

# ***D-Digit***<sup>®</sup>

## **Gel Scanner**

User Guide



***LI-COR***<sup>®</sup>



## **CE Marking:**

This product (model number 3500) 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.

## 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 D-DiGit®Gel Scanner is intended to be used by qualified personnel. Read this entire manual before using the D-DiGit Gel Scanner.

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# Chapter 1: Safety Information and Initial Setup

D-DiGit® Gel Scanner

## About the D-DiGit Gel Scanner

The D-DiGit Gel Scanner is designed to scan gels stained with safe alternatives to Ethidium Bromide.

The D-DiGit Gel Scanner is intended for use with the following stains:

- SYBR® Safe DNA Gel Stain
- SYBR® Gold Nucleic Acid Gel Stain
- SYBR® Green I Nucleic Acid Gel Stain
- Diamond™ Nucleic Acid Dye
- GelGreen™ Nucleic Acid Gel Stain
- GelRed™ Nucleic Acid Gel Stain
- Midori Green Direct
- Midori Green Advance DNA Stain
- GreenView™ Nucleic Acid Gel Stain
- GreenView™ Plus Nucleic Acid Gel Stain
- GreenView™ Ultra DNA Gel Stain

## FCC Compliance Statement

This equipment (model number 3500) has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE: A shielded Hi-Speed USB interface cable with ferrite core installed on the gel scanner connector end must be used with this equipment.

Caution: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## Safety Precautions

Before using your scanner, read the following safety guidelines carefully. The safety guidelines detail the proper operation of the scanner and its accessories to prevent injury to users or damage to equipment.

### Safety Icons



This icon indicates a hazardous situation which, if not avoided, could result in injury to users or damage to equipment.



This icon indicates a hazardous situation which, if not avoided, could result in serious injury or death to users.

### Power Supply



Use a power source with the power rating specified on the marking label on the scanner.



Turn off the power to each device before connecting or disconnecting cables.



Insert the plug completely into the outlet, as a loose connection may cause arcing and result in fire.



Hold the plug or connector to disconnect cables. Pulling the cable may damage the wire and result in fire or electric shock.



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



When the scanner is left unattended and unused for long periods of time, unplug it from the wall outlet.

### Moving and Storing the Scanner



Always ensure the scanner is stored properly before shipping or moving it. Quick stops, excessive force, and uneven surfaces may cause the product to overturn when moving.



Do not hit or drop the scanner. The scanner may be damaged if it receives a strong jolt, which may result in fire or electric shock if the scanner is used without being repaired.



Do not place the scanner on any slippery, slanted, or unstable surface. The product may slide or fall, causing serious injury to people as well as serious damage to the product.



Do not use the scanner near water. To avoid the risk of electric shock and other hazards, never spill liquid of any kind on the scanner.



Place the scanner away from heat sources, such as radiators, heat registers, stoves, amplifiers, or other products.



Do not store the scanner where it might be exposed to direct sunlight.

## Using the Scanner



Before using the scanner, ensure the glass surface is clear from obstacles.

## Maintenance and Service



Before cleaning the scanner, turn off each device and unplug the power cable from the AC outlet.



For repairs, consult qualified service personnel.



When replacement parts are required, use replacement parts that are specified by the manufacturer or have the same characteristics as the original parts.



Inspect the scanner before using it. In addition, perform a regular inspection at least once per year.

## Blue LED



The blue LED in the scanner is classified as Risk Group 1 (RG1), indicating low risk from optical radiation. During normal operation, the light emitted from the blue LED will not endanger human eyes.



To protect your eyes, do not stare directly at the light from the blue LED.



When using the blue LED for gel excision or observation, protect your eyes from direct exposure to the blue light by using the Viewing shield that came with your scanner or other appropriate eye protection. For details on how to use the supplied Viewing shield, see *Excising or Observing a Gel* on page 10.

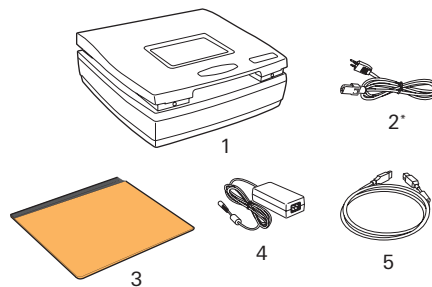
## Initial Setup

### Unpack the D-DiGit Gel Scanner

Unpack the box and check for the components.

1. D-DiGit Gel Scanner
2. Power cords

Be sure to use the correct power cord for your country. If you need to use a Safety Approved plug adapter, be sure that the adapter is rated to 10Amp/250V. Do **not** use the US power cord with a plug adapter.



\*Only the US power cord is shown.

3. Viewing shield
4. Power adapter
5. USB Cable
6. Quick start guide

### Computer Requirements for D-DiGit Image Acquisition Software

The following specifications are required to run D-DiGit Image Acquisition Software:

- Color display with 24-bit color output capability
- 512 MB RAM or above
- 300 MB HDD or above
- Pentium IV PC or higher with Hi-Speed USB (USB 2.0)
- Windows 7, Windows 8 or Windows 10

### Install D-DiGit Image Acquisition Software

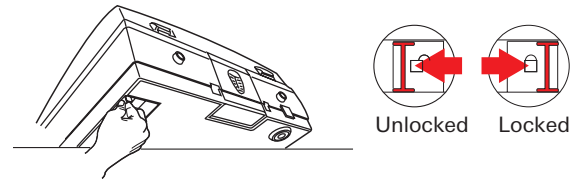
Ensure you have the correct permissions to install software on the computer you want to use.

Install the software before connecting the scanner to the computer.

1. Download the D-DiGit Image Acquisition Software from [licor.com/ddigit-software](http://licor.com/ddigit-software).
2. Follow the installation instructions on the download page.

## Unlock Scanner

1. Ensure the scanner is powered off, and the power cord is unplugged.
2. With the rear panel of the scanner facing you, tilt the scanner and locate the locking switch underneath the scanner.
3. Push the locking switch to the left until the "unlocked" icon is showing, as indicated in the graphic at right.



When shipping the D-DiGit Gel Scanner, ensure the switch is in the locked position. See *Prepare Scanner for Shipment* on page 12 for more information.

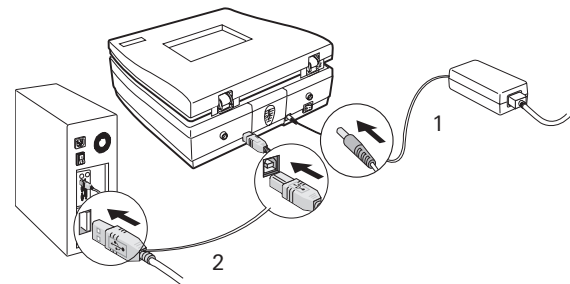
## Connect Power and USB Cables

### 1. Connect the power adapter

Connect the power adapter to the back of the scanner. Plug one end of the power cord into the power adapter and the other end into a wall outlet.

### 2. Connect the USB cable

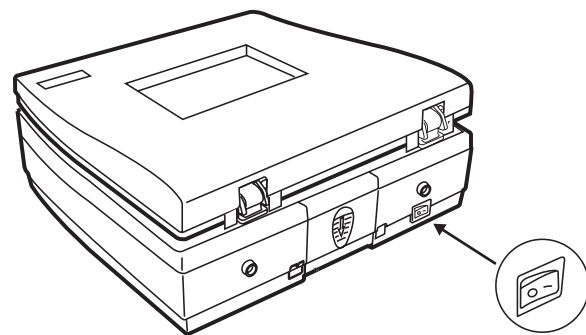
Connect one end of the USB cable to your computer and the other end to the scanner.




## Turn on the D-DiGit Gel Scanner

Flip the power switch on the back of the scanner so that the "I" is down.

You will know that the power is on if you can connect the scanner to the software in the next step.



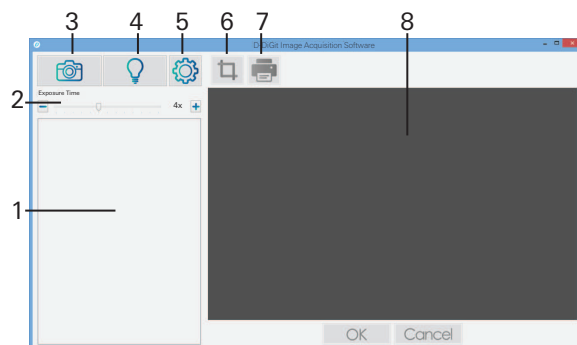
## Start D-DiGit Image Acquisition Software

Double-click the D-DiGit Image Acquisition Software shortcut  on the desktop. Once your D-DiGit Gel Scanner is detected, the D-DiGit Image Acquisition Software control panel will activate.

Once the control panel is active, you can use the D-DiGit Gel Scanner to scan, excise, or observe gels.

## D-DiGit Image Acquisition Software Overview

D-DiGit Image Acquisition Software allows you to capture images from the D-DiGit Gel Scanner. After capture, images can be imported into Image Studio™ Lite for convenient analysis, annotation, and storage. To download Image Studio, visit [licor.com/islite](http://licor.com/islite).

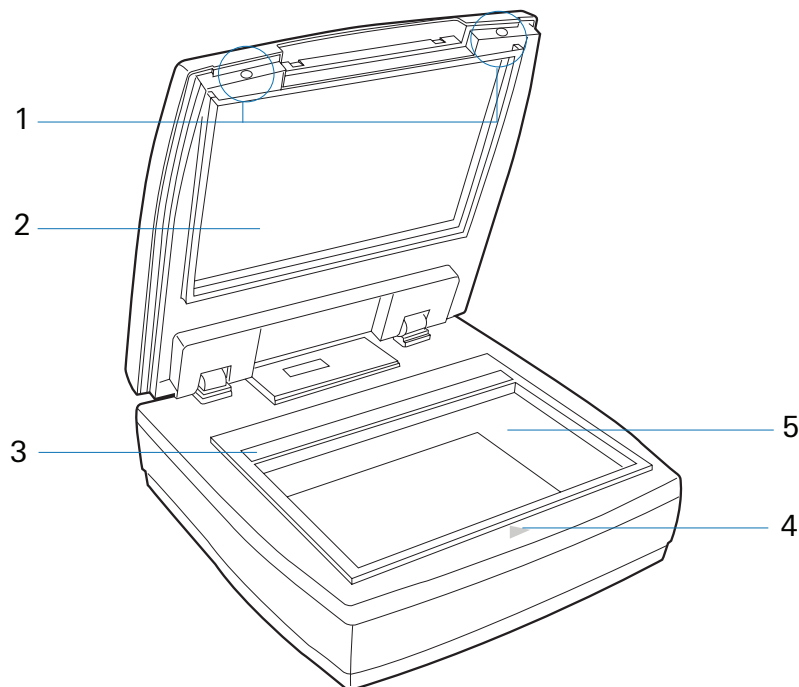


1. **Thumbnail view:** This area displays thumbnails of scanned images.
2. **Exposure Time:** Drag the slider to adjust exposure time.
3. **Image capture:** Click to start a scan.
4. **Light:** Click to activate the blue LED for gel excision or observation.
5. **Settings:** Click to open the Settings window where you can adjust scan settings, image file settings, and storage settings.
6. **Crop:** Crop the selected image.
7. **Print:** Print the selected image.
8. **Preview:** This area displays an enlarged view of the thumbnail selected in the Thumbnail view.

# Chapter 2: System Overview

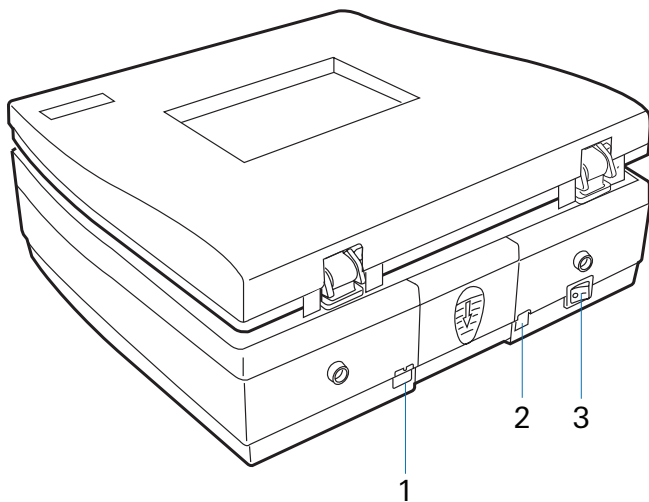
## Scan Surface and Lid

View with the lid raised and the scan surface exposed.



Part Name	Description
1 Holes (2)	Used to attach the Viewing Shield when performing a gel observation or band excision
2 Scanner Lid	The top cover of the scanner
3 Calibration Window	The scanner uses the calibration window to make automatic calibrations during scanning.
4 Alignment Arrow	Used to align gels on the scan surface
5 Scan Surface	Place the gel here for scanning, excision, or observation

## Rear Panel



Part Name	Description
1 Hi-Speed USB Port	Connects the Hi-Speed USB (USB 2.0) cable to the computer.
2 Power Connector	Connects the scanner to the power adapter.
3 Power Switch	Turns the scanner on or off.



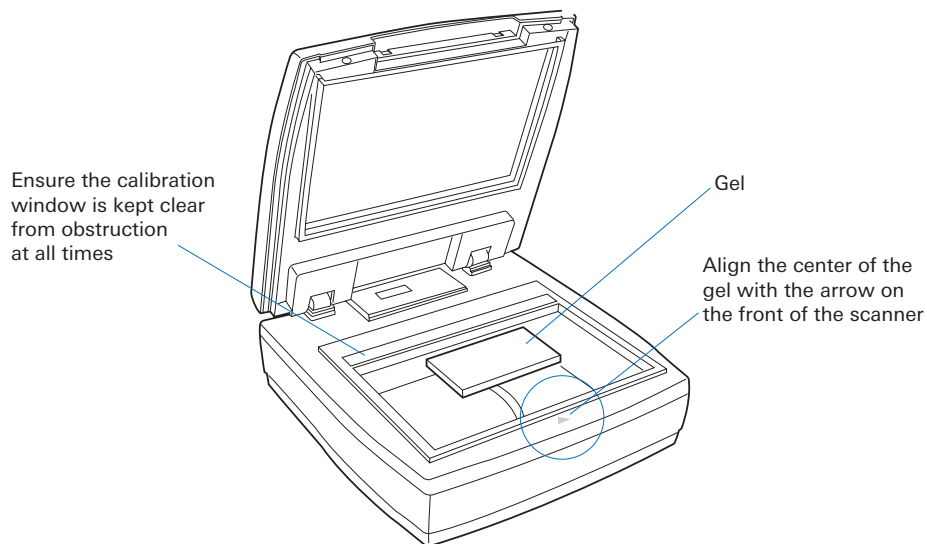
# Chapter 3: Operation

## Image Gel

### Position Gel

1. Raise the scanner lid.
2. Place the gel on the scan surface, and align the center of the gel with the arrow on the front of the scanner.

Ensure the calibration window is clear from obstruction at all times.




3. Lower the lid.


Before scanning, ensure the scanner lid has been closed tightly to prevent light leakage and poor quality scans.

### Scan Gel

The scanner must be unlocked before scanning. See *Unlock Scanner* on page 5 for instructions.

1. Start D-DiGit Image Acquisition Software.
2. Click **Image Capture**  on the Main Control Panel to image the gel.

**Tip:** The default exposure time is **4x**. For higher sensitivity, drag the slider bar to the right to increase the exposure time. Drag the slider bar to the left to decrease the exposure time and lower sensitivity.

After a scan is completed, the scanned image will be saved to the folder defined under **Settings** . For information about changing the folder location, see *Modify D-DiGit Image Acquisition Software Settings* on page 11.

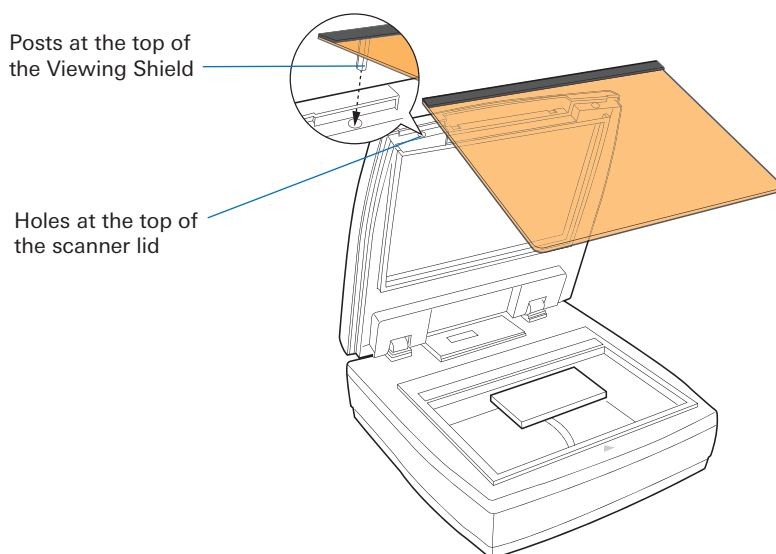
## Excising or Observing a Gel

Follow the steps below to observe a gel or excise a band from a gel.

1. Place the gel on the scan surface.

See *Position Gel* on page 9 for more information.

2. Attach the Viewing Shield to the lid. Insert the posts on the Viewing Shield into the holes on the lid, as shown below.



Before continuing, ensure the Viewing Shield is attached securely. The Viewing Shield should be securely attached to protect your eyes from exposure to light from the blue LED.


3. Start D-DiGit Image Acquisition Software.

4. Click the **Light** button  on the Main Control Panel.

The blue LED will automatically move to a predefined position and will illuminate.

The blue LED will stay illuminated for 3 minutes at a time before shutting off to cool down.



After the Light button  has been clicked, a countdown timer will appear in the software and will start counting down from 3 minutes. After 3 minutes, the blue LED will turn off and the software will prompt you to wait for 2 minutes before using the light again.

- Once you are finished, click **Light Off** to turn off the light and exit the countdown timer.


## Modify D-DiGit Image Acquisition Software Settings

Click Settings  on the Main Control Panel to adjust the following parameters.

- Image name options
- Image format
- Folder where images will be saved after scan completes

### Image Folder

The Image Folder is the folder where images are saved after a scan completes.

To specify a folder location, click the ellipsis button  and select the folder where you want images to be saved.

### Gray Mode

The Gray Mode setting allows you to specify the grayscale mode that will be applied the next time you scan a gel. Grayscale images use shades of gray to represent gradations of color.

- **Gray (8-bits)** This mode saves grayscale images with 8 bits per pixel. Approximately 256 shades of gray are available in this mode.
- **Gray (16-bits)** This mode saves grayscale images with 16 bits per pixel. Approximately 65,536 shades of gray are available in this mode.

When the **Gray 16-bit** mode is chosen, images can only be saved in the TIFF format.

### Resolution

The Resolution list allows you to pick the resolution for the next scan. The options are 150, 300, and 600 dpi. The default resolution is 300 dpi.

### Image Name

The options in the File Name group allow you to specify a format for image names. The format of an image name is comprised of a prefix and a suffix, in the form `Prefix-Suffix`.

#### Prefix

The **Prefix** option allows you to specify the beginning part of a file name for scanned images.

- **Date + Time:** If Date + Time is selected, the first part of the image name will be the year (Y), month (M), day (D), and time (hour, minute, second) when the image was acquired.

The date and time will appear with the format YYYY-MM-DD\_hh.mm.ss in the image name.

- **Text:** If text is selected, you will be able to enter text in the text field. The text you enter will be used as the first part of the image name. The word Image is the default text.

## Suffix

If the **Suffix** option is selected, you can choose a starting number to be appended to the image name. The number you set will be incremented by one for each successive scan (unless you change the number again).

## Example

If **Text** is selected in the **Prefix** section and **Suffix** is selected and set to 2, the first image acquired with these File Name settings will be `Image-000002`.

## Image Format

The **File Format** list lets you choose a file format to use for scanned images. The options are TIFF and JPEG.

## Show Warning Messages

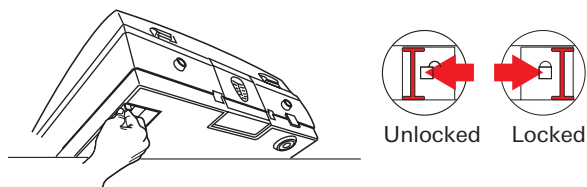
If the **Show warning message(s)** option is selected, you will be warned each time you attempt to delete a thumbnail image from the **Thumbnail View**.

## Prepare Scanner for Shipment

Lock the D-DiGit Gel Scanner before shipping it.

1. Ensure the scanner is powered off, and the power cord is unplugged.
2. With the rear panel of the scanner facing you, tilt the scanner and locate the locking switch underneath the scanner.
3. Push the locking switch to the right until the "locked" icon is showing, as indicated in the graphic at right.

Do not turn the scanner upside down while engaging the lock switch.



# Chapter 4: Maintenance

The D-DiGit Gel Scanner is designed not to require routine maintenance or calibration. You should clean the scanner thoroughly after each use.



If you experience a problem with your scanner, please contact LI-COR for assistance. Do not attempt to fix or perform maintenance on the D-DiGit Gel Scanner, or you may endanger yourself or cause damage to the scanner.

## Care and Cleaning

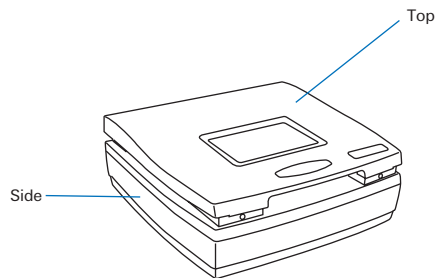
To avoid contamination, fresh Kimwipes should be used to clean each section of the scanner (as described below).

Do not use any detergents, synthetic cleaning solutions, cleaning naphtha, or other solvents to clean the scan surface.

**1. Turn off the scanner and unplug the power cable from the AC outlet.**

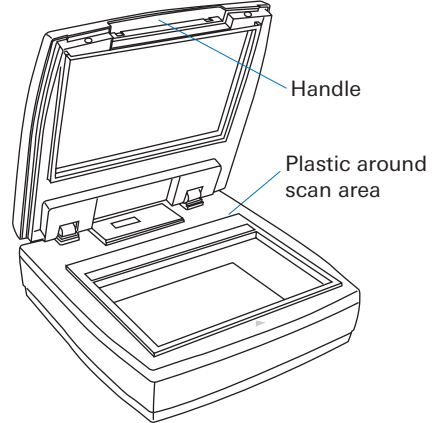
### 2. Wipe the top and sides

- a. Moisten a large Kimwipe with warm water.
- b. Thoroughly wipe down the top and sides of the scanner.
- c. Wipe dry with a Kimwipe.



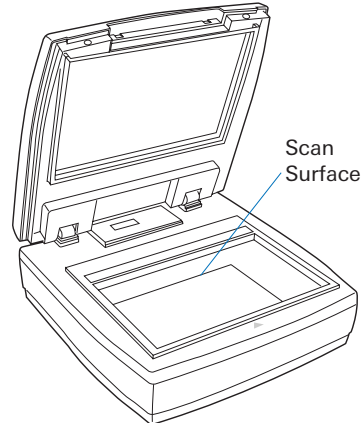
### 3. Wipe around the scan surface and under the handle

- a. Moisten another large Kimwipe with warm water.
- b. Thoroughly wipe down the plastic around the scan surface and under the handle.
- c. Wipe dry with a Kimwipe.



### 4. Wipe the scan surface with deionized water

- a. Moisten a large Kimwipe with **deionized water** and wipe down the scan surface.
- b. Clean the scan surface at least twice.
- c. Wipe the glass dry with a Kimwipe.



## Troubleshooting

1. **When trying to scan, an error message says that the scanner can't be found.**

Ensure the scanner is powered on. See *Turn on the D-DiGit Gel Scanner* on page 5.

2. **When trying to scan, an error message says "Code: -3, Scanner Hardware Error."**

Ensure your scanner is unlocked. See *Unlock Scanner* on page 5.

3. **For other problems that occur when scanning gels:**

Ensure that the calibration window is not covered and the gel is placed properly. See *Position Gel* on page 9.

## Specifications

Type	Desktop flatbed gel scanner
Light Source	Blue LED
Scanning Modes	16-bit grayscale (Approx. 65,536 shades of gray) or 8-bit grayscale (Approx. 256 shades of gray)
Resolution	150, 300, or 600 dpi
Sensitivity	0.04 ng/band
Scanning Area	7" x 5" (177.8 mm x 127 mm)
Interfaces	Hi-Speed USB (USB 2.0)
Dimensions (L x W x H)	12" x 12" x 5" (304.8 mm x 304.8 mm x 127 mm)
Weight	Without the Viewing Shield: 10.56 pounds (4.8 kg) With the Viewing Shield: 11 pounds (5 kg)
Voltage	AC 100V-240V, 50-60 Hz, 1.5A max. (Input) DC 15V, 2.5A (Output)
Power Consumption	37.5 W max
Power Supply	Voltage: AC 100V to 240V MFR: HARD Model No: HDAD38W101
Environment Operating Temperature	41° to 104°F (5° to 40°C)
Relative Humidity	20% to 85%