Odyssey® M

Operator's Manual

LI-COR®

CE Marking:

This product (model number 3340, 3350) is a CE-marked product. For conformity information, contact LI-COR Support at http://www.licor.com/biotechsupport. Outside of the U.S., contact your local sales office or distributor.

奥德赛M 成像仪 **Odyssey M Imager**						
部件名称 Part Name	有毒有害物质或元素 Toxic and Hazardous Substances or Elements					
	铅 (PB)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 (PCBs)	X	O	O	O	O	O
机电配件 (Electromechanical Parts)	X	O	O	O	O	O
光学 (Optics)	X	O	X	O	O	O
电缆和电线 (Cables and Wires)	O	O	O	O	O	O
金属部件 (Metal Parts)	X	O	O	O	O	O
塑料零件 (Plastic Parts)	X	O	O	O	O	O
电池 (Batteries)	O	O	O	O	O	O

本表格依据 SJ/T 11364 的规定编制

O = 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下

indicates that the content of the toxic and hazardous substance in all the Homogeneous Materials of the part is below the concentration limit requirement as described in GB/T 26572

X = 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求

indicates that the content of the toxic and hazardous substance in at least one Homogeneous Material of the part exceeds the concentration limit requirement as described in GB/T 26572

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 cannot be guaranteed if the product is used in any other way than is specified in this manual. The Odyssey® M Imager is intended to be used by qualified personnel. Read this entire manual before using the Odyssey M 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

Intended Use of the Odyssey M Imager

The Odyssey M provides reliable data for membranes, plate-based assays, slides, nucleic acid gels, and protein gels. The Odyssey M is versatile and can capture assays in 18 channels, including white light, luminescence (bioluminescence and chemiluminescence), and fluorescence (near-infrared / visible).

Odyssey M Model Numbers (3340 and 3350)

Odyssey M Model 3350 and Odyssey M Model 3340 are the same, except that Odyssey M Model 3350 contains hardware that allows it to image chemiluminescence. See "Imaging System Specifications" on page 47 for details.

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 M 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 M 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® M, 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.

AVERTISSEMENT: L'utilisation des commandes ou le réglage ou la performance des procédures autrement qu'il a été indiqué dams le présent texte peut résulter en de dangereuses expositions aux radiations.

The manufacturer label is illustrated in Figure 1-2 and is also on the rear panel of the instrument.

The Odyssey® M Near-Infrared Imaging System contains four lasers; one emitting at 488 nm, 520 nm, 685 nm, and 785 nm. The lasers emit visible and invisible laser radiation - **avoid eye or skin exposure to direct or scattered radiation**. Laser radiation is emitted out of the top of the Odyssey M microscope, up through the scan glass. Because the microscope moves in both planes relative to the glass scanning surface, laser radiation could be focused at any position on this scanning surface. Safety interlocks (described below) automatically turn the lasers off when the Odyssey M lids are opened.

Labels

The labels shown in Figure 1-1 and Figure 1-2 are affixed to the Odyssey M case.

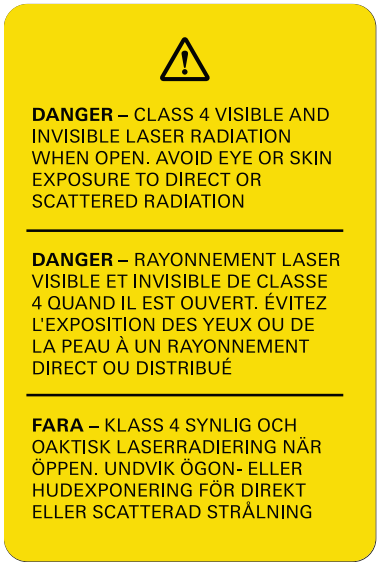

Figure 1-1. Laser radiation danger label.

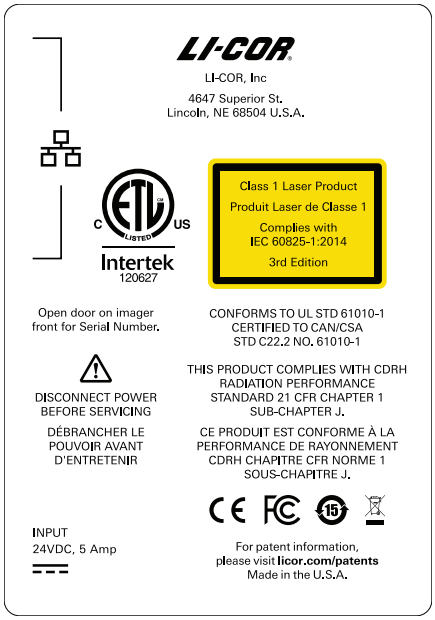

Figure 1-2. Label with CDRH compliance statement.

Imager Label Locations

Figure 1-3. The label affixed to the rear panel of the imager contains ETL, CDRH regulation compliance, and manufacturer information.

Figure 1-4. A laser safety label is visible on the front panel of the imager with the Tray Holder removed.

Figure 1-5. There is a laser safety label on the bottom panel of the imager.

Safety Interlocks

The Odyssey® M Imager has safety interlocks that prevent access to the lasers, LEDs, and moving parts, by disabling these hazards when the front or rear lid is opened.

⚠ Do not attempt to defeat these interlocks.

Placement in the Laboratory

The Odyssey M Imager Model 3340 weighs 115 lbs (52kg). The Odyssey M Imager Model 3350 weighs 121 lbs (55kg). The imager 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 will be installed beside the Odyssey M Imager.

The Odyssey M is intended for indoor use only.

Ambient Laboratory Conditions

Place the Odyssey M 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 22 °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.

Imager 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 M Imager requires an area approximately 24" width x 30" depth x 15" height (61 cm width x 76 cm depth x 38 cm height). With the lid fully open, the Odyssey M has a height of 28" (71 cm).

Moving the Imager

LI-COR recommends that you **do not** move your imager. Instead, please contact LI-COR Technical Support for options.

LI-COR cannot be held responsible for any damage incurred while moving, transporting, or shipping the Odyssey M Imager, even if an existing warranty and/or service contract applies. LI-COR cannot be held responsible for any injury incurred while moving, transporting, or shipping the Odyssey M Imager.

Leveling the Imager

Leveling the imager is important for many reasons, including to **prevent liquid from pooling** in the imaging tray and to **keep the imager from tilting**.

The imager sits on three feet. The two front feet can be used to raise or lower the front corners of the imager. The back foot cannot be adjusted.

Figure 1-6

Follow these steps to level the imager:

1. Place a circular bubble level on the center of the Scan Surface.

Figure 1-7

Use the bubble level to determine if the imager is level or which adjustments might be needed to level the imager.

2. Slightly raise the front of the imager to remove pressure from the foot you want to adjust.
3. Turn the screw on the foot *clockwise* to *lower* the corner or *counterclockwise* to *raise* the corner.

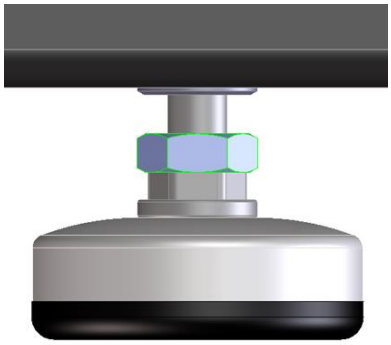

Figure 1-8 Turn the metal inserts on the feet to adjust the height.

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 M should not be used with any radioactive materials.

Electrical Considerations

Power Cords

The Odyssey M is provided with a power supply that converts wall voltage to 24 V DC. Use only the provided power supply cord to connect the Odyssey M to the wall outlet.

- The 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 place the Odyssey M where the power cord will be walked on or exposed to water or chemical spills.
- The Odyssey M draws < 3 Amps 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).
- If the power supply's DIN8 output connector (Figure 1-9) is handled improperly (such as if the pins are pressed against a screw on the imager chassis), the pins in the power supply's DIN8 output connector can short or spark.

Figure 1-9

- For information about disconnecting power, see ***Disconnecting the Power*** on page 35.

Fuse Information

There are no user-serviceable fuses. If the imager does not power on, please contact LI-COR Biosciences or a LI-COR representative.

Routine Maintenance

The Odyssey® M 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 Scan Surface. The following are some general maintenance guidelines.

Inspect Cables and Cords

Inspect all cables and power cords for evidence of fraying, exposed wire, or loose connections.

Maintain Scan Surface

- Remove all chemical spills from the Scan Surface to prevent damage to the surface coating.
- Clean the Scan Surface according to instructions in "Clean the Scan Surface" on page 39.
- Prevent organic solvents from pooling on the imager's Scan Surface and keep the Scan Surface from contacting other combustibles.

Maintain Imager Exterior

- Remove all chemical spills from the imager exterior to prevent damage to the imager exterior.
- Clean the exterior case parts with warm water and a damp cloth.

⚠ Do not use scouring compounds or solvents (e.g., acetone, benzene, carbon tetrachlorides, lacquer thinner, or alcohol) to clean the case.

Clean or Replace Fan Filter

The fan filter behind the Tray Holder should be inspected and cleaned at least once a year, but more frequent cleaning may be necessary depending on the cleanliness of the imager's surroundings.

If the fan filter becomes damaged, contact LI-COR for a replacement.

Follow this procedure when you need to inspect or clean the fan filter:

1. Open and remove the Tray Holder (see ***Remove Tray Holder*** on page 28).
2. Remove the screw holding the retaining plate in place using a No. 2 screwdriver.

Figure 1-10 Exploded view of the fan filter assembly

3. Remove the retaining plate and the fan filter.
4. To clean the fan filter, flush it with water. If flushing the filter with water does not adequately remove oil and trapped particles, you can immerse the filter in hot water and detergent.
5. When the fan filter is clean, you can wring it out to remove most of the water. Wait for the fan filter to dry completely.
6. Once the fan filter is completely dry, place the fan filter, retaining plate, and Tray Holder back on the imager (see ***Install Tray Holder*** on page 30).

Networking Cables

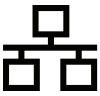

Figure 1-11. Networking port label.

A Category 6 network cable is provided with the Odyssey M Imager. The networking port is on the back panel of the imager and is marked with the symbol in Figure 1-11.

Chapter 2: System Overview

External Panels and Controls

Front Panel and Scan Surface

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

Power Button

Briefly press the Power button ⏻ to turn the imager on and off when the imager is not connected to LI-COR® Acquisition Software.

- When the imager is powered on, the power button will be illuminated solid blue.
- During the process of powering on or powering off, the power button will flash blue.

Display Panel

The front display panel shows the following:

- The username chosen in LI-COR® Acquisition Software when the Odyssey® M Imager was connected to LI-COR Acquisition Software.
- If the lid is open.
- The time remaining in a scan.
- During a scan, the type of scan will be shown.

Front Panel Indicator Light

An indicator light is located on the front panel. In most circumstances, the color of the light mirrors a status indicated in LI-COR Acquisition Software.

Figure 2-2

Indicator Light State	Meaning
Off	No connection to LI-COR Acquisition Software
Green	Ready or Done
Yellow/Orange	Scanning or Lid Open
Red	And error has occurred. Check LI-COR Acquisition Software for more information.

Scan Surface

Gently lift the handle on the front edge of the lid to access the Scan Surface. Instructions for acquiring images are provided in "Operation" on page 39.

Gently press down on the lid when you are ready to close it. There will be slight upward resistance when the lid is nearly in the close position to help prevent the lid from closing with excessive force.

During imaging, the Scan Surface will automatically move to the rear portion of the imager to place the samples in the appropriate location relative to components of the optical system. When the scan is complete, the Scan Surface will return to the front of the imager.

Figure 2-3

Move Scan Surface

Use the following instructions to move the Scan Surface to the rear of the imager. You may need to do this, for example, to clean the grid pattern below the Scan Surface (see ***Clean the Grid Below the Scan Surface*** on page 24).

1) Press the Power button ⏻ to power on the imager.

   Wait for the Power button to become solid blue before continuing.

2) Open the front lid.

3) Briefly press the Power button ⏻.

4) Close the front lid **within 5 seconds** while the Power button is still flashing.

   If you close the front lid **within 5 seconds**, the Scan Surface will move to a position in the rear portion of the imager.

   While the Scan Surface is moving, the Power button will continue to flash blue and the lid will remain locked. Once in position, the Power button light will turn off and the lid will unlock.

   ⚠ If you leave the front lid open for **longer than 5 seconds**, the imager will power down without moving the Scan Surface.

Manually Move Scan Surface

If there is a power outage during a scan, the Scan Surface will not move forward normally. If the Scan Surface is in the rear portion of the imager and is not moving forward normally, you may need to move the Scan Surface forward manually by following these steps.

1) Ensure power to the imager is disconnected (see ***Disconnecting the Power*** on page 35).

2) Open the front lid.

3) Pull upward on the Sample Enclosure to remove it.

Figure 2-4

4) With the Sample Enclosure removed, a thumb screw will be visible.

Figure 2-5

5) Rotate the thumb screw by hand clockwise to move the Scan Surface forward.

If the Scan Surface does not move, please contact LI-COR Technical Support. Do not attempt to move the Scan Surface by applying force to it.

Figure 2-6

Clean Front Panel

To clean the front panel, use mild soap and water. Do not allow soap or water to enter the imager.

Remove any debris from the electromagnets on the front two corners of the front lid.

Figure 2-7

Clean the Grid Below the Scan Surface

Cleaning the grid pattern beneath the Scan Surface is not part of regular maintenance. The grid does not need to be cleaned routinely. Over time, depending on lab conditions, the grid may need to be cleaned.

If the grid does need to be cleaned, first gain access to the grid by using the automated Scan Surface moving procedure (see ***Move Scan Surface*** on page 21) to move the Scan Surface to the rear of the imager.

- If possible, use a microfiber cloth to gently wipe the grid clean.
- If necessary, use mild soap and water.

  Do not allow soap or water to enter the imager.

  Do not allow soap to get on the greased bearings adjacent to the grid.

Clean Underside of Scan Surface

Cleaning the underside of the Scan Surface is not part of regular maintenance. The underside of the Scan Surface does not need to be cleaned routinely. Over time, depending on lab conditions, the underside may need to be cleaned. The following instructions show how the Scan Surface can be removed to clean the underside.

1. Gently open the front lid.
2. Remove the Sample Enclosure (see ***Sample Enclosure*** on page 27).
3. Loosen the three sets of screws on the frame of the Scan Surface using a 5/64" hex allen wrench. Ensure the screw, washer, spring, and ball are loosened on every set. The hardware is captive with the sample glass frame.

Figure 2-8

4. Pull the Scan Surface frame straight up. If it does not come up, ensure the screws are loosened.
5. Flip over the Scan Surface.

   Do not remove the glass from the frame!

6. Thoroughly clean the glass Scan Surface with ultrapure water and wipe with a lint-free tissue.

   Do **not** use scouring compounds or abrasive scouring pads. The glass can scratch, which can affect the scanned image.

7. Repeat the wash with 70% ethanol to remove any visible smears. Use methanol to remove any remaining residues.
8. Reinstall the Scan Surface by aligning balls on the glass frame with their sockets on the Y-stage and tighten screws (torque not to exceed 8 in-lbs).

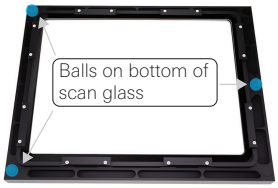

Figure 2-9 Balls on bottom of glass frame

Figure 2-10 Y-Stage sockets

Alignment Guides

Plate Alignment Guide

Use the Plate Alignment Guide (926-18972) to precisely position multiwell plates during imaging. The Plate Alignment Guide is held in position by magnets.

Figure 2-11

Figure 2-12

Slide Alignment Guide

Use the Slide Alignment Guide (PN 926-18971) to precisely position microscope slides during imaging. The Slide Alignment Guide is held in position by magnets.

Figure 2-13

Figure 2-14

Sample Enclosure

The Sample Enclosure is the frame surrounding the Scan Surface. The Sample Enclosure is held in place by magnets and needs to be removed in some circumstances.

Remove the Sample Enclosure

Pull upward on the Sample Enclosure to remove it. The Sample Enclosure must be removed, for example, to manually move the Scan Surface (see ***Manually Move Scan Surface*** on page 22) or to clean the underside of the Scan Surface (see ***Clean Underside of Scan Surface*** on page 25).

Figure 2-15

Installing the Sample Enclosure

Lower the Sample Enclosure into place. The magnets will attract and pull the Sample Enclosure into position.

Tray Holder

The Tray Holder is used to store the following accessories: the Plate Alignment Guide, the Slide Alignment Guide, and the Silicone Mat. These accessories fit in individual slots within the Tray Holder.

- To **open** the Tray Holder, gently push the door of the Tray Holder, then release. The door will pivot open, allowing access to the accessories inside. Slide the accessories out of their slots when you need to use them, or slide them back into their slots to store them in the Tray Holder.
- To **close** the Tray Holder, gently push the front of the door of the Tray Holder into the imager until it latches.

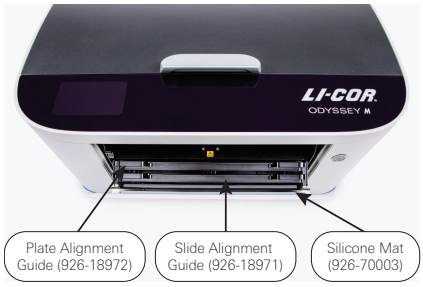

Figure 2-16. This side view shows how the Alignment Guides and Silicone Mat fit into the Tray Holder.

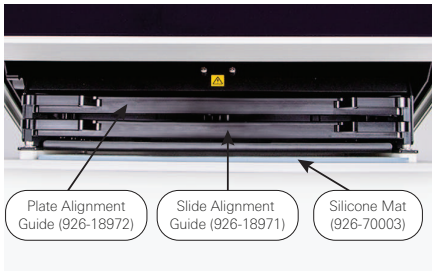

Figure 2-17. This top view shows how the Alignment Guides and Silicone Mat can fit into the Tray Holder. The Plate and Slide Alignment Guides can fit in either location, but fit in a specific orientation.

Remove Tray Holder

The Tray Holder on the front of the imager can be removed for certain maintenance tasks, such as cleaning the fan filter (see ***Clean or Replace Fan Filter*** on page 17). For more information about the Tray Holder, see ***Tray Holder*** on page 28.

To remove the Tray Holder:

1) Gently push the door of the Tray Holder, then release. The door will pivot open.

Figure 2-18

2) Remove everything inside the Tray Holder.

3) With the door open, push the front of the Tray Holder into the imager. It will move into the imager about 0.5 in.

Figure 2-19

4) Push up the holding lever until it stops and hold the lever in that position.

Figure 2-20

5) Support the Tray Holder with your hand while allowing it to rotate forward out of the imager.

Figure 2-21

6) Pull the Tray Holder up and away from the base of the imager. The roller pins on the Tray Holder will detach from the hooks on the imager.

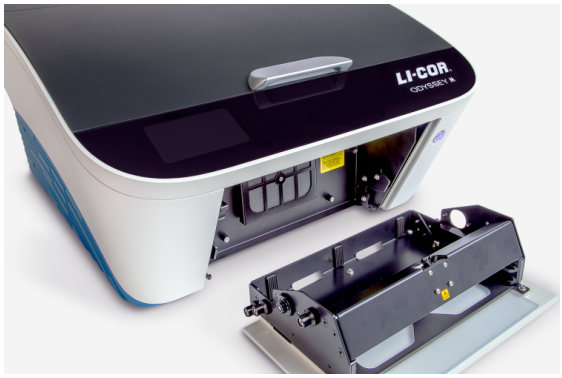

Figure 2-22

Install Tray Holder

1) Position the lower roller pins on the left and right sides of the Tray Holder into their corresponding hooks.

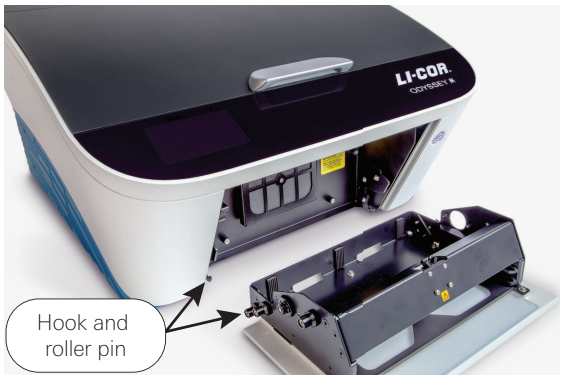

Figure 2-23

2) Rotate the Tray Holder to the closed position. The Stop Lever will reset itself when the Tray Holder is closed.

Figure 2-24

Serial Number

The serial number for your Odyssey M is located inside the Tray Holder near the top. The serial number is in this format: ODM-XXXX (ODM- followed by four numbers).

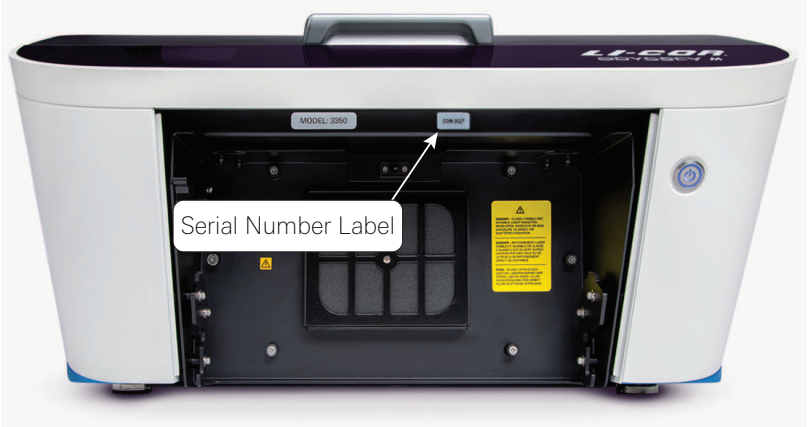

Figure 2-25 This image shows the location of the serial number label within the Tray Holder. The Tray Holder has been removed in this photo.

Rear Panel

This is the Rear Panel of the Odyssey® M Imager.

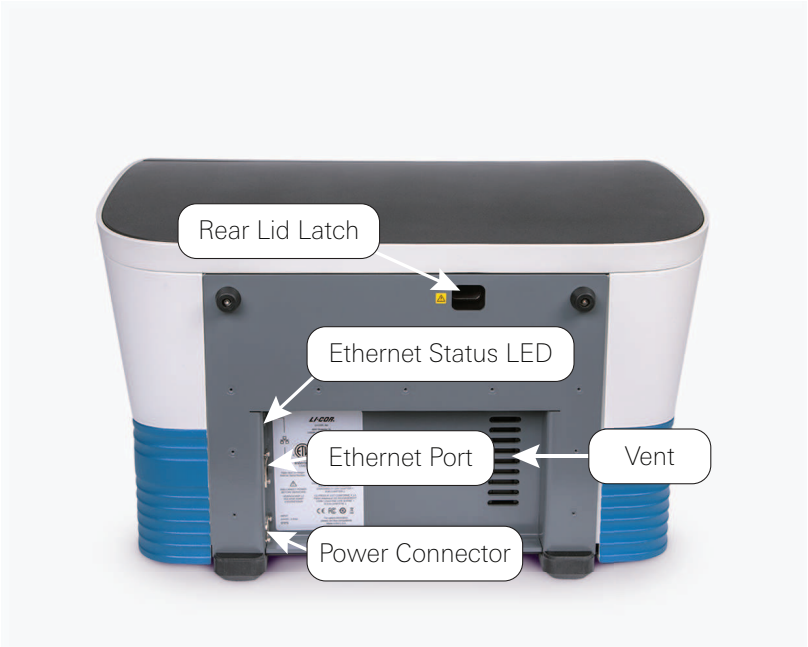

Figure 2-26. Closeup of the Odyssey M Imager rear panel showing the power receptacle and LAN port (use only the supplied networking cable). Note: The appearance of your instrument's back panel may vary slightly from the one shown.

- Rear Lid Latch Access Hole: A switch inside this hole allows you to unlatch the rear lid. Do not attempt to open the rear lid without reading instructions in the Rear Lid section "Rear Lid" below carefully.

  > The rear lid is safety interlocked. Removing the lid removes power to the illumination sources and the motors.

- Ethernet Status: Two LED status indicators show if the Ethernet connection is transmitting or receiving information.
- Exhaust: The slotted openings help ventilate air through the imager.
- Power IN: Plug the DC power plug part of the LI-COR provided power adapter into this port.

Rear Lid

The rear lid of the imager can be removed, **if necessary**, to retrieve samples (see ***Retrieve Samples*** on page 34) or to clean the chemi module (***Chemi Module Glass*** on page 35).

Figure 2-27 This is the imager with the rear lid removed.

Remove Rear Lid

If you need to retrieve a sample or you need to clean the glass cover of the chemi imaging module, the rear lid can be removed using the following procedure.

> The rear lid is safety interlocked. Removing the lid removes power to the illumination sources and the motors.

1. Exit LI-COR® Acquisition Software.
2. Turn off the Odyssey M by pressing the Power button ⏻ on the front panel.
3. Disconnect the power cord. See "Disconnecting the Power" on page 35 for more information about disconnecting power.
4. On the rear panel, locate the latch access hole.

Figure 2-28

5. Inside the latch hole, press the switch to the left to release the latch. The rear lid will pop up slightly.
6. Lift the rear lid up slightly (about 10 - 20 degrees).
7. Grab the rear lid and gently slide it toward the rear of the imager. Pulling the rear lid slightly will allow the two connectors on the front side of the lid to be removed from their sockets, and the rear lid can then be separated from the imager and set aside.
8. You can then proceed with sample retrieval instructions (see ***Retrieve Samples*** below) or instructions for cleaning the glass covering of the chemi module (see ***Chemi Module Glass*** on the facing page).
9. To attach the rear lid back to the imager, slide the rear lid at a slight angle to the back of the imager to reengage the connectors. Press firmly down in the middle of the back edge to reengage the latch.

Retrieve Samples

As described in ***Scan Surface*** on page 20, the Scan Surface automatically moves to the optical system in the rear of the imager during a scan. If a power failure occurs during the scan when the Scan Surface is in the rear of the imager, the Scan Surface will not be able to return to the front area normally.

If the Scan Surface does not return to the front area normally and you need to access samples within the imager, first try to move the Scan Surface forward manually using the procedure in ***Manually Move Scan Surface*** on page 22. If the Scan Surface cannot be moved forward manually, follow instructions for removing the rear lid (see ***Remove Rear Lid*** on the previous page).

With the lid removed, look for the samples. If there is a clear, unobstructed path that can be used to safely remove the samples without impacting internal components of the imager, then carefully remove the samples.

Chemi Module Glass

The Chemi Imaging Module (available on Odyssey M model 3350) has a glass covering. Do not attempt to clean this glass covering. If you believe the glass covering has become contaminated (for example, something has been spilled on it), contact LI-COR Technical Support for assistance.

General Description of Scanning

Scans are initiated using LI-COR® Acquisition Software.

LI-COR Acquisition Software Overview

LI-COR Acquisition Software provides step-by-step workflows for imaging the types of assays that the Odyssey M is intended to image. Choose the appropriate workflow for the type of assay that you want to image, then follow the guidance provided on the pages in the software imaging workflow.

Continuous Operation

The Odyssey M is designed to operate continuously. During idle times, the Odyssey M can remain powered on or be powered off at your discretion. See "Imaging System Specifications" on page 47 for more information about how much current the Odyssey M draws. For information about disconnecting the power, see "Disconnecting the Power" below.

Disconnecting the Power

⚠ Do not press the power button or unplug the power cable while the system is scanning, except for an emergency situation.

1. Exit LI-COR Acquisition Software .
2. Briefly press the Power button ⏻ on the front panel to power off the Odyssey M.
3. Unplug the power supply from the wall outlet. You can then unplug the power supply from the back of the Odyssey M.

Optical System Description

Brief Description of Illumination Sources

Laser

Lasers are narrow wavelength (e.g. 488nm ± 1nm), high intensity light. Lasers are used as an excitation source for substances that emit light at a specific wavelength after being excited by light at

a specific wavelength. This process of light excitation and emission is known as fluorescence. Fluorescence detection can be used for samples or fluorophores. The benefit of using lasers to induce fluorescence is that specific structures (those excited by the wavelength of the incident laser) will be illuminated, but the rest of the sample that does not fluoresce under the indicent laser's wavelength will not be illuminated. Fluorescence enables accurate targeting and imaging. Fluorescence is the preferred method when accurate quantification of samples is required.

Examples

- Fluorescent Western blots
- In-Cell Western™ Assay

Transillumination (Transmitted Light)

Transillumination involves transmitting visible light (or in some cases UV light) through your sample. The light is attenuated in the sample via absorption (which generates contrast) and the transmitted light is recorded. Transillumination creates even illumination of the sample to observe highly contrasted, stained, or naturally pigmented samples. The illumination wavelength (and emission filter) are selected based on the spectral characteristics of the sample to generate the best contrast. Images in the RGB (red, green, blue) format, also called "true color" images, are a composite of three independent grayscale images that correspond to the intensity of red, green, and blue light transmitted by the sample.

Examples

- Coomassie or silver staining of protein gels
- H&E stained tissue sections

Epi-Illumination (Reflected Light)

Method of choice for imaging samples that are not translucent or transparent. In epi-illumination, the recorded light is reflected from the sample with absorption and diffraction of the reflected light by the sample resulting in discernible variations in the image, from black through various shades of gray, or color if the sample is colored. Epi-illumination creates even illumination of the sample to observe highly contrasted, stained or naturally pigmented samples. For grayscale images the illumination wavelength (and emission filter) are selected based on the spectral characteristics of the sample to generate the best contrast. Images in the RGB (red, green, blue) format, also called "true color" images, are a composite of three independent grayscale images that correspond to the intensity of red, green, and blue light transmitted by the sample.

Examples

- Western blot membranes using colorimetric substrates or stains
- Colorimetric MW markers used in chemiluminescent blots

Computer Connections and Networking

Note: Use only the supplied Category 6 network cable to connect the Odyssey M and computer.

When LI-COR® Acquisition Software starts, it searches for and discovers any Odyssey M Imagers automatically. If only one imager is found, LI-COR Acquisition Software establishes communication. If more than one imager is found, you will be able to choose which imager you want to connect to on the LI-COR Acquisition Software **Connect** page.
If you do not see your imager in the list, click the link on the Connect page that says `My imager is not in the list` to view troubleshooting steps. For information about contacting Technical Support and locating LI-COR Acquisition Software log files, see ***Obtaining Technical Support*** on page 45.

Chapter 3: Operation

Before You Begin

Clean the Scan Surface thoroughly before and after every scan. Thoroughly clean the silicone mat each time the mat is used.

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 M. Contaminated surfaces in contact with the membrane surface may cause blotches and streaks that cannot be removed with further washing.

Clean the Scan Surface

1) When cleaning the Scan Surface, leave the Sample Enclosure in place on the Scan Surface.

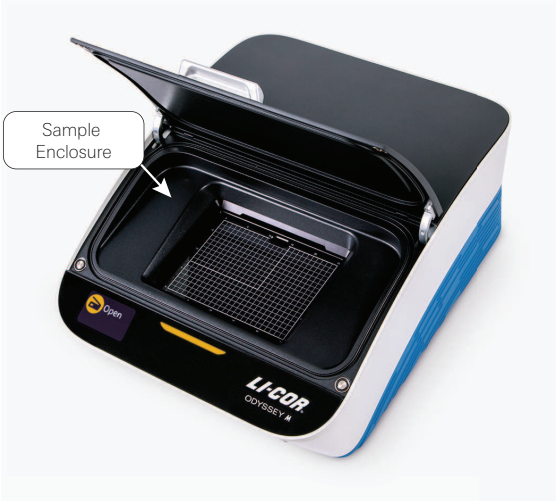

Figure 3-1

2) Thoroughly clean the glass Scan Surface and the metal frame surrounding the Scan Surface with ultrapure water and wipe with a lint-free tissue.

Figure 3-2

Do **not** use scouring compounds or abrasive scouring pads. The glass can scratch, which can affect the scanned image.

3) Repeat the wash with 70% ethanol to remove any visible smears. Use methanol to remove any remaining residues.

Do not get ethanol or methanol on the Sample Enclosure or on the outside of the imager.

Clean Silicone Mat (926-70003)

Clean the silicone mat each time it is used.

1. Rinse the mat 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.
2. Air dry the mat.

Clean Alignment Guides (926-18972 and 926-18971)

The Plate Alignment Guide (926-18972) and Slide Alignment Guide (926-18971) can be cleaned with soap and warm water. Clean the guides away from the imager to ensure that the soapy water does not enter the imager.

Keeping these guides clean will help reduce wear over time and will help ensure proper connection between the permanent magnets in the guide with the magnets they connect to on the imager.

Imaging Membranes

Handling Membranes

Nitrocellulose or PVDF membranes can be used. Only handle membranes by the edges with clean forceps. Be careful not to touch the membrane with your hands or gloves.

Scanning Fluorescent and Colorimetric Membranes

1. Ensure the Odyssey M is powered on and connected to LI-COR® Acquisition Software .
2. Open the lid.
3. Place wet or dry membrane(s) on the Scan Surface with the **sample-side down**.

   When scanning a wet membrane, **ensure that there is no liquid pooled on the Scan Surface**. Dry away excess liquid on the Scan Surface before imaging.

4. For optimal image quality, ensure that the membrane is flat against the Scan Surface.
   - When imaging a **wet membrane**, use a 4" soft roller (PN: 926-71000) to roll the membrane flat against the Scan Surface and to remove any air bubbles. Then cover the membrane completely with a silicone mat (PN: 926-70003) to hold the membrane flat and to keep the membrane moist during the scan.
   - When imaging a **dry membrane**, cover the membrane completely with the silicone mat.
5. Close the lid.
6. In LI-COR Acquisition Software, choose the workflow for scanning membranes and follow the guidance on the pages in the workflow.

Scanning Chemiluminescent Membranes

The following instructions for imaging chemiluminescence are relevant to Odyssey M Model 3350.

Prepare the blot and add substrate away from the imager's Scan Surface.

1. Ensure the Odyssey M is powered on and connected to LI-COR Acquisition Software .
2. Open the lid.
3. Place the membrane(s) **sample-side down** on the "Chemi Scan Area" of the Scan Surface.

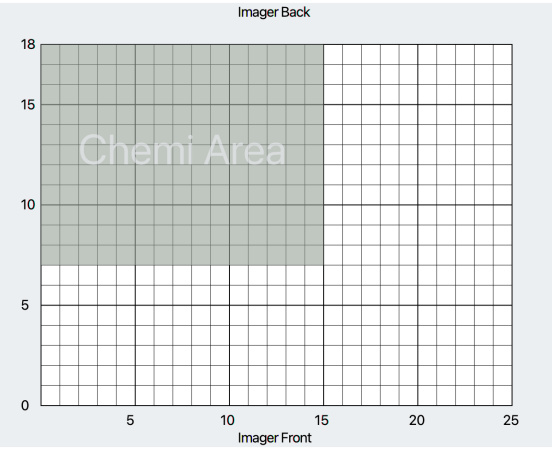

Figure 3-3

Ensure that there is no liquid pooled on the Scan Surface. Dry away excess liquid on the Scan Surface before imaging.

4. For optimal image quality, ensure that the membrane is flat against the Scan Surface.
   - Use a 4" soft roller (PN: 926-71000) to roll the membrane flat against the Scan Surface and to remove any air bubbles. Then cover the membrane completely with a silicone mat (PN: 926-70003) to hold the membrane flat and to keep the membrane moist during the scan.
   - Cover the membrane completely with the silicone mat.
5. Close the lid.
6. In LI-COR® Acquisition Software, choose the workflow for scanning membranes and follow the guidance on the pages in the workflow.

Imaging Gels

Both protein gels and nucleic acid gels can be scanned on the Odyssey® M Imager.

Scanning Gels

Do not use the silicone mat for imaging gels.

1) Ensure the Odyssey M is powered on and connected to LI-COR Acquisition Software .
2) Open the lid.
3) Thoroughly rinse the gel with destaining solution or water to remove dye particulate.
4) Place the gel face-up on the Scan Surface, being careful not to trap air bubbles underneath.
5) Close the lid.
6) In LI-COR Acquisition Software, choose the workflow for scanning gels and follow the guidance on the pages in the workflow.

Imaging Multiwell Plates

Multiwell plates in 6, 12, 24, 48, 96, and 384 well formats can be scanned on the Odyssey M. Be sure to select multiwell plates that fit the Plate Alignment Guide.

Do not attempt to image plates that have a height greater than 23 mm on the Odyssey M.

Proper selection of multiwell plates significantly affects the results of your analysis, because each plate has its own characteristics including well depth, autofluorescence, and well-to-well signal crossover. Some general considerations for multiwell plate selection are provided here.

- Do not use plates with white walls, because the autofluorescence from the white surface will create significant noise.

- For an In-Cell Western™ Assay, LI-COR recommends the following plates.
  - For adherent cells, LI-COR recommends a 96-well plate with a clear, flat bottom and black wells, such as the Greiner Bio-One CELLSTAR® Black µClear® Microplate, LI-COR PN 926-19156 (8 pack) or 926-19157 (32 pack).
  - For suspension cells, LI-COR recommends growing cells in a 96-well U-bottom plate and transferring cells to Greiner Bio-One CELLSTAR® Black µClear® Microplate, LI-COR PN 926-19156 (8 pack) or 926-19157 (32 pack), for imaging.
- The Odyssey M Scan Surface should be thoroughly cleaned using the procedures described earlier in this chapter. If artifacts are noticed on the image, it may help to clean the bottom of the plate with a moist, lint-free tissue.
- Protect plates from light before imaging to ensure highest sensitivity. When storing plates after imaging, protect plates from light.
- 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 a range of focus offsets. The focus offset range for the Odyssey M is -1.00 mm to 5.00 mm. 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.

Scanning Multiwell Plates

1. Ensure the Odyssey M is powered on and connected to LI-COR® Acquisition Software .
2. Open the lid.
3. For the recommended Greiner plates, we generally recommend taking the lid off before imaging. You can use plate tape to cover the plate to mitigate evaporation problems.

   When scanning live cells, you may need to leave the lid on to prevent contamination.
4. Place the Plate Alignment Guide on the Odyssey M Scan Surface and place multiwell plates in the Plate Alignment Guide.
5. Close the lid.
6. In LI-COR Acquisition Software, choose the workflow for scanning multiwell plates and follow the guidance on the pages in the workflow.

Imaging Slides

Slides can be scanned on the Odyssey M.

Scanning Slides

1. Ensure the Odyssey M is powered on and connected to LI-COR Acquisition Software .
2. Open the lid.

3. Place the Slide Alignment Guide on a clean, solid surface (such as a lab bench) off of the Odyssey M Scan Surface.

4. Before inserting slides into the Slide Alignment Guide, **determine which orientation you should use to load your slides** into the Slide Alignment Guide.

   For slides **with a coverslip**, slides should be placed with the coverslip (sample) **facing up**.

   For slides **without a coverslip** (such as membrane-coated slides), place the slide sample-side **facing down**.

5. Carefully lower a slide into a slot on the Slide Alignment Guide, starting with the slide at an oblique angle to the slot. Lower the slide slowly until it is flat in the slot and pressed against the pressure clasp. Ensure the slide remains flat against the base of the slot.

   Repeat until all slides have been loaded.

   ⚠ Do not place the slide straight down into the slot, or you might break the slide.

6. Carefully lower the Slide Alignment Guide onto the Scan Surface.

7. Close the lid.

8. In LI-COR® Acquisition Software, connect to the Odyssey® M Imager and start the Microscope Slide image acquisition workflow. Follow the guidance on the pages in the workflow.

   On the Set scan area page, use the **Scan Area Preview** to locate your samples and ensure that the Scan Area encloses only the sample without extraneous background from the slide. This will ensure the fastest image acquisition and best focus.

   The focus offset is 2.5 mm in the standard Slide imaging workflow. If you are imaging a non-standard slide, not using the Slide Alignment Guide, or imaging the slide with the cover slip facing up, you may need to determine the optimal focus offset for your assay. You can set non-standard focus offsets in the Custom imaging workflow in LI-COR Acquisition Software and then evaluate the results to determine which non-standard focus offset is optimal for your assay.

9. When you are done imaging the slides, open the lid and move the Slide Alignment Guide (with the slides on it) off of the Scan Surface.

10. Remove slides from the Slide Alignment Guide by pulling them from their slots at an oblique angle (i.e., the opposite order of the steps followed to load the slides).

Obtaining Technical Support

To resolve a question about your Odyssey M, contact LI-COR Technical Support at 800-645-4260 (North America) or by email at biohelp@licor.com.

To help you, Technical Support may request log files or images from LI-COR Acquisition Software.

Chapter 4: Appendix

Imaging System Specifications

Unless otherwise specified, the following apply to Odyssey M Model 3350 and Odyssey M Model 3340.

Laser Source

The Odyssey M is a Class 1 laser product.

Laser Source	Maximum Laser Output	Beam Divergence
488 nm	30 mW	0.038°
520 nm	50 mW	0.046°
685 nm	450 mW	0.085°
785 nm	1.2 W	0.060°

Strong Electromagnetic Fields

Operating the Odyssey M in the presence of a strong electromagnetic field in the 100MHz to 400MHz frequency range has been shown to degrade the performance of the chemiluminescent imager. It is possible that some allowable faint bars or striping may be seen at slightly more than the background levels of the camera. When used in the expected environment, this interference should be uncommon.

LED

LED Risk Group: Exempt group in accordance with IEC 62471:2006. The LEDs do not pose any photobiological hazard.

Focus

Focus offset range: -1.00 mm to 5.00 mm

Pixel Resolution

Available imaging resolutions: 5 µm, 10 µm, 20 µm, 50 µm, 100 µm

Resolution for chemi images: 100 µm

Maximum Height of Samples

To image an item on the Odyssey M, the item must be 23 mm or less from the Scan Surface to the top of the item.

Operating Specifications

Operating Conditions

For indoor use only; operating temperature 15 - 35 °C and dew point not greater than 22 °C, non-condensing; altitude not to exceed 2000 m.

Transport Conditions

Shipping/transport conditions for the Odyssey® M Imager should not exceed -40 °C to 65 °C.

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); < 3 Amp maximum; At 120 V: 0.5 Amp typical when idle; 50-60 Hz.
- Power Supply: One end of the provided power supply connects to a wall outlet and the other end connects to the imager. The power supply converts from wall outlet voltage to 24 VDC (5 Amp). Only use the provided power supply to plug in the imager. If you need another power supply, contact LI-COR Biosciences.

Dimensions

- 24" width x 30" depth x 15" height (61 cm width x 76 cm depth x 38 cm height)
- Height with lid fully open: 28" (71 cm)

Scan Surface

- Total Scan Area: 25 cm W X D 18 cm (9.8" W × 7.1" D)
- Scan Area of Chemi Region (Odyssey M Model 3350 only): 15 cm W x 11 D cm (5.9" W x 4.3" D)

Dynamic Range

>6 logs for chemiluminescence (Model 3350) and fluorescence. This dynamic range is obtained in a single acquisition.

Weight

- Odyssey M Model 3350: 121 lbs (55kg)
- Odyssey M Model 3340: 115 lbs (52kg)

Network

- Protocol: TCP/IP
- Connection: Use the Category 6 network cable provided with the Odyssey M.

Detectors

- sCMOS image sensor
- Sensor for chemiluminescence (Model 3350): CCD

Expected Laser Lifetime

- 685 nm: 20,000 hours
- 785 nm: 20,000 hours
- 488 nm: 40,000 hours
- 520 nm: 40,000 hours

Light Sources

- RGB LED (trans-illumination)
- RGB LED (reflective illumination)
- Solid-state diode laser at 488 nm
- Solid-state diode laser at 520 nm
- Solid-state diode laser at 685 nm
- Solid-state diode laser at 785 nm

Odyssey M Detection Channel Summary

Channel	Excitation / Illumination	Emission Filter	Odyssey M Channel	Assay Category / Imaging Mode
800	785 nm	816 - 840 nm	785Ex-820Em	Membrane, In-Cell Western (includes On-Cell Western), Cell Analysis, Microscope Slide, Custom
700	685 nm	721 - 740 nm	685Ex-720Em	Membrane, Gel, In-Cell Western (includes On-Cell Western), Cell Analysis, Microscope Slide, Custom
520	520 nm	570 - 610 nm	520Ex-590Em	Membrane, Gel, In-Cell Western (includes On-Cell Western), Cell Analysis, Microscope Slide, Custom
520A	520 nm	721 - 740 nm	520Ex-720Em	Custom
520B	520 nm	816 - 840 nm	520Ex-820Em	Custom
488	488 nm	519 - 543 nm	488Ex-530Em	Membrane, Gel, In-Cell Western, Cell Analysis, Microscope Slide, Custom
488A	488 nm	570 - 610 nm	488Ex-590Em	Gel, Custom
488B	488 nm	721 - 740 nm	488Ex-720Em	Custom
488C	488 nm	816 - 840 nm	488Ex-820Em	Custom
Chemi	NA	NA	Chemi	Membrane, Custom (luminescent assays)

Channel	Excitation / Illumination	Emission Filter	Odyssey M Channel	Assay Category / Imaging Mode
RGB Epi	470 525 630 Epi	NA	RGBEpi	Custom
630 Epi	631 - 659 nm	Clear Window	630Epi	Membrane
525 Epi	500 - 530 nm	Clear Window	525Epi	Membrane
470 Epi	447 - 472 nm	Clear Window	470Epi	Custom
RGB Trans	470 525 630 Trans	NA	RGBTrans	Microscope Slide, Custom
630 Trans	631 - 659 nm	Clear Window	630Trans	Gel, ELISA
525 Trans	500 - 530 nm	Clear Window	525Trans	Custom
470 Trans	447 - 472 nm	Clear Window	470Trans	Gel, ELISA

Embedded Firmware Source Code

The embedded firmware running on the Odyssey M Imager (model number 3340, 3350) utilizes open source software. To obtain source code or related information, contact LI-COR Support at http://www.licor.com/biotechsupport.