



# ODYSSEY<sup>®</sup> CLx

## Operator's Manual



**LI-COR<sup>®</sup>**



## **CE Marking:**

This product (model number 9140) is a CE-marked product. For conformity information, contact LI-COR Support at <http://www.licor.com/bio/support>. Outside of the U.S., contact your local sales office or distributor.

## Notes on Safety

LI-COR® products have been designed to be safe when operated in the manner described in this manual. The safety of this product can not be guaranteed if the product is used in any other way than is specified in this manual. The Odyssey® CLx Imager is intended to be used by qualified personnel. Read this entire manual before using the Odyssey CLx Imager.

## Equipment Markings:



The product is marked with this symbol when it is necessary for you to refer to the manual or accompanying documents in order to protect against damage to the product.



The product is marked with this symbol when a hazardous voltage may be present.

## Manual Markings:

**WARNING**    **Warnings** must be followed carefully to avoid bodily injury.

**CAUTION**    **Cautions** must be observed to avoid damaging your equipment.

**NOTE**        **Notes** contain additional information and useful tips.

**IMPORTANT**    **Information of importance** to prevent procedural mistakes in the operation of the equipment or related software. Failure to comply may result in a poor experimental outcome but will not cause bodily injury or equipment damage.

### Federal Communications Commission Radio Frequency Interference Statement

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

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# Chapter 1: Installation and Safety Information

## Safety Considerations

### Laser Safety

The Center for Devices and Radiological Health (CDRH) was established in October 1982, by the U.S. Food and Drug Administration (FDA) to protect the public health in the fields of medical devices and radiological health.

Manufacturers of products subject to performance standards under the Radiation Control for Health and Safety Act of 1968 are required to furnish various reports to the CDRH.

The Odyssey CLx Imager is certified as a Class I laser product. This means that hazardous laser radiation is not emitted outside the instrument. Radiation emitted inside the Odyssey CLx Imager is confined within protective housings and external covers. A series of safety interlocks ensures that the laser beam cannot escape during any phase of user operation.

The CDRH implemented regulations for laser products on August 1, 1976 (CDRH radiation performance standard 21, Code of Federal Regulations Chapter 1, Subchapter J). Compliance for products marketed in the United States is mandatory. The label that must be attached to laser products marketed in the United States is illustrated in Figure 1-2 and is located on the rear panel of the Odyssey CLx, indicating compliance with CDRH regulations.

**WARNING:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

The manufacturer label is illustrated in Figure 1-1 and is also on the rear panel of the instrument.

The Odyssey CLx Infrared Imaging System contains two lasers; one emitting at 785 nm, and one at 685 nm. The 685 nm laser emits visible laser radiation - **direct exposure to either beam may cause eye damage**. Laser radiation is emitted through apertures at the top of the Odyssey CLx Imager microscope assembly. Because the microscope assembly moves in both planes relative to the glass scanning surface, laser radiation could be focused at any position on this surface. Safety interlocks (described below) automatically turn the lasers off when the Odyssey CLx Imager lid is opened.

The label shown in Figure 1-3 is affixed to the inside of the Odyssey CLx Imager case at two locations; one near the laser/microscope assembly scanning bed, and the second on the cover that is used to seal the above mentioned assembly.



Figure 1-2. CDRH regulation compliance label.



Figure 1-1. Manufacturer label.

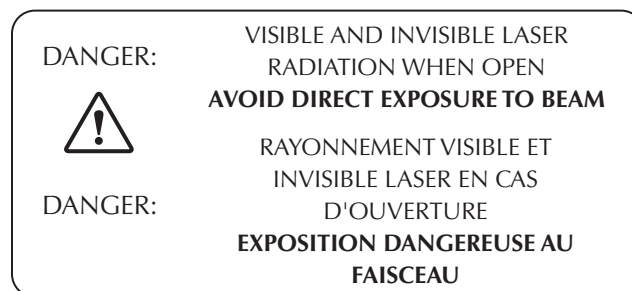


Figure 1-3. Laser radiation danger label.

"Rear Panel" on page 8 for the location of the labels in Figure 1-1 and Figure 1-2. The label in Figure 1-3 is affixed to the inside of the Odyssey® CLx Imager case at two locations; one near the laser/microscope assembly scanning bed, and the second on the cover that is used to seal the above mentioned assembly.

## Safety Interlocks

The Odyssey CLx Imager has two safety interlocks that prevent access to the laser when the instrument lid is opened during operation. Do not attempt to defeat these interlocks. The interlocks are located on the front of the instrument bezel as shown below. Audible tones sound when the lid is opened and closed (Figure 1-4).

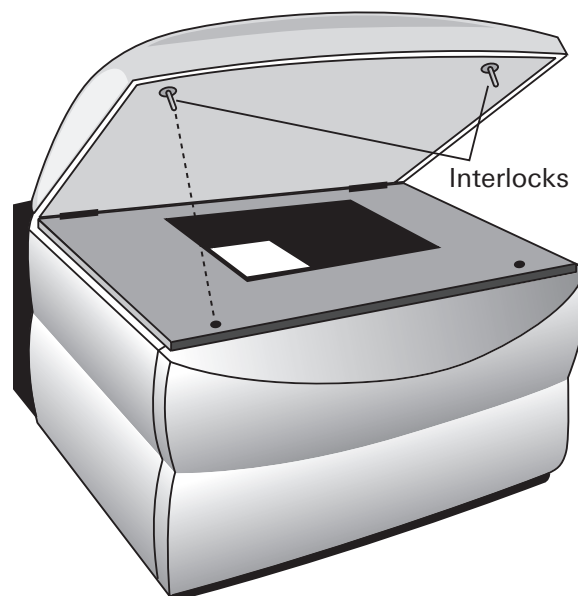


Figure 1-4. Location of interlocks on the Odyssey CLx instrument bezel.

## Placement in the Laboratory

The Odyssey CLx Infrared Imaging System weighs approximately 33 kg (72 lbs). The instrument should be placed on a laboratory bench that is sufficiently sturdy to bear its weight. The bench should also be able to bear the weight of the computer if the computer is to be installed beside the Odyssey CLx instrument

## Ambient Laboratory Conditions

Place the Odyssey CLx Imager away from external heat sources (furnaces, windows, etc.). Additional heating can cause high temperatures within the enclosure. Place the instrument away from sinks or other sources of water that pose a shock hazard. Recommended operating conditions are 15-35°C and a dew point not greater than 20°C to prevent condensation on the laser/microscope assembly during operation. Allow the instrument to adjust to the temperature and humidity of the room before powering it on to avoid damaging the instrument. It may be necessary to allow up to a day in the new location in cases of extreme temperature and/or humidity change.

## Instrument Ventilation

The instrument enclosure and circuit boards are cooled with multiple internal fans. The fan on the rear of the instrument serves as an exhaust port, so the fan shrouds are not filtered and the cover serves only as an exhaust outlet. There are no restrictions regarding placement of the instrument as spacers on the rear of the instrument ensure sufficient airflow for the exhaust port. However, it is important to not allow any objects (e.g., paper or a cover) to block airflow from the exhaust port while the instrument is on.

## Space Requirements

The Odyssey CLx Imaging System requires an area approximately 37 H x 53 W x 58 D cm (15 x 21 x 23 inches). With the hood fully open, the Odyssey CLx Imager requires 74 cm (29") of vertical clearance.

## Moving the Instrument

LI-COR recommends that you do not move your instrument. Please contact your local Technical Support for LI-COR recommended service options. In extreme situations, you may use the procedure below to move your instrument.



These instructions are provided as a courtesy for our customers. LI-COR cannot be held responsible for any damage incurred while moving, transporting, or shipping an Odyssey CLx Imager, even if an existing warranty and/or service contract applies.

To move your instrument:

- 1) Ensure the new location meets all requirements specified in *Placement in the Laboratory* on the previous page.
- 2) Turn off the Odyssey CLx Imager by pressing **Power** on the front panel.
- 3) Exit Image Studio Software.
- 4) Disconnect the power cord.
- 5) Be cautious and lift with two people (the instrument weighs about 33kg/72lbs).
- 6) Lift under the metal enclosure on each side of the unit, keeping the instrument as close to vertical as possible during the move.
- 7) Gently place the instrument in its new location.
- 8) Level the instrument to prevent moist membranes from sliding on the scan surface and to keep the instrument from tilting.

The instrument can be leveled by turning the threaded metal inserts located in each of the 4 plastic feet (Figure 1-5).

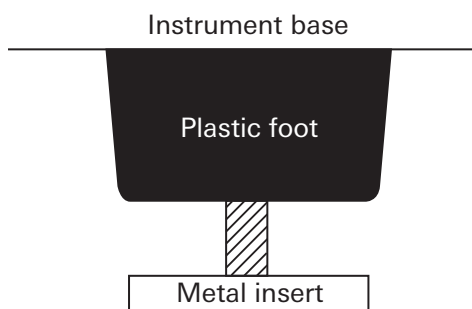


Figure 1-5. Turn the metal inserts on the feet to adjust the height.

## Chemical Safety

LI-COR Biosciences recommends that all biochemicals be handled carefully, and that safe laboratory procedures be followed at all times. Be aware of the hazards associated with any chemical before you begin work.

*The LI-COR Odyssey CLx Imager should not be used with any radioactive materials.*

## Electrical Considerations

### Power Cords

The Odyssey CLx Imager is equipped with a 3-wire grounding-type plug. This plug will only fit into a grounding-type outlet. This is a necessary safety feature. If you are unable to insert the plug into the outlet, you will need to replace the outlet. ***Do not defeat the purpose of the grounding-type plug.***

Do not locate the Odyssey CLx Imager where the power cord will be walked on or exposed to water or chemical spills.

The Odyssey CLx Imager draws at most 4 amperes at 120V. If an extension cord is used, make sure the total of the ampere ratings on the instruments plugged into the extension cord does not exceed the extension cord ampere rating. Also make sure the total amperage of instruments plugged into the wall outlet does not exceed the amperage capacity for the outlet (usually 15 or 20 amperes in the United States).

To disconnect power before servicing, first disconnect the instrument from the software, briefly press the Power button to power down the instrument, and then remove the power cord from the power receptacle on the Odyssey CLx back panel (Figure 1-6). See ***Disconnecting the Power*** on page 9 for more information.

### Power Switch

A power switch is located above the power receptacle on the back panel (Figure 1-6). Push ‘-’ to enable power to the instrument or ‘O’ to disable the power. To power on the instrument, make sure the power is enabled and press the Power button on the front of the instrument.

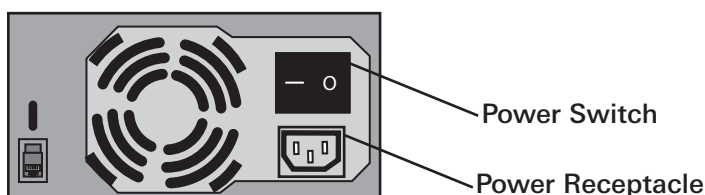


Figure 1-6. Location of the power switch and power receptacle on the Odyssey CLx back panel.

### Fuse Information

There are no user-serviceable fuses. If the instrument fails to power up, and you suspect that a fuse has blown, contact LI-COR® Biosciences or a LI-COR representative.

## Routine Maintenance

The Odyssey CLx Imager requires only minimal maintenance. However, as with any equipment utilizing electrical voltages, there is a danger of fire or electrical shock if the equipment is not properly maintained.

LI-COR Biosciences recommends that you routinely inspect the system and the scanning surface. The following are some general maintenance guidelines:

- Wipe all chemical spills from the case and/or scanning surface to prevent damage to the surface coating.
- Inspect all cables and power cords for evidence of fraying, exposed wire, or loose connections.
- Keep the scanning surface free of organic solvents and other combustibles.
- Clean the exterior case parts with warm water and a damp cloth. The exterior case parts are painted with a durable urethane coating that is resistant to chemical spills. Do not use scouring compounds or solvents (e.g., acetone, benzene, carbon tetrachlorides, lacquer thinner, or alcohol) to clean the case.

## Networking Cables

A Cat. 5e network cable is provided with the Odyssey<sup>®</sup> CLx Imager. Do not use networking cables other than the one provided. The use of other networking cables may result in improper electrical performance. The networking port is on the back panel of the instrument and is marked with the label illustrated in Figure 1-7.



Figure 1-7. Networking port label.

# Chapter 2: System Overview

Odyssey® CLx Imager

## External Panels and Controls

### Front Panel and Scanning Surface

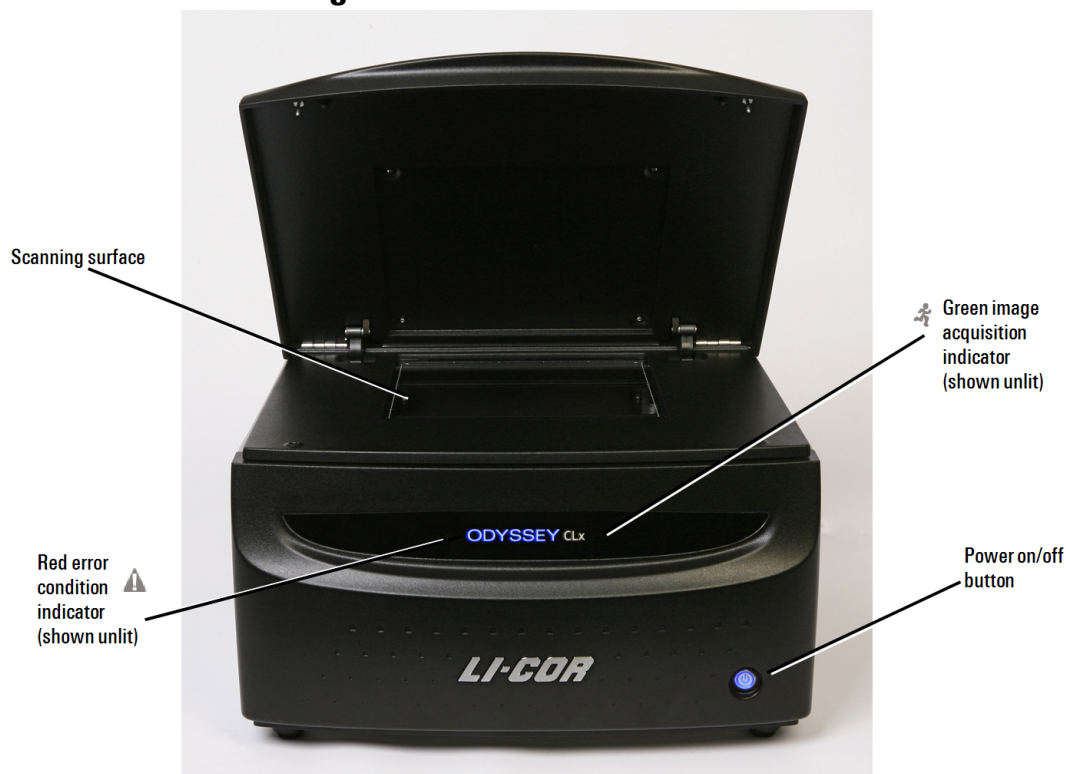


Figure 2-1. Front panel features and power button on the Odyssey CLx Imager.

**Power On/Off Button:** Briefly pressing this button turns the instrument on and off, when the instrument is not connected to the Image Studio™ Software. If the instrument is connected, pressing the button results in the red error light blinking along with a warning sound to alert the user that the instrument is connected to the software. Continuing to hold the power button for 5 seconds will turn the instrument off and the software connection will end.

**Green Image Acquisition Indicator:** This indicator light blinks during image acquisition and is continuously on at other times, as long as communication with Image Studio Software is maintained. The indicator light is off before the instrument is connected to the software and if the Image Studio Software is closed or communication is otherwise lost.



Figure 2-2. Location of the green image acquisition light and red error light.

**Red Error Indicator:** The error indicator light illuminates when a particular process could not be completed.

## Rear Panel



Figure 2-3. Closeup of the Odyssey® CLx Imager rear panel showing the power receptacle and LAN port (use only the supplied networking cable). Also shown are the CDRH regulation compliance label, the manufacturer label and the power switch. The power switch can be left in the 'on' position.



## Scanning Surface

The scanning surface is a 25 cm x 25 cm glass plate (Figure 2-4), upon which the samples to be scanned are placed. The scanning surface is sealed from the instrument interior so no moisture can penetrate to the detection optics and electronics below.

### General Description of Scanning

Scans are initiated using the Image Studio Software Acquire ribbon. On the Acquire ribbon the user chooses the settings for the scan as well as the area to scan. Scanning progresses first across the X-axis, and then moves incrementally along the Y-axis of the scanning surface after each X-axis pass.

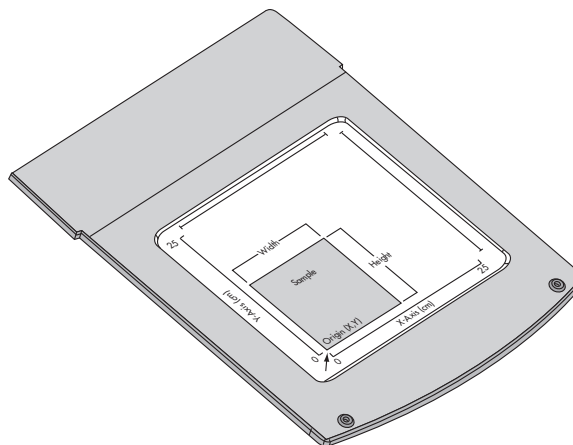


Figure 2-4. Scans progress across the X-axis and then incrementally move along the Y-axis after each X-axis pass.

## Continuous Operation

The Odyssey CLx Imager and network switch are designed to operate continuously. During idle times, the Odyssey CLx Imager can remain powered on or be powered off at your discretion. When idle, the Odyssey CLx Imager draws approximately 0.5 amp of current, about the same as a light bulb. If the Odyssey CLx Imager needs to be disconnected (when moving it, for example), see below.

## Disconnecting the Power

First, exit the Image Studio Software by selecting **Instrument > Disconnect** on the Application menu or by closing the application window. Next, briefly press the Power button on the front panel to power off the Odyssey CLx Imager. To disconnect the power before servicing or moving the instrument, shut down the Odyssey CLx Imager by pressing the Power button on the front panel. Then remove the power cord from the power receptacle as described in *Electrical Considerations* on page 5.

**Note:** Do not unplug the power cable or push 'O' on the rear power switch while the system is running, except for an emergency situation.

## Optical System Description

Solid state diode lasers simultaneously provide light excitation at 685 and 785 nm. Collimating lenses, optical bandpass filters, and a focusing lens focus and tune the laser beams to produce an excitation spot on the scanning surface. The microscope electronics then modulate the laser beams to discriminate the infrared dye signal fluorescence from background fluorescence. The scanner detection optics focus on the excitation spot and collect light from the fluorescing infrared dyes.

The light is passed to a dichroic mirror after collection by the microscope objective. The mirror splits the light and essentially sorts the fluorescent signals by transmitting the light above 810 nm and reflecting light below 750 nm. Transmitted and reflected light travels two independent paths through optics designed to remove scattered and stray light. The light is ultimately focused onto one of two avalanche photodiodes that converts the light to an electrical signal for processing by the microscope detection electronics.

In the microscope electronics the signal is amplified, filtered, and finally converted to a digital value by an analog-to-digital converter. The digital signal is demodulated, filtered again, and coordinated with the microscope position by a Digital Signal Processor (DSP) to produce the image file.

The entire compact laser/microscope assembly travels on a platform that moves beneath the scanning surface along both the X- and Y-axes. It is adjustable in the Z-dimension to allow for focusing at the scan bed up to 4 mm above the scan bed to accommodate membranes, gels, and microplates.

The Odyssey<sup>®</sup> CLx Imager has two modes for dynamic range, Automatic and Manual. In Automatic mode the Odyssey CLx Imager acquires images with virtually no saturated pixels on the first attempt with no user adjustments. More than six logs (22 bits) of dynamic range are available for each image. In Manual mode the intensity of each channel can be manually adjusted across a 12 bit dynamic range.

**Note:** Do **not** use the Automatic mode when imaging small animals with the MousePOD<sup>®</sup> Accessory.

## Computer Connections and Networking

**Note:** Use only the supplied Cat. 5e network cable to connect the Odyssey CLx Imager and computer.

When Image Studio<sup>™</sup> Software starts, it searches for and discovers any Odyssey CLx Imagers automatically. If only one instrument is found, Image Studio Software establishes communication. If more than one instrument is found, the user is presented with a list of instruments and asked which to use.

## **Image Studio™ Software Overview**

### **Learning the Software**

Each part of the user interface (button, etc.) has an extensive tool tip associated with it that can be invoked by hovering the mouse over the feature on the user interface. A more comprehensive review of acquiring images as well as analysis functions can be found in the Image Studio Software Help system. Updates to the Help system will be available online at: <http://www.licor.com/bio/support>.



# Chapter 3: Operation

## Before You Begin...

The following procedure is recommended before every scan:

- 1) Thoroughly clean the glass scanning surface with ultrapure water and wipe with a lint-free tissue.
- 2) Repeat the wash with isopropanol to remove any visible smears. Use ethanol to remove any remaining residues. If dye contamination continues to be a problem, slightly wet a cloth with acetone and wipe the glass.

**Important:** Do not allow the acetone to contact anything other than the glass. The paint can be damaged by acetone.

- 3) If the silicone mat is used, rinse it under warm water. Gentle lab soap may be used, but the soap must be completely rinsed away before use. The silicone mat may also be rinsed with isopropanol if needed. Dry the silicone mat with a lint-free tissue.

## Cleaning the Scanning Surface

The scanning surface is plate glass and can be cleaned with any non-abrasive glass cleaner. Warm, soapy, distilled water or isopropanol can be also be used. Do not use scouring compounds or abrasive scouring pads; the glass can scratch, which can affect the scanned image.

It is very important that the glass and silicone mat be free of smudges, dust, and dye before placing membranes or gels onto the Odyssey CLx Imager. Contaminated surfaces in contact with the membrane surface may cause blotches and streaks that cannot be removed with further washing.

## Using Membranes

For Western blotting methods, nitrocellulose or PVDF membranes may be used (see [www.licor.com/bio](http://www.licor.com/bio) for the latest membranes and kits). Pure-cast nitrocellulose membranes are recommended for best performance. Detailed blotting protocols can be found in the Odyssey CLx Application Protocols manual. There are some general tips, however, for using membranes with the Odyssey CLx Imager.

- Do not touch the membrane – handle only with a clean, smooth-edged forceps. Lift the membrane only by the corners. Fingerprints, even from a glove, will show clearly when imaged.
- Use the silicone mat included to cover the membrane(s) before scanning. Use the 4" soft roller included to remove any air bubbles that may be present. These optional steps help keep the membrane flat against the scanning surface for optimum imaging.

- Protect the membrane from light until it has been scanned.
- Keep the membrane wet if it is to be stripped and re-used. For Western blots store dry or in PBS buffer at 4°C.
- Use clean containers to avoid cross-contamination and reduce background.
- Multiple membranes can be washed together, provided there is ample volume so each membrane moves freely.
- If the signal on the membrane is too strong, the saturated pixels will appear cyan (blue) in the image. Re-scan at a lower intensity setting in Manual mode, or use the Auto mode.
- The fluorescent signal on a dried membrane will remain stable for several months or longer if protected from light.

## Using Gels

A protocol for In-Gel Westerns is provided in the Odyssey<sup>®</sup> CLx Imager Application Protocols Manual. Coomassie-stained gels can also be scanned since Coomassie Blue dye can be seen clearly in the 700 nm channel, and faintly in the 800 nm channel (see the Western Blot Analysis protocol for details). Nucleic acids stained with Syto<sup>®</sup> 60 and separated in a gel can be imaged in the 700 nm channel (see the Syto 60 Staining of Nucleic Acids in Gels protocol for more information). To scan a gel, follow these procedures:

- 1) Thoroughly rinse the gel with destaining solution or water to remove dye particulates.
- 2) When placing the gel on the scanning surface, take care not to trap air bubbles underneath. Cover the gel with plastic wrap to prevent drying, if desired.
- 3) Scan the gel in the 700 nm channel.
- 4) Adjust the focus offset for the gel thickness. The correct focus offset is 1/2 the thickness of the gel; for a 1 mm gel, set the focus offset to 0.5 mm. The maximum offset is about 4 mm in the Odyssey CLx Imaging system, allowing gels of up to 8 mm to be scanned.
- 5) After removing the gel, clean the glass surface to remove any residual dye by following the instructions in the section *Before You Begin...* on page 13.

## Using Microplates

Microplates that meet certain physical characteristics can be scanned directly on the Odyssey CLx Imager scanning surface. Proper selection of microplates significantly affects the results of your analysis as each plate has its own characteristics including well depth, plate autofluorescence, and well-to-well signal crossover. Some general considerations for microplate selection are provided here.

- Plate dimensions must be such that the distance from the Odyssey CLx Imager scanning surface to the target detection area of the plate is 4.0 mm or less.
- In order to avoid well-to-well signal spread, black-walled, clear bottom plates should be used for assays that involve imaging of a liquid. Since the In-Cell Western<sup>™</sup> Assay uses detection at the well surface with no liquid present, both clear and black-walled plates can be used. Consult pro-

protocols in the Application Protocols manual or on the LI-COR® Bio Technical Resources Library (<http://www.licor.com/bio/support>) for specific recommendations.

- Do not use plates with white walls because the autofluorescence from the white surface will create significant noise.
- For an In-Cell Western™ Assay requiring sterile plates for tissue culture growth, the following plates are recommended by LI-COR Biosciences.

96-well format Nunc® (P/N 161093) Clear

96-well format Nunc (P/N 165305) Black

96-well format Falcon™ (P/N 353075) Clear

96-well format Falcon (P/N 353948) Black

384-well format Nunc (P/N 164688) Clear

384-well format Nunc (P/N 164730) Black

384-well format Falcon (P/N 353961) Clear

384-well format Falcon (P/N 353962) Black

- Before plate scanning, clean the bottom plate surface with a moist, lint-free paper to remove any obstructions. Additionally, the Odyssey CLx Imager scanning surface should be thoroughly cleaned using the procedures described earlier in this chapter.
- Protect plates from light before imaging to ensure highest sensitivity. When storing plates after imaging, protect plates from light at room temperature.
- A **Focus Offset** of 3.0 mm should be entered in the scan parameters when using the plates specified above.

Plates other than those recommended above may require lower or higher focus offsets for optimal resolution and detection. If alternative plates are used, an initial optimization scan will be necessary. Scan a plate containing experimental and control samples at 0.5, 1.0, 2.0, 3.0, and 4.0 mm focus offsets. Use the same intensity settings for each scan. After reviewing the collected scans, use the focus offset with the highest signal-to-noise ratio as the focus offset for experiments with the alternate plates.

- Select the Automatic Channel Intensities for a wide dynamic range. If using the Manual Channel Intensities mode, the **Intensity** scan parameter for both 700 and 800 nm channels should be set to 5 for initial scanning. If the image signal is saturated or too high, re-scan using a lower intensity setting (i.e. 2.5). Likewise, if the image signal is too low, re-scan using a higher intensity setting (i.e. 7.5).
- For satisfactory images with minimal scan time, the **Quality** scan parameter should be lowest, with **Resolution** set to 169 µm. Higher scan quality and resolution may be used, but scan time will increase.

## Using the MousePOD Accessory

The optional Odyssey® MousePOD® Accessory fits over the Odyssey CLx Imager scanning surface for *in vivo* imaging of up to three mice or one rat in a temperature-controlled enclosure. Operation of the MousePOD Accessory is described in the Odyssey *In vivo* Imaging Guide available at: <http://www.licor.com/bio/support>.



## Positioning Membranes and Gels

Membranes are placed on the scanning surface with the sample surface down and the top of the membrane facing the front of the instrument, as shown in Figure 3-1. Gels are placed in the same orientation.

**Important:** Handle membranes only with a clean, smooth-edged forceps and touch only the corners. Fingerprints, even from a glove, will show clearly when imaged.

It is a good practice to leave a gap (1 cm or so) between the sample and either axis. This makes it possible to specify a scan boundary that is 1 cm larger than the membrane in all dimensions. The larger scan boundary creates an image that is easier to analyze in the Image Studio™ Software. If the sample is placed too near either axis or if the scan boundary is too close to the membrane, annotations in the Image Studio software may be truncated in some views. Multiple membranes and/or gels can be scanned at one time by simply drawing multiple scanning areas on the scanning bed graphic in the Acquire ribbon.

**Note:** The orientation of the samples on the scanning surface is not critical, but membranes are easier to analyze if the sides are parallel to the X/Y scan axes.

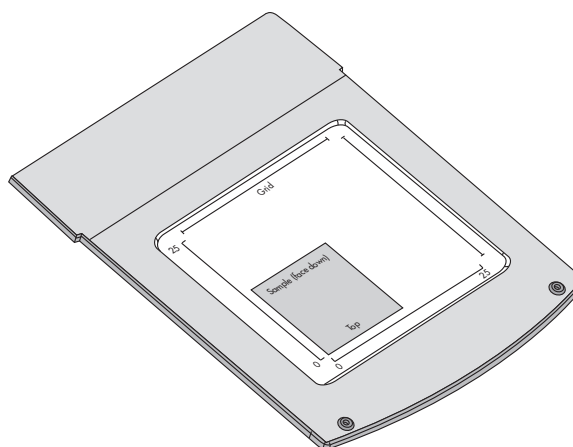


Figure 3-1. Membranes and gels are placed with sample surface down, with top of the membrane or gel facing the front of the instrument.



## Positioning Microplates

The plastic microplate alignment guide (P/N 9891-080) should be placed on the scan surface so the corner of the guide contacts the front, left corner of the bezel surrounding the scan surface. Push the guide into the corner until it contacts the bezel on both the front and left sides. Put the microplate on the scanning surface and slide it into place until it contacts both the front and left side of the alignment guide. The first well in the first row (A1) should be toward the back and left side of the alignment guide as shown (Figure 3-2).

Microplates can be scanned in the Image Studio™ Software using the **Plate** scan preset. Multiple microplates can be scanned at one time by drawing multiple scanning areas on the Acquire ribbon scanning bed graphic.

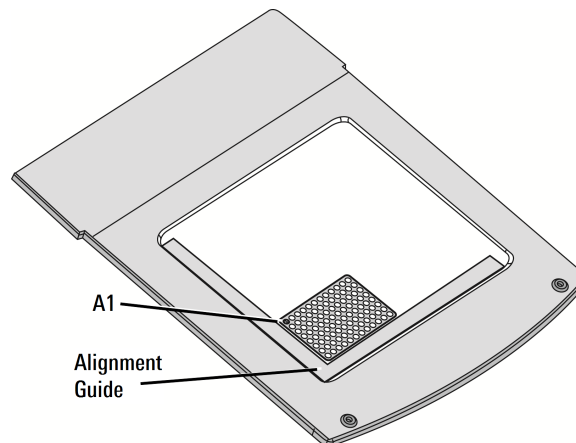


Figure 3-2. The microplate alignment guide should be placed in the front, left corner and should contact the bezel surrounding the scan surface.

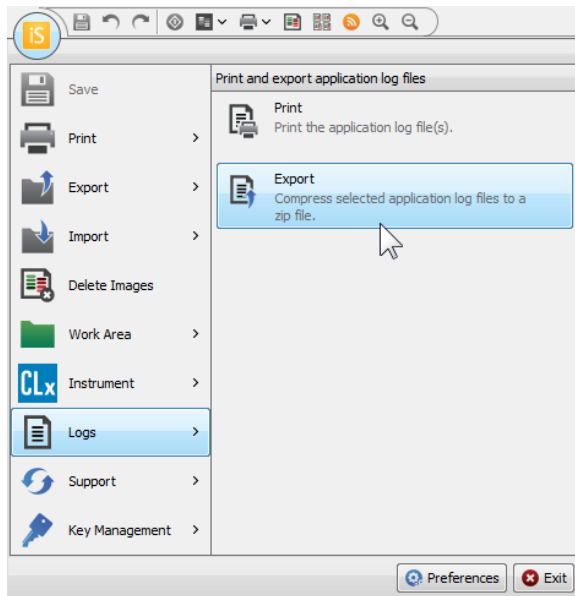
## Obtaining Technical Support

To resolve a problem with your Odyssey CLx Imager, start by contacting LI-COR® Technical Support at 800-645-4260 (U.S. only), or emailing [biohelp@licor.com](mailto:biohelp@licor.com). Outside of the U.S., contact your local sales office or distributor. Be prepared to give the serial number of your instrument, which can be found on the manufacturer label on the rear panel of the instrument (Figure 1-1). You can also find the serial number of the instrument in Image Studio Software by hovering over the Status group on the Acquire ribbon.

LI-COR Technical Support may ask you to provide copies of the instrument log files to aid in diagnosing problems.

To export and share a log file with Technical Support:

- 1) Click the **Image Studio Application Button**, point to **Logs**, and then click **Export**.



The **Zip Application Log Files** dialog will open.

- 2) In the **Zip Application Log Files** dialog, keep **All log files** selected (unless you need to save a smaller file due to email restrictions), and choose where to save the file.
- 3) Save the log file and email it to the address recommended by Technical Support.

# Chapter 4: Appendix

## Specifications

### Imaging System

**Laser Lifetime:** 40,000 hours typical.

**700 Channel Laser Source:** Solid-state diode laser at 685 nm.

**800 Channel Laser Source:** Solid-state diode laser at 785 nm.

**Detectors:** Silicon avalanche photodiodes.

**Scanning Speed:** 5-40 cm/s.

**Resolution:** 21-337  $\mu\text{m}$ .

**Focus:** Adjustable to be aligned to the top surface of the scan bed up to 4 mm above the scan bed to obtain the best signal-to-noise ratio of sample in membranes, gels, or microplates.

**Dynamic Range:**

4 logs (Manual); >6 logs (Auto).

## Operating Specifications

**Operating Conditions:** For indoor use only; operating temperature 15-35°C and dew point not greater than 20°C, non-condensing; altitude not to exceed 2000 m.

**Environmental Conditions:** Pollution Degree 2.

**Power Requirements:** Universal input range is between 100-240 VAC (voltage fluctuations not to exceed 10% of the nominal voltage); 4 Amp maximum; 50/60 Hz.

**Dimensions:** 37 H x 53 W x 58 D cm (15 x 21 x 23 inches).

**Weight:** 33 kg (72 lb.).

**Network Protocol:** TCP/IP.

**Network Connection:** Cat. 5e RJ-45, 10BASE-T/100BASE-TX/1000BASE-T. Use only the supplied cable.

