# SignalView CL Imaging System

## User Manual

Version 2.1




YamayBio

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**Warranty Statement**

This product is covered by a one-year warranty. During the warranty period, if the instrument is found to have defects in materials or workmanship under normal use, YamayBio will, at its discretion, repair, upgrade, replace, or otherwise remedy the instrument.

During the warranty period, the instrument is eligible for complimentary service; however, consumables are excluded from warranty coverage. Consumables include single-use materials and components requiring periodic replacement.

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**Safety Information**

YamayBio instruments are designed for safe, reliable, and convenient operation. However, improper use or mishandling may cause instrument damage or pose a risk to user safety.

The instrument must be used in accordance with this manual and established laboratory safety procedures. If any problems or questions arise, contact YamayBio for assistance.

**Important:** The following section contains critical safety information and must be read and understood before operating the instrument.



**General Safety**

This instrument complies with applicable laboratory safety standards. However, the use of chemicals and biological materials presents additional hazards. Always follow Good Laboratory Practice and perform an appropriate risk assessment before use.



**Electrical and Environmental Safety**

Do not operate the instrument near strong electromagnetic radiation sources. Avoid placing the instrument near devices that generate electrical interference. Ensure the instrument is properly grounded before use. Disconnect the instrument from the power supply before maintenance.



**Biological Safety**

Follow Good Laboratory Practice when handling biological samples. Perform a risk assessment for all sample types. Use appropriate containment and disposal procedures.



**Chemical Safety**

Be aware of hazards associated with all reagents and chemicals used. Always consult the relevant Safety Data Sheets (SDS). Use appropriate personal protective equipment (PPE).



**Operational Safety**

Do not use the instrument in the presence of flammable materials. Do not remove protective covers unless instructed by YamayBio or authorized service personnel. Hazardous voltages may be present inside the instrument.



**General Precautions**

Ensure proper grounding of the instrument. Disconnect the instrument from the power supply before servicing. Use only manufacturer-approved accessories and reagents specified in this manual. Wear appropriate PPE when required.



**Environmental and Operational Conditions**

Install and operate the instrument in a clean, dry environment free from excessive moisture. Avoid spilling liquids or reagents near the instrument to prevent damage and ensure proper performance.



**Inspection and Maintenance**

After each use, clean and inspect the instrument and all accessories for signs of damage or wear. If damage is detected, discontinue use and contact YamayBio Technical Support.



**Thermal Warning**

Under normal operating conditions, components of the instrument may become warm. Avoid touching internal components immediately after use.

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# Chapter 1 Introduction

This manual provides information on the system structure, installation, operation, maintenance, and technical support for the SignalView CL Imaging System.
This chapter provides an overview of the system, including its components and specifications.

## 1.1 Operating Principle

Chemiluminescence imaging is used to detect antibody signals during immunoblotting experiments. Blots are incubated with primary antibodies, followed by secondary antibodies with enzyme tags. Chemical reactions between the enzyme and a substrate cause light to be emitted, which is then typically recorded using digital imagers.

## 1.2 Product Overview

The SignalView CL Imaging System is a chemiluminescence imaging instrument featuring a 13.3-inch touch screen and a 15-megapixel high-sensitivity CMOS camera. The system offers smooth image processing, automatic sample drawer entry and exit, and enhanced software functionality for efficient and convenient imaging.
This instrument is intended for laboratory use only.

### Applications

The SignalView CL Imaging System is suitable for:

1. Chemiluminescence-based assays: Western blot, Southern blot, Northern blot, Dot blot, and protein microarrays.
2. Luciferase-based imaging: Colony or plant leaf live imaging.
3. Electrochemiluminescence detection.

Table 1-1 Product Information

| Item | Description |
|---|---|
| Name | SignalView CL Imaging System |
| Model | SignalView CL |
| System Components | The product consists of a main unit with a drawer and touchscreen. |
| Intended Use | Imaging of chemiluminescence-based assays |
| Intended Users | Laboratory personnel |

## 1.3 About This Manual

This manual is supplied with the instrument. Before operating the instrument, carefully read and understand this manual to ensure proper use of the system and operator safety. Retain the manual for future reference.

Due to version differences, the figures, settings, and data shown in this manual may differ slightly from those displayed on the instrument.

The symbols used on the instrument and its packaging are described below.

**Note:** The symbols shown are for reference only. Refer to the product packaging for the applicable symbols.

Table 1-2 Instrument and Packaging Symbols

| Symbol | Meaning |
|---|---|
| AC | Indicates that the instrument operates on alternating current. |

| | |
|---|---|
| I | Indicates that the instrument is connected to the power supply. |
| O | Indicates that the instrument is disconnected from the power supply. |
| USB | Indicates a USB interface. |
| SN | Manufacturer's serial number. |

## 1.4 General Precautions

This section describes important precautions that must be followed during operation to ensure safe and effective use of the instrument. Failure to follow these instructions may lead to inaccurate experimental results, instrument damage, or personal injury.

- The instrument must only be operated by laboratory personnel.
- Operate the instrument only under the specified environmental conditions.
- Do not open the instrument housing or attempt to repair the instrument.
- If an instrument label becomes illegible or detached, contact YamayBio for replacement.

**Data Storage Notice**

The system stores data on an internal storage device. If the internal database is deleted or damaged, stored data may be lost.

**Electromagnetic Compatibility (EMC) Statement**

- The system uses radio-frequency (RF) energy to support specific functions. RF emissions are very low and are unlikely to cause interference with nearby electronic equipment.
- Portable and mobile RF communication equipment may affect the operation of this instrument. Any equipment used

near the instrument should comply with applicable EMC requirements.

- This instrument is intended for use in non-residential environments and facilities not directly connected to the public low-voltage power supply network serving residential buildings.
- The power-frequency magnetic field at the intended installation site should be evaluated to ensure it is sufficiently low. Keep the instrument away from sources of strong magnetic fields. If necessary, magnetic shielding should be installed to ensure proper operation.

### 1.5 System Components

This section describes the overall instrument structure and key components of the SignalView CL Imaging System.

- **Scientific CMOS (sCMOS) Camera:** Provides higher sensitivity and signal-to-noise ratio compared to conventional CMOS cameras, with improved quantum efficiency and reduced signal loss for detection of weak signals.
- **Integrated Touchscreen Interface:** 13.3-inch color touchscreen enables intuitive navigation and streamlined operation.
- **Advanced Cooling System:** Four-stage thermoelectric cooling enables rapid temperature reduction and stable low-temperature operation. Combined air and water cooling minimizes background noise and improves imaging stability.

**Front View**

The front of the instrument includes the following components:

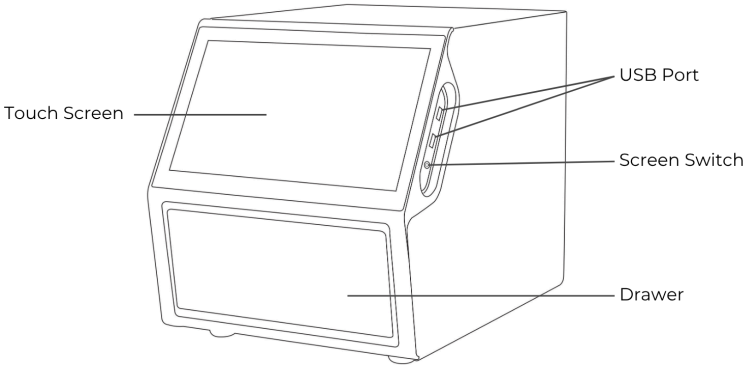



Figure 1-1 Front View of the SignalView CL Imaging System

**Rear View**

The rear of the instrument includes the following components:

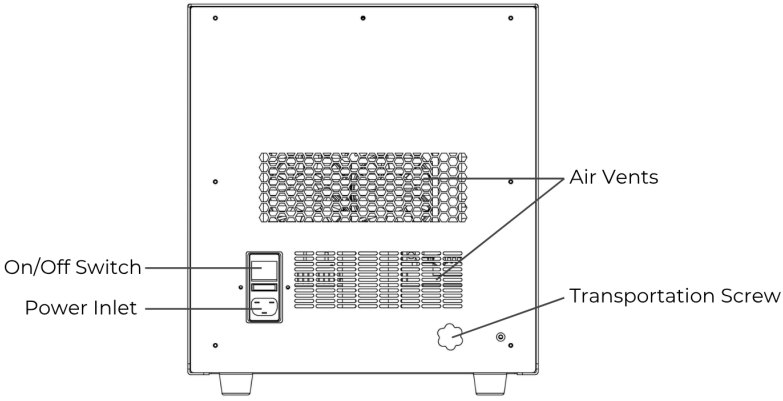



Figure 1-2 Rear View of the SignalView CL Imaging System

## 1.6 Instrument Specifications

Table 1-3 System Configuration

| Item | Description |
|---|---|
| Product Name | SignalView CL Imaging System |
| Model | SignalView CL |
| Imaging Area | 17 × 19 cm |
| Sensor Type | sCMOS (scientific CMOS) |
| Sensor Size | 4/3 inch |
| Resolution | 15 MP |
| Pixel Size | 3.8 × 3.8 μm |
| Grayscale | 16-bit, 0–65535 levels |
| Pixel Binning Modes | High Resolution (2×2), Standard (4×4), High Sensitivity (8×8) |
| Cooling Temperature | -30°C @ 25°C ambient |
| Quantum Efficiency (QE) | 95% |
| Lens | 25 mm, F/0.95 |
| Display | 13.3-inch touchscreen, 1920×1080 resolution |
| Readout Noise | 1.0 e-RMS |
| Dimensions (W×D×H) | 33.1 × 45.0 × 37 cm |
| Power Supply | AC 80–264 V, 47–63 Hz, 200 VA MAX |
| Net Weight | 24.2 kg |

# Chapter 2 Installation

This chapter describes the installation requirements and procedures for the SignalView CL Imaging System, including installation conditions, handling instructions, and instrument connection.
The instrument has been thoroughly tested and carefully packaged before shipment to prevent damage during transportation. Upon receipt of the instrument, inspect the packaging carefully for any signs of physical damage. If damage is detected, immediately notify YamayBio.
Before installation, ensure that the required space, power supply, and environmental conditions are met.

## 2.1 Installation Requirements

### Space Requirements

To ensure adequate space for maintenance, heat dissipation, and normal operation, the following installation conditions must be met:

- The bench surface must be level (inclination < 2%).
- Maintain a minimum clearance of 200 mm on the left, right, and rear sides of the instrument.
- Do not place the instrument where the power outlet is difficult to access.

### Power Requirements

The instrument must be connected to a three-prong grounded power outlet that meets electrical safety standards. Improper grounding may result in safety hazards, instrument damage, or system malfunction. The power supply must meet the following specifications:

Table 2-1 Power Requirements

| Parameter | Specification |
|---|---|
| Input Voltage | 80–264 V AC |
| Frequency | 47/63 Hz |
| Input Power | 200 VA |
| Ground Resistance | < 100 mΩ |
| Fuse | F6.3L 250V |

**Environmental Requirements**

Install, operate, and store the SignalView CL Imaging System only under the specified environmental conditions:

- For indoor use only
- Install in a dry, dust-free environment
- Avoid strong mechanical vibrations and electromagnetic interference
- Ensure adequate ventilation
- Avoid direct sunlight
- Keep away from heat sources and strong airflow
- Do not block the fan exhaust outlet
- Keep away from equipment that emits strong electromagnetic radiation (such as radio transmitters)
- Avoid sharing a power circuit with large brush-type motors or frequently switching electrical devices to prevent voltage fluctuations
- Keep away from corrosive or flammable gases

Before operating the instrument, evaluate the electromagnetic environment of the laboratory and avoid strong electromagnetic interference.

Table 2-2 Environmental Specifications

| Condition | Temperature | Humidity | Atmospheric Pressure |
|---|---|---|---|
| Operating | 10–30 °C | 20–85 % | 80–106 kPa |
| Storage | −20–55 °C | 20–85 % | 70–106 kPa |
| Transportation | −20–55 °C | 20–85 % | 70–106 kPa |

## 2.2 Handling and Transportation

When transporting the instrument, observe the following precautions:

- Follow the “Fragile,” “This Side Up,” “Keep Dry,” and “Do Not Tilt” labels on the packaging.
- Always keep the instrument upright during transport.
- Handle the instrument carefully to avoid shock, vibration, or impact.

## 2.3 Component Checklist

Ensure that all components are present and undamaged:

- Main unit
- Sample tray
- Measurement tray
- Power cord
- Computer mouse
- Keyboard

## 2.4 Instrument Connection

After unpacking all components, connect the instrument according to the following steps:

1. Remove the instrument from the packaging and position it according to the space and environmental requirements described in Section 2.1.
2. Remove the transportation screw located on the rear panel of the instrument.
3. Confirm that the power switch is in the OFF position.
4. Connect the instrument to a power outlet.
5. Turn on the main power switch. The display will illuminate, and the system will begin the startup sequence.




Figure 2-1 Remove the Transportation Screw

**Important:** Ensure the transportation screw is removed before operation. Failure to do so may prevent the drawer from opening or cause damage.

# Chapter 3 Daily Operation

This chapter describes the daily operating procedure of the SignalView CL Imaging System, including startup, experimental operation, and system shutdown.

The standard daily workflow includes the following steps:

1. Instrument startup and user login
2. Imaging an experiment
3. System shutdown

## 3.1 Instrument Startup & User Login

1. Turn on the power switch at the back of the instrument.
2. The system will boot automatically and launch the software.
3. Enter your username and password on the login screen.
4. Once logged in, the program will launch and the camera will begin initialization.

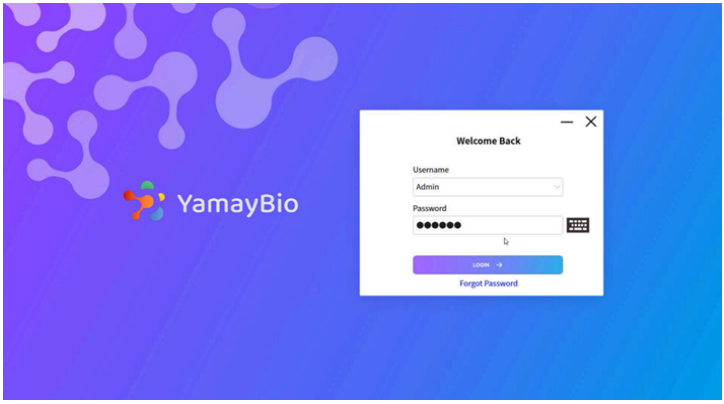



Figure 3-1 Login Screen

**User Management**

If you do not have an account, log in as an administrator and create a new user. The default administrator **username is Admin** and default **password is 123456**.

After logging in as an administrator, you can add or delete users, modify user passwords, and view user operation logs.

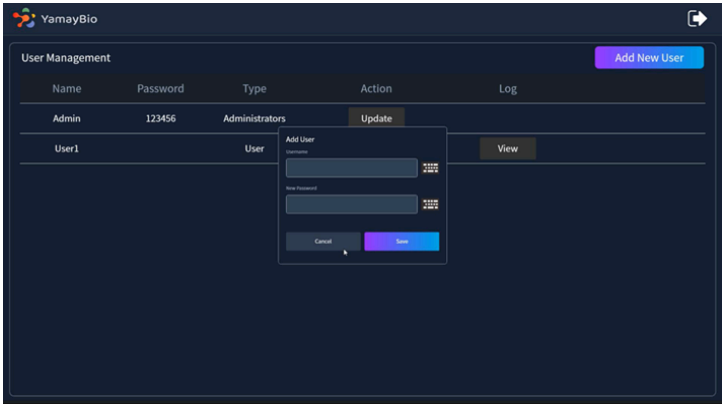



Figure 3-2 User Management

## 3.2 Imaging an Experiment

### Loading Samples

1. Wait for the system to complete initialization.
2. Tap **Open Drawer** to open the drawer door.
3. Place the sample tray and membrane onto the stage.
4. Tap **Close Drawer** to close the drawer.

**Note:** Always start imaging within 5 minutes after placing the sample to avoid signal decay.

### Setting Up Imaging Parameters

The system includes several imaging modes and settings that can be adjusted to optimize image capture.

### System Settings

In the main software interface, tap **Settings** on the top menu bar to access system settings. In this menu, users can adjust the sensitivity mode and multiple mode exposure ratio.

For **Sensitivity Mode,** three binning modes are available:

1. Low Sensitivity - used for high-signal samples
2. Medium Sensitivity - used for samples in a typical signal range
3. High Sensitivity - used for low-signal samples

For **Exposure Ratio** in **Auto Multiple Mode**, the exposure time of images 2–5 is automatically set as multiples of the first exposure. Users can customize these multipliers as needed. This function is useful for exposure optimization.

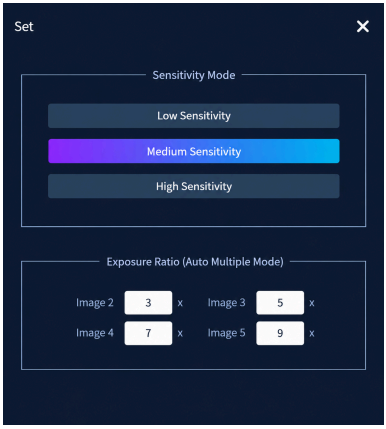



Figure 3-3 Sensitivity Mode and Exposure Ratio Settings

**Exposure Settings**

On the main software interface, exposure settings are on the right side of the screen. These include preview adjustment, auto/manual exposure modes, and single/multiple exposure modes.

**Preview Adjustment**

1. After loading the sample, the white light automatically turns on.
2. Use the adjustment arrow buttons to modify the preview exposure time.

3. The current preview exposure time is displayed in the upper-left corner.

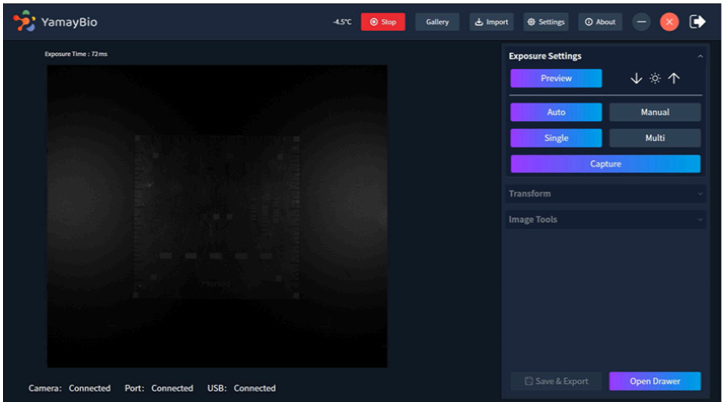



Figure 3-4 Preview

**Auto Exposure Mode** is recommended for samples with unknown signal intensity.

- **Auto Single Exposure:** Automatically determines optimal exposure time to avoid over- or under-exposure.
- **Auto Multiple Exposure:** Captures up to 5 images with different exposure times for optimization. The first image can be set during preview, and the exposure time ratios for the remaining images can be configured in the Settings menu.

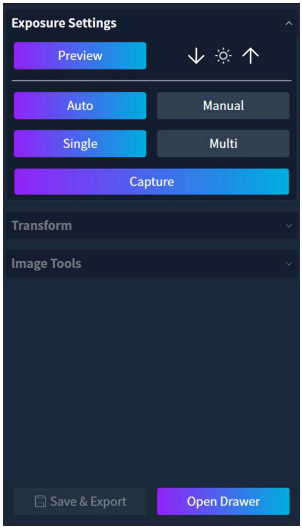



Figure 3-5 Auto Single Mode

**Manual Exposure Mode** is recommended for signals with known signal intensity.

- **Manual Single Exposure:** User defines a fixed exposure time.
- For **Manual Multiple Exposure,** the system provides three capture modes:
    - **Continuous (High):** Captures a predefined number of images using a fixed exposure time for each image.
    - **Accumulation (Medium):** Captures multiple images using a fixed exposure time. Each newly captured image is overlaid onto the previous images for cumulative display.
    - **Extended Exposure (Low):** Captures the first image using the preset exposure time. For each subsequent image, the exposure time is doubled relative to the previous one.

**Note:** Accumulation mode is recommended for most applications.

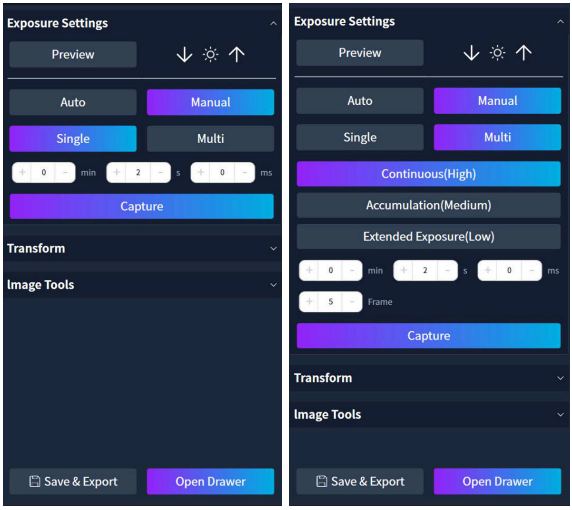



Figure 3-6 Manual Single and Manual Multi Modes

**Image Acquisition**

1. After setting exposure parameters, tap **Capture** to acquire images.
2. Wait for exposure to be completed. During multi-exposure acquisition, users can tap **Stop** to terminate the process if needed.
3. Upon completion, the system generates a white light image, chemiluminescence image, and merged image.
4. In multi-image mode, switching between chemiluminescence images will automatically update the corresponding overlay image.
5. Tapping on a point in the image displays pixel intensity (grayscale value) and X-Y coordinates.

**Image Transformation**

In the Transform section users can adjust the image if necessary. Use the **-** and **+** buttons to alter the Low and High values to control image contrast and dynamic range.

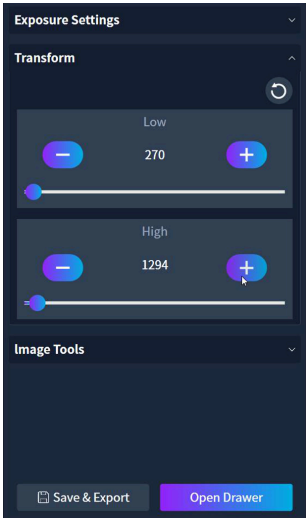



Figure 3-7 Transform

### Image Tools

The software provides the following tools:

- **Undo:** Revert previous operations step by step
- **Crop:** Select a region of interest (ROI) and confirm to crop
- **Rotate:** Adjust image orientation
- **Invert Grayscale:** Switch between a black background with white bands and a white background with black bands
- **Pseudocolor:** Display signal intensities using color mapping

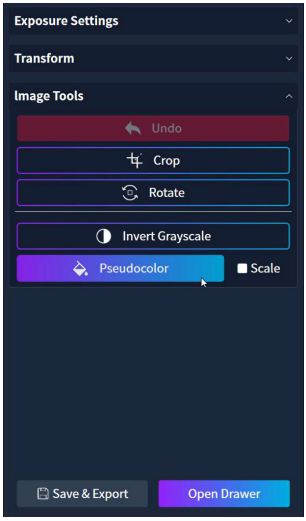



Figure 3-8 Image Tools

### Saving Options

Users can save all images or selected images to either a USB drive or a user-defined directory. Batch saving automatically generates folders named by sample name, imaging mode, and acquisition time.

Supported file formats include:

- PNG (compressed, smaller file size)
- TIF (uncompressed, high quality)
- ERB (raw data format, re-editable in software)

**Note:** ERB files store the complete dataset. This format cannot partially save individual images. Images can be re-imported into the software for further analysis and adjustment.

Supported bit depths include:

- 16-bit: Higher data precision, suitable for quantitative analysis
- 8-bit: Smaller file size, suitable for publication or presentation

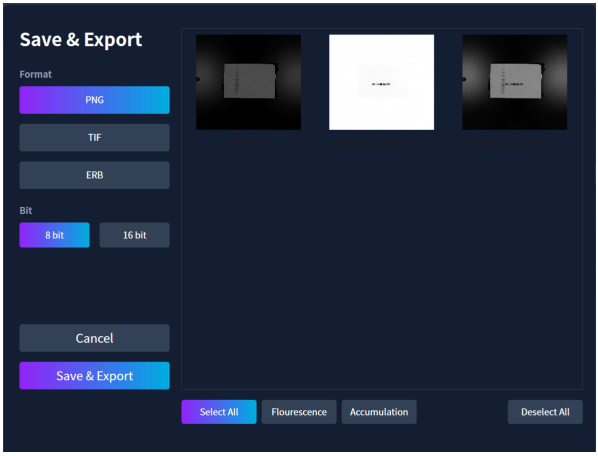



Figure 3-9 Image Saving

**Camera Control**

By default, the camera automatically shuts down after 5 minutes of inactivity. Tap **Stop** to manually turn off the camera. Tap the button again to restart the camera.

## 3.3 Post-Imaging Procedure

1. After imaging is complete, open the drawer and remove the sample.
2. Clean the sample tray thoroughly.
3. Close the drawer after cleaning.
4. Shut down the software and turn the power switch to “O” (OFF).

5. Unplug the power cord if the instrument will not be used for an extended period.

**Notes for Operation**

- Ensure the drawer is fully closed before starting exposure.
- Avoid introducing excess buffer into the drawer to prevent contamination or damage.
- Clean the sample tray after each use to maintain imaging quality and prevent cross-contamination.
- Excessively high room temperatures beyond a standard ambient temperature of 25°C may compromise the device's cooling capacity.

# Chapter 4 Troubleshooting

This chapter describes troubleshooting guidelines for the SignalView CL Imaging System.
If the instrument does not operate normally, refer to the troubleshooting table below.

Table 4-1 Instrument Troubleshooting Guide

| Problem | Possible Cause | Solution |
|---|---|---|
| Unable to start image acquisition | Camera temperature has not reached -30°C | Wait until the camera reaches operating temperature |
| | Sample tray is not loaded into the drawer | Load the tray and close the drawer |
| | Camera is in standby mode after inactivity | Reactivate the camera |
| Image Overexposed / Signal Too Strong | Exposure time is too long | Shorten the exposure time (down to seconds or milliseconds if necessary) |
| | Binning mode is set too high | Decrease the Binning level (switch to Low or Medium Sensitivity) to reduce sensitivity and preserve image resolution |

| | | |
|---|---|---|
| | ECL substrate sensitivity is too high | Switch from a high-sensitivity ECL substrate to a standard sensitivity one (e.g., Pico level) |
| Image Too Dark / Weak Signal | Exposure time is too short | Prolong the exposure time or enable the Auto-Exposure function |
| | Binning mode is set too low | Increase the Binning level (switch to High Sensitivity) to maximize weak signal capture |
| | ECL substrate sensitivity is insufficient | Switch from a standard ECL substrate to a high-sensitivity one (e.g., Femto level) |
| High Background / Localized Artifacts | Uneven ECL application or localized membrane drying | Ensure the ECL substrate covers the entire membrane evenly and completely |

**Technical Support**

If a problem cannot be resolved using the troubleshooting guide:

1. Record the instrument serial number (SN).
2. Note the software version.
3. If applicable, record the error message displayed on the screen.

Contact the manufacturer for technical support. Providing detailed information will help technical support diagnose the problem more quickly.

**Important Notes**

- Do not attempt to disassemble the instrument housing.
- Use only manufacturer-approved replacement parts.
- Follow laboratory safety guidelines when handling chemicals.

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Video Guide