appears before printing begins.

Delete The Delete button permanently deletes the highlighted image.

Image Gallery The image gallery allows the user to view and open previously captured images.

1. Select the Gallery tab at the top of the touchscreen.

2. Click on the Browse button to open the gallery.

Thumbnail Thumbnail displays previously captured images. Images are separated into sections of days, weeks, months and years. You can use the two right middle arrow buttons or the vertical scrollbar to move and view between the sections. If the current gallery contains images from more than 40 image acquisitions, the program automatically creates a new gallery folder and move to the new gallery. Other galleries can be accessed using the up and down Gallery arrow buttons.
Choose an image or series of images (up to six images including ChemiV image) by selecting the images on the touchscreen. Selected images are highlighted in blue. Double-tap on an image or select the Back to Gallery button to return to the main image gallery screen.

**Note** Before selecting an image, users can choose to view only the Chemi image or both the Chemi and ChemiV images of the same sample by selecting the Open ChemiV Image button at the bottom right of the Gallery screen. This function is useful for establishing band locations in a Chemi image against known protein weight markers in a ChemiV image.

**Note** Select one ChemiM image to open all of the images associated with that specific multiple exposure. Up to six images, including ChemiV images, can be selected and displayed at one time.

**File List**

The **File List** button displays image information in a list format for ease of searching and sorting. The list is sortable in eight different fields by selecting the appropriate column heading: **File Name, Date, Notes, Mode, Exposure, Project, User** and **Resolution**.

**Search**

The **Search** tab allows you to search through the full gallery. Images can be searched by **File Name, Date, Notes, Project** or **User** by entering the needed information. The search results are displayed in the Search Result window; the results listings are sortable by field.
**Search Results**  
The **Search Results** button allows for viewing results from the previous search. Results listings are sortable by field.

**File Manager**  
The **File Manager** button allows for selection of multiple image files for copying, deleting, exporting and editing image information. Images selected in **File Manager** are highlighted in a light green color. The **File Manager** button can be selected from the **Thumbnail, File List** or **Search Results** screens.

**Note**  
**File Manager** in **Search Results** contains a **Select All/Unselect All** button in place of an **Unselect** button.

**Copy**  
The **Copy** button allows users to copy the selected images from one or more gallery folders to the desired location.

**Delete**  
The **Delete** button allows users to delete the selected images from one or more gallery folders.
**Export** The **Export** button allows users to copy the selected images to the first USB flash drive plugged into the imager.

**Edit Info** The **Edit Info** button allows users to create or change the User/Project/Notes fields of the acquisition information for the selected images. File names cannot be changed using **Edit Info** from **File Manager**.

**Unselect** The **Unselect** button removes all of the selections in the **File Manager**.

**Exit File Manager** Selecting the **Exit File Manager** button returns to the previous **Gallery** mode screen.
Chapter 4  Maintenance

Cleaning the Imager and Sample Screens

IMPORTANT When using any cleaning products with the imager, consult the appropriate material safety data sheet (MSDS) to confirm compatibility with the imager and proper usage of the cleaning product.

LCD Touchscreen

Spray a soft cloth or paper towel with cleaning solution (e.g., general purpose cleaner, isopropanol or 70% ethanol). Wipe the surface of the transilluminator, the sample screens and the imager’s exterior housing.

Cleaning the Touchscreen

Use a pre-moistened LCD screen cleaning tissue to clean the surface of the touchscreen.

IMPORTANT Use of ammonia-based cleaners to clean the touchscreen is NOT recommended. Do not spray cleaner directly onto the LCD screen.

IMPORTANT Do not press hard while cleaning the screen. Do not leave excess cleaning solution on the LCD screen as this may cause long-term damage.

Use of the Stylus

The stylus is recommended for interacting with the touchscreen. Use the tip of the stylus to tap the touchscreen for selection of menus, icons, and buttons.

Note Fingertips can be used for interaction with the touchscreen; however, the stylus is easier to use with gloved hands and prevents fingerprints on the screen.
CAUTION The UV transilluminator contains UV bulbs. Long-term exposure to UV light can be harmful. Use the appropriate eye and skin personal protective equipment (PPE) if there is any chance of exposure to the UV light.

1. Wearing UV-protective eyewear and clothing, open the imager door and slide out the transilluminator.

2. Place the UV exposure screen (clear) on the transilluminator and place the gel sample on top of the screen.

   IMPORTANT Use of the UV exposure screen (clear) protects the transilluminator from nicks and scratches as a result of excision.

3. In UV mode, select the UV button. A message appears asking if the user wants to turn on the UV light with the door open. Select Yes.

4. The software then displays a warning message requiring the appropriate PPE and asks the user to pull out the white door peg.

5. Excise the appropriate bands from the gel sample.

   Note As a safety precaution, the UV light automatically turns off after five minutes. With 30 seconds remaining, a message appears on the touchscreen indicating that the UV light is turned off unless the “Keep UV on” button is selected.
Cleaning the Transilluminator

Ensure the transilluminator surface is cool. Saturate a clean soft cloth or paper towel with cleaning solution (e.g., general purpose cleaner, isopropanol or 70% ethanol). Wipe the surface of the transilluminator.

Replacement of Transilluminator Bulbs

**Note** To ensure uniform illumination, replace all six UV transilluminator bulbs, even if only one bulb fails.

1. Shut down the imager and unplug the power cord.
2. Open the imager door and completely slide out the transilluminator. Ensure the transilluminator is cool to touch.
3. Loosen the four thumbscrews on the transilluminator coverplate.
4. Lift the coverplate to expose the bulbs. Use caution to avoid damaging the electrical cord.
5. Remove the transilluminator bulbs by rotating ~90° counterclockwise until the pins align with the bulb socket. A click is heard when the bulb pins are aligned. Lift the bulb up and out of the socket.
6. Insert the new transilluminator bulbs by sliding pins into the bulb socket and rotating ~90° clockwise. A click is heard when the bulb pins are set.
7. Repeat Steps 5 and 6 for the remaining five bulbs.
8. Replace all necessary components of the transilluminator and avoid damaging the electrical cord. Replace and hand tighten the four thumbscrews.
9. Push the transilluminator back into the imager.
10. Plug the imager power cord back in and turn the system power on.
Emission Filters
A variety of emission filters can be used in the imager. The appropriate filter choice is dependent on the emission wavelength of the sample. Consult Table 2-5 in Chapter 2 to confirm the filter choice is appropriate for the application.

Changing Filters
The filter wheel allows for easy installation and removal by using threaded filters. The filters are fragile, so use caution when handling and installing or removing.

**IMPORTANT** When installing filters, ensure that the filter threads are correctly aligned with the filter wheel threads. **Forcing a filter to screw in can result in cross threading and damage to the filter wheel.**

1. Turn off the system power.
2. Open the imager door and locate the filter wheel at the rear of the cabinet. Each filter position is labeled with a red position number.

**Position 1** Permanently empty for chemiluminescent imaging  
**Position 2** Orange filter (default filter supplied with the imager)  
**Position 3** Open for additional filter  
**Position 4** Open for additional filter
3. To install an emission filter, insert the threaded side of the filter into an open port on the filter wheel. Turn clockwise to screw the filter in place until hand tight.

4. To remove an emission filter, grasp the outer edge of the filter housing and turn counterclockwise to unscrew and remove.

5. When filter installation/removal is complete, turn the system power on.

Appendix A
Technical Specifications

<table>
<thead>
<tr>
<th>Imager Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Maximum</td>
<td>120W</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>50-60Hz</td>
</tr>
<tr>
<td>AC Voltage</td>
<td>100-240V</td>
</tr>
<tr>
<td>Current</td>
<td>1.2A maximum (dependent on supply voltage)</td>
</tr>
<tr>
<td>Fuse</td>
<td>T4AL, 250V, 4A fuse</td>
</tr>
<tr>
<td>Dimensions</td>
<td>21 inches H × 12.25 inches W × 22 inches D (53.3cm H × 31.1cm W × 55.9cm D)</td>
</tr>
<tr>
<td>Weight</td>
<td>65lbs (29.5kg)</td>
</tr>
<tr>
<td>Wavelength Range</td>
<td>Specific wavelengths between 370-700nm</td>
</tr>
<tr>
<td>Camera</td>
<td>High-resolution, thermoelectrically regulated at -25°C, 4.2MP digital camera with 16-bit dynamic range</td>
</tr>
<tr>
<td>Lens</td>
<td>50mm, f/0.95 aperture</td>
</tr>
<tr>
<td>Filter Wheel</td>
<td>4 filter positions, motorized</td>
</tr>
<tr>
<td>Touchscreen</td>
<td>10.4 inch LCD screen</td>
</tr>
<tr>
<td>Light Source</td>
<td>306nm trans-UV, epi-white</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Thermo Fisher Scientific</td>
</tr>
<tr>
<td></td>
<td>3747 N Meridian Rd</td>
</tr>
<tr>
<td></td>
<td>Rockford IL  61105-0117</td>
</tr>
<tr>
<td></td>
<td>USA</td>
</tr>
</tbody>
</table>
## Appendix B

### Accessories

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Product Name</th>
<th>Package Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>62237†</td>
<td>MYImageAnalysis Software</td>
<td>1 CD</td>
</tr>
<tr>
<td>62238†</td>
<td>Orange Filter</td>
<td>1 filter</td>
</tr>
<tr>
<td>62239</td>
<td>Green Filter</td>
<td>1 filter</td>
</tr>
<tr>
<td>62240</td>
<td>Red Filter</td>
<td>1 filter</td>
</tr>
<tr>
<td>62241</td>
<td>Blue Filter</td>
<td>1 filter</td>
</tr>
<tr>
<td>62242†</td>
<td>Chemiluminescence Exposure Screen</td>
<td>1 screen</td>
</tr>
<tr>
<td>62243†</td>
<td>White Light Conversion Screen</td>
<td>1 screen</td>
</tr>
<tr>
<td>62244†</td>
<td>UV Exposure Screen</td>
<td>1 screen</td>
</tr>
<tr>
<td>62255</td>
<td>Transilluminator Bulb, 365nm</td>
<td>1 bulb</td>
</tr>
<tr>
<td>62258†</td>
<td>Transilluminator Bulb, 306nm</td>
<td>1 bulb</td>
</tr>
<tr>
<td>62261†</td>
<td>Touchscreen Stylus and Holder</td>
<td>1 package</td>
</tr>
<tr>
<td>62267†</td>
<td>Imaging Reference Target</td>
<td>1 package</td>
</tr>
<tr>
<td>EW84857</td>
<td>One Year Extended Warranty</td>
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</tr>
<tr>
<td>84858†</td>
<td>Power Cord/C13 Connector, North America</td>
<td>1 cord</td>
</tr>
<tr>
<td>84859†</td>
<td>Power Cord/C13 Connector, Continental Europe</td>
<td>1 cord</td>
</tr>
<tr>
<td>84860†</td>
<td>Power Cord/C13 Connector, United Kingdom/Ireland</td>
<td>1 cord</td>
</tr>
</tbody>
</table>

† Replacement part for accessory supplied with the MYECL Imager.
## Appendix C

### Related Thermo Scientific Products

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Product Name</th>
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<tbody>
<tr>
<td>34087</td>
<td>SuperSignal* West Pico Chemiluminescent Substrate</td>
</tr>
<tr>
<td>34075</td>
<td>SuperSignal West Dura Extended Duration Substrate</td>
</tr>
<tr>
<td>34095</td>
<td>SuperSignal West Femto Maximum Sensitivity Substrate</td>
</tr>
<tr>
<td>46640</td>
<td>SuperSignal Western Blot Enhancer</td>
</tr>
<tr>
<td>32209</td>
<td>Pierce* ECL Western Blotting Substrate</td>
</tr>
<tr>
<td>32132</td>
<td>Pierce ECL Plus Western Blotting Substrate</td>
</tr>
<tr>
<td>24615</td>
<td>Imperial Protein Stain, 1L</td>
</tr>
<tr>
<td>88518</td>
<td>PVDF Transfer Membrane, 0.45µm, 26.5cm × 3.75m</td>
</tr>
<tr>
<td>88018</td>
<td>Nitrocellulose Membrane, 0.45µm, 30cm × 3.5m</td>
</tr>
<tr>
<td>88610</td>
<td>Western Blotting Filter Paper, extra thick, 8.5cm × 9cm</td>
</tr>
<tr>
<td>26616</td>
<td>PageRuler* Prestained Protein Ladder, 10-170kDa, 2 × 250µL</td>
</tr>
<tr>
<td>26619</td>
<td>PageRuler Plus Prestained Protein Ladder, 10-250kDa, 2 × 250µL</td>
</tr>
<tr>
<td>26614</td>
<td>PageRuler Unstained Protein Ladder, 10-200kDa, 2 × 250µL</td>
</tr>
<tr>
<td>26634</td>
<td>Spectra* Multicolor Broad Range Protein Ladder, 10-260kDa, 2 × 250µL</td>
</tr>
<tr>
<td>26625</td>
<td>Spectra Multicolor High Range Protein Ladder, 40-300kDa, 2 × 250µL</td>
</tr>
<tr>
<td>26628</td>
<td>Spectra Multicolor Low Range Protein Ladder, 1.7-40kDa, 250µL</td>
</tr>
<tr>
<td>26612</td>
<td>Pierce Prestained Protein Molecular Weight Marker</td>
</tr>
</tbody>
</table>
Glossary

**Aperture**  Diameter of the lens opening that limits the amount of light entering the camera

**CCD**  Charge coupled device that converts a photoelectric signal into electronic data

**CCD Camera**  Camera with CCD sensor used to capture moving and still images

**Chemiluminescence (Chemi) mode**  Captures image of sample-emitted luminescent as well as sample image under epi-white light

**Display Saturation**  Displays red-painted image pixels if pixel intensity reaches a value near saturation

**Emission filter**  Optical glass filter mounted in the Filter Wheel; used for filtering specific wavelengths of light

**Filter Wheel**  Automated wheel that can hold multiple filters in front of camera lens

**Gallery**  Holding space for captured images

**Hard (Main) Power Switch**  Main power rocker switch located on the rear imager panel

**Lens**  Optical device that controls light transmission

**Noise**  Imperfections in the image data

**Plug-and-play**  Ability of a computer system to automatically configure and operate other connected devices

**Remote Access**  Imager access by technical support to a remote location

**Reset**  Returns camera settings to the standard or home value

**Resolution**  Sharpness and clarity of an image; defined by the number of camera pixels used to capture an image

**Sample screens**  The clear, black and white panels placed over the transilluminator during image acquisition

**Sensitivity**  CCD camera’s degree of response to light

**Soft Power Switch**  Blue-lit round button located on the front imager panel

**Stylus**  Pen-shaped device used to input commands on the touchscreen

**Transilluminator**  Sliding sample work platform containing the UV bulbs

**Ultraviolet (UV) mode**  Captures images using transmitted ultraviolet light

**Visible (Vis) mode**  Captures image using transmitted light and/or reflected visible light