A Geno Technology, Inc. (USA) brand name

Gel Imaging Analyzer

Cat. No. BT3802

1-800-628-7730 ♦ 1-314-991-6034 ♦ info@BTLabSystems.com

Table of Contents

Important Safety Information 3
Maintenance and Care 3
Introduction 4
  Features 4
Technical Specifications 5
  Normal Operating Conditions 5
  Basic Parameters 5
  Minimum Computer Requirements 5
Structure 6
  Operation Panel 6
User Login 7
Main Interface 7
Quick Mode 8
  Imaging Parameters 8
  Lane and Band Parameters 8
  Qualitative Analysis Parameters 9
  Export Settings 9
Qualitative and Quantitative Analysis Modes 10
  Image Acquisition 11
  Lane and Band Detection 12
  Qualitative Analysis 13
  Quantitative Analysis 14
    Relative Quantification 14
    Absolute Quantification 14
  Annotations and Export 15
Troubleshooting 16
Warranty 17
Returns and Service 17
Wiring Diagram 18

Thanks for choosing BT Lab Systems' Gel Imaging Analyzer. This operation manual describes the function and operation of the instrument. For proper use and to avoid any serious injuries, please read this manual carefully before operating the instrument.

IMPORTANT SAFETY INFORMATION



WARNING: Excessive exposure to ultraviolet (UV) radiation can injure the eyes and skin. Keep the chamber closed whenever UV illumination is active.

- Only trained personnel who have read and understood this manual should operate the instrument.
- Connect the instrument only to a properly grounded electrical outlet.
- Turn off the unit and remove the gel promptly after use.
- Do not open, disassemble, or repair the instrument without authorization. Unauthorized service may create a safety hazard and may void warranty coverage.
- In case of the following, immediately disconnect the power and contact BT Lab Systems.
    - The instrument encounters liquid.
    - The instrument gets soaked or burned.
    - The instrument emits an abnormal sound or smell.
    - The instrument is dropped or the outer shell damaged.
    - The instrument functions abnormally.
- Disconnect the power cord before replacing UV lamps or performing maintenance.
- Store and operate the instrument in a clean, dry, well-ventilated location away from corrosive substances

MAINTENANCE AND CARE

- Turn off UV lamps when not in use to prolong lamp life.
- UV lamps are consumable components that gradually lose intensity over time due to normal use and frequency switching. UV lamps are not covered under warranty.
- Keep the transparent viewing and transillumination surfaces clean and free of scratches. Do not apply excessive pressure.
- After each use, promptly remove the gel to prevent it from adhering to the glass surface. Clean the glass with a soft, lint-free cloth lightly moistened with absolute ethanol to remove residue and to maintain optimal light transmission.

INTRODUCTION

BT Lab Systems' Gel Imaging Analyzer is a high-performance laboratory instrument designed for the visualization, documentation, and analysis of electrophoretic gel bands. Equipped with a high-resolution Sony Exmor CMOS camera, the system captures clear, detailed images, including faint bands that may be difficult to detect with the naked eye. An advanced optical filter system minimizes background interference and enhances image clarity, while the enclosed imaging chamber helps reduce contamination and exposure to ultraviolet (UV) radiation. The integrated imaging and analysis software allows users to magnify, capture, save, annotate, edit, and analyze gel images, as well as generate and print experimental reports. Combining sensitive imaging technology with intuitive operation and comprehensive analysis capabilities, the Gel Imaging Analyzer provides an efficient and reliable solution for gel documentation and analysis in molecular biology, biochemistry, and life science laboratories.

Features

- Durable galvanized-metal housing with a drawer-style sample platform, side access doors, and a concealed observation window.
- Center-position indicator for convenient gel placement.
- Overlapping chamber seals are designed to reduce stray UV exposure.
- 302 nm UV transillumination with two intensity settings; 254 nm and 365 nm reflected UV illumination.
- High-resolution, low-light digital imaging with a 6X zoom lens and adjustable focus and aperture.
- Multi-layer coated optical filter system that effectively minimizes background interference and enhances image clarity.
- Zoom, focus, aperture, UV illumination, and white light illumination can be controlled through either the computer software or the instrument's control panel.
- Equipped with safety features such as automatic UV shutoff, delayed power-off, and UV leakage protection when the chamber door is opened, the system helps minimize exposure to ultraviolet radiation and enhances operator safety.
- Equipped with an ultra-thin white light panel utilizing advanced phosphor-based UV-to-visible light conversion technology to provide uniform illumination for clear and accurate gel imaging.
- Specialized gel imaging software featuring automatic lane and band recognition, identification, adjustment, and numbering. The software supports the calculation and comparison of molecular weight, optical density, migration rate, pH, and percentage composition of nucleic acids and proteins. Additional capabilities include 1D and 2D gel analysis, Dot Blot analysis, and colony and clone counting. Users can capture, visualize, process, annotate, analyze, and save DNA, RNA, protein, and other electrophoretic gel images, as well as generate and export experimental reports in text or Excel formats.

TECHNICAL SPECIFICATIONS

Normal Operating Conditions

- Ambient temperature: 5 – 40 °C
- Relative Humidity: ≤80%
- Atmospheric pressure: 70.0 – 106.0 Pa

Basic Parameters

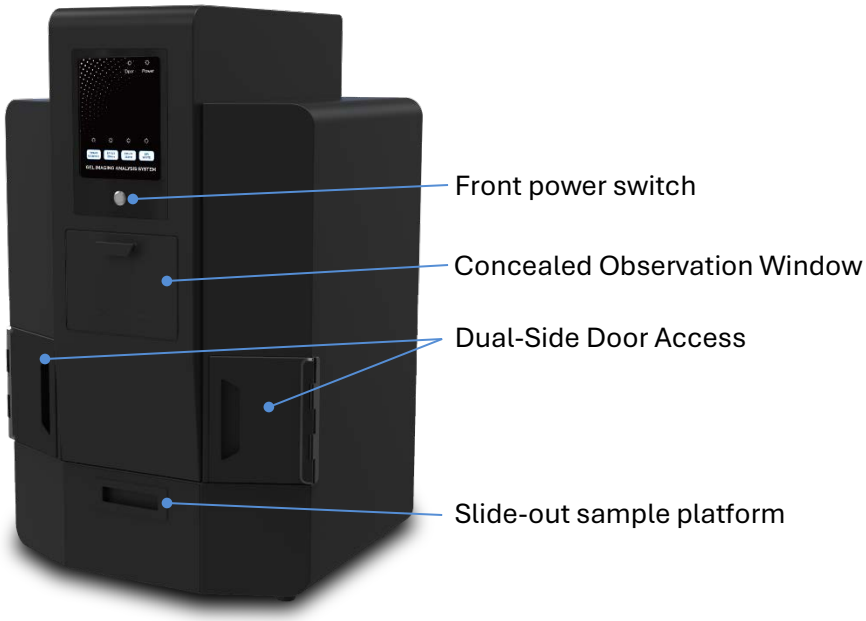
Model	**BT3802**
Camera	Sony Exmor CMOS
Lens	6X zoom; F1:1.2; 2/3-inch format
Shutter	Electronic
Camera Port	Standard C interface
Effective pixels	5440 x 3648
Bit depth	12-bit
Pixel size	2.4 x 2.4 μm
Resolution	20 MP
Housing material	Galvanized sheet metal
Detection sensitivity	Stained double-stranded DNA: less than 20 pg EB
Signal-to-noise ratio	≥56 dB
Optical filter	590 nm
UV lamp type	Quartz UV lamp
UV transillumination area	168 x 210 mm
Visible-light transillumination area	200 x 250 mm
White-light conversion plate area	210 x 260 mm
Transmitted UV wavelength	302 nm
Reflected UV wavelengths	254 nm, 365 nm
Transmitted UV lamp power	302 nm (8W)
Reflected UV lamp power	254 nm (11W); 365 nm (11W)
Power supply	AC 220V ±10%, 50Hz ±2% For operation in 110V environment, a compatible transformer will be provided.
Fuse	5A (ϕ5 x 20)
Dimensions (W × D × H)	470 x 450 x 755 mm
Net weight	33 kg

Minimum Computer Requirements

- USB-compatible computer motherboard and ports.
- A PC with a Pentium IV processor or higher is recommended to ensure optimal performance of the MVC USB digital camera.
- At least 1 GB RAM and 512 MB video memory.
- More than 20 MB available disk space for software and driver installation.
- Ensure that a compatible operating system, such as Windows 7 or Windows 10, is properly installed
- Ensure that the computer is free of viruses and malware. Check Windows Device Manager to verify that all device drivers are properly installed and that there are no conflicts with other video capture devices or their drivers.

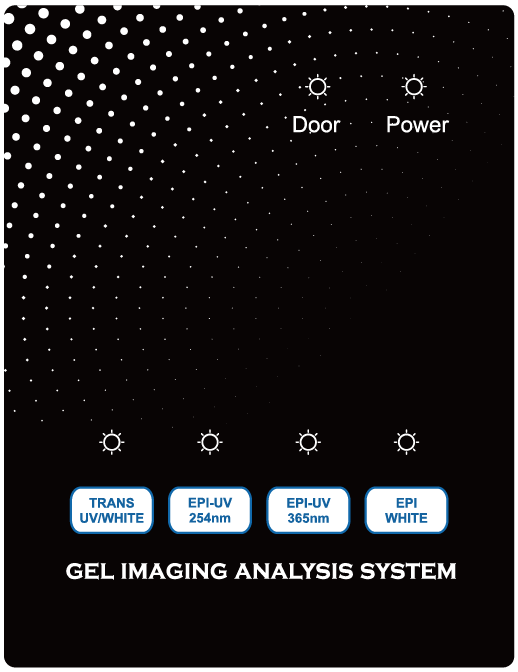
STRUCTURE

Familiarize yourself with the front power switch, operation panel, side access doors, observation window, rear communication ports, and drawer-style UV gel platform before operating the instrument.



Operation Panel

The front panel provides illumination controls and status indicators. The door interlock automatically switches off UV illumination when the chamber door is opened.



Power	Indicates instrument power status.
Door	Illuminates when the chamber door is open. UV lamps automatically turn off, and the white light turns on. When the door is closed, the indicator turns off, the UV lamps automatically turn on, and the white light turns off.
TRANS UV/WHITE	Selects transmitted UV or white-light illumination.
EPI-UV 254nm	Controls 254 nm reflected UV illumination.
EPI-UV 365nm	Controls 365 nm reflected UV illumination.
EPI WHITE	Controls reflected white-light illumination.

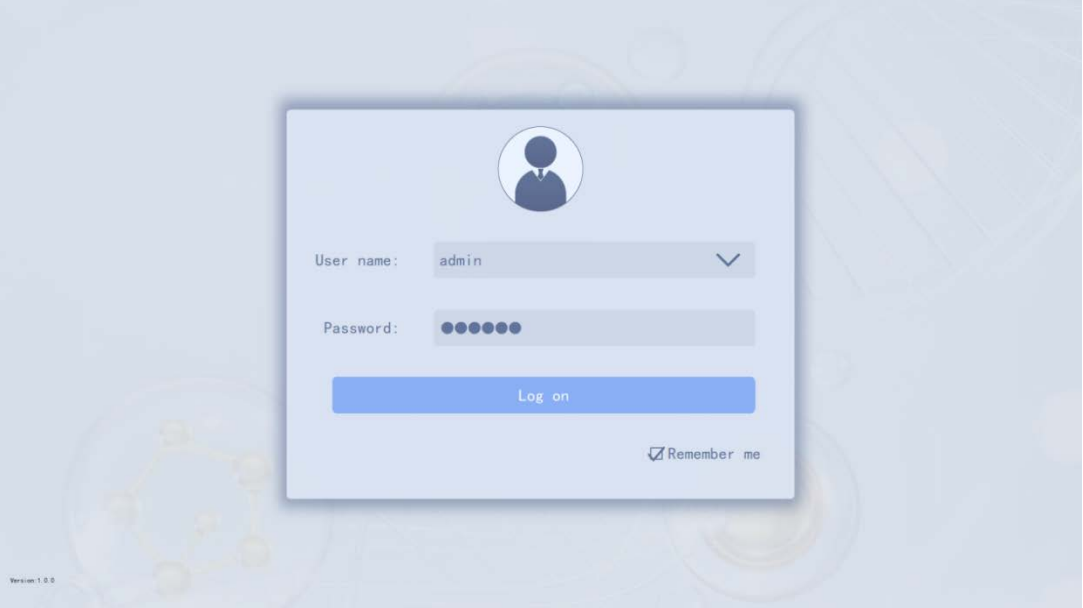
Software Operation Guide

This section describes the basic operating controls, and preparation required before startup. Before operating the instrument for the first time, become familiar with the controls described below.

Note: When using this software, the minimum display resolution is 1920 x 1080

USER LOGIN

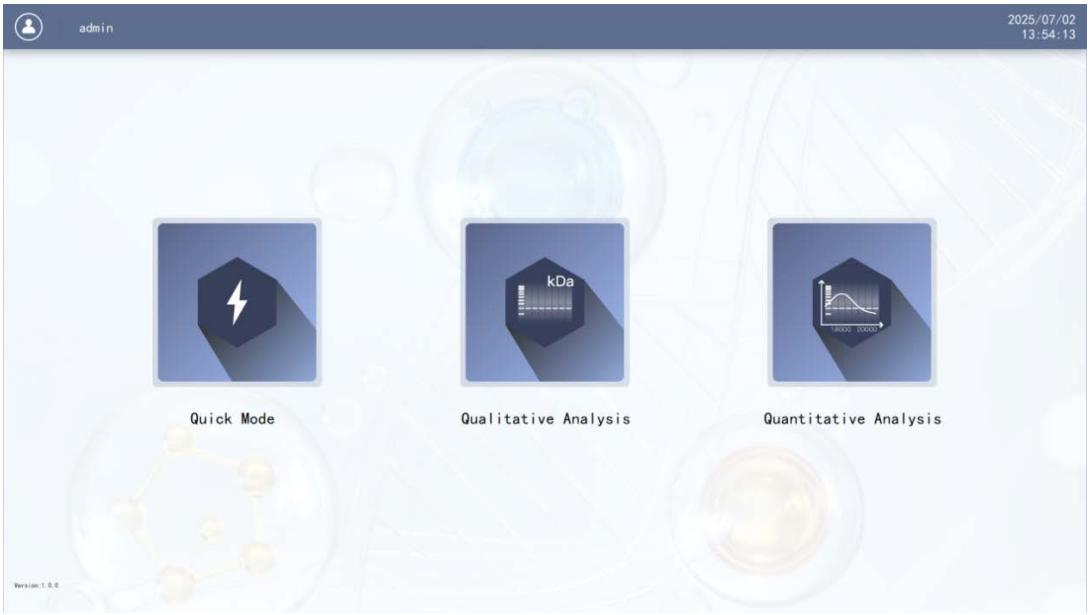
Double-click the gel imaging analysis software icon, then Wait for the welcome screen and login window.



Enter the default username **Admin** and password **123456**

MAIN INTERFACE

The software offers three analysis modes: Quick Mode, Qualitative Analysis, and Quantitative Analysis.



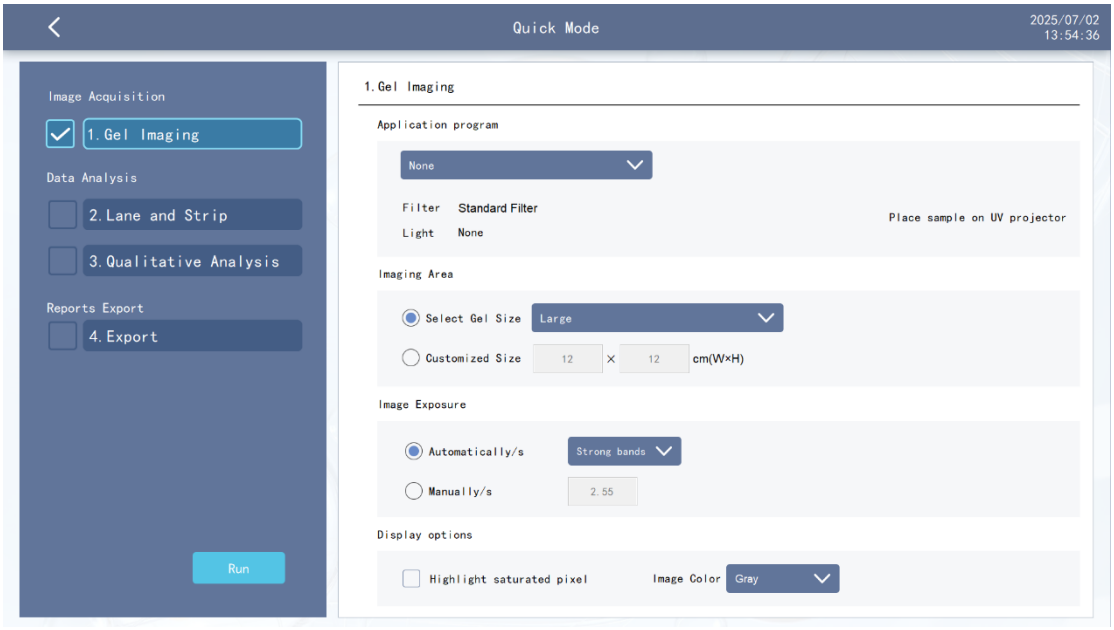
QUICK MODE

Select Quick Mode to access the preset configuration interface, where you can customize the parameters for the current experiment. Select the desired processing steps from the left-hand panel, then click each step to expand its corresponding parameter settings.

Imaging Parameters

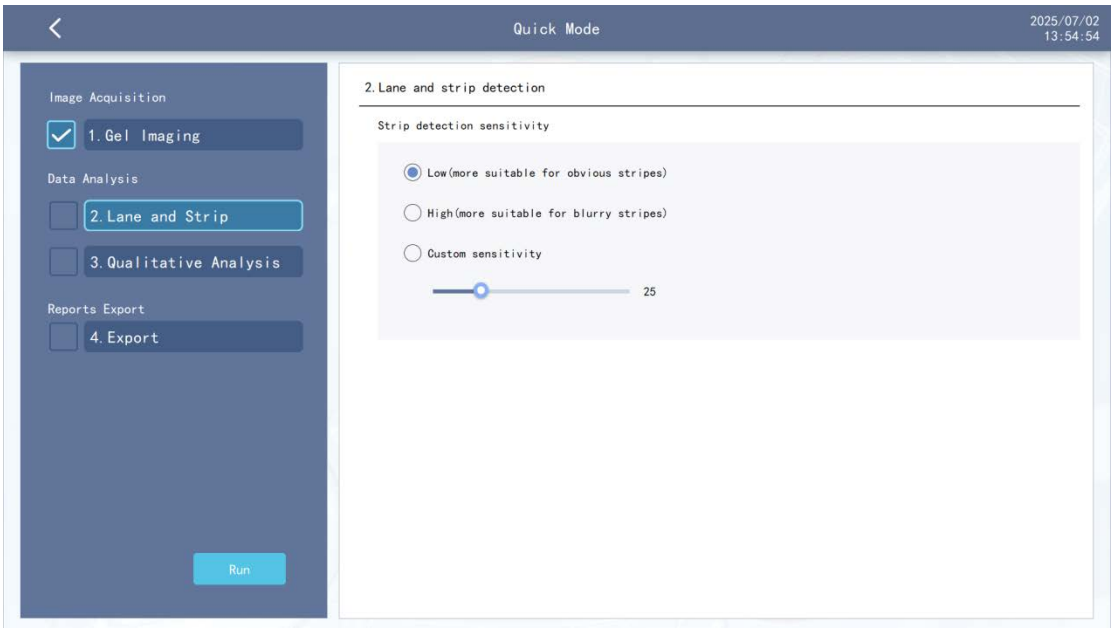
Configure the imaging parameters, including gel size, exposure time, saturated pixel highlighting, and gel color restoration.

Note: The gel size setting can be ignored, as this instrument does not feature a motorized positioning mechanism.



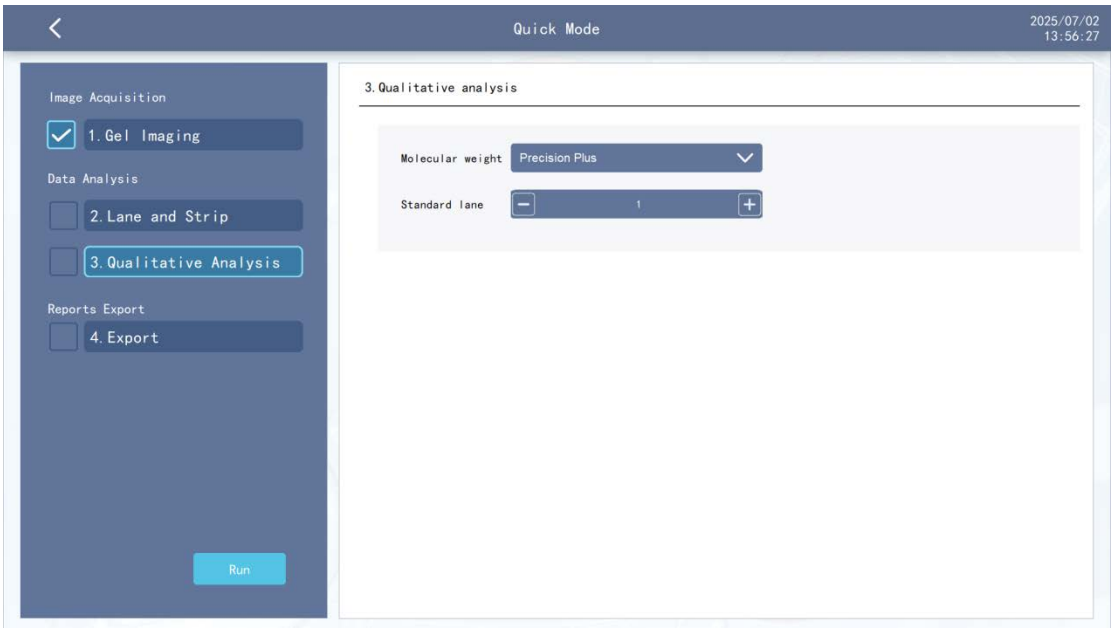
Lane and Band Parameters

Set the lane and band detection parameters by selecting an appropriate detection sensitivity preset or adjust sensitivity manually.



Qualitative Analysis Parameters

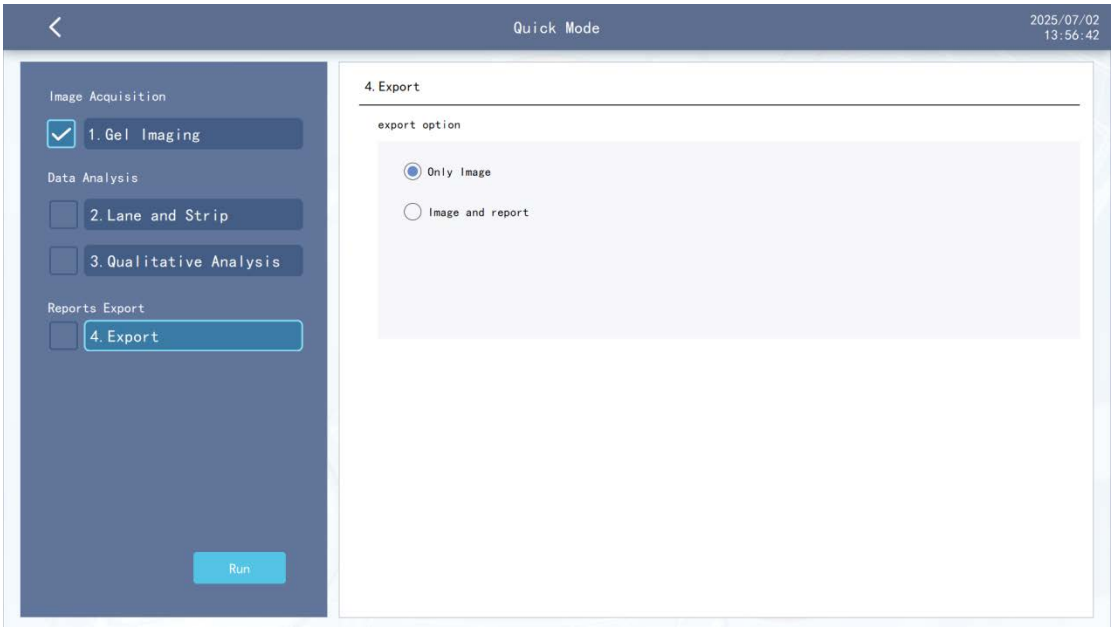
Select the appropriate molecular weight standard (marker) and specify the lane containing the standard to generate qualitative analysis results for the experiment.



Export Settings

Choose the export content. The software can export the image directly or include annotations and report content. After configuring the desired analysis steps and parameters, click Run to execute the Quick Analysis process.

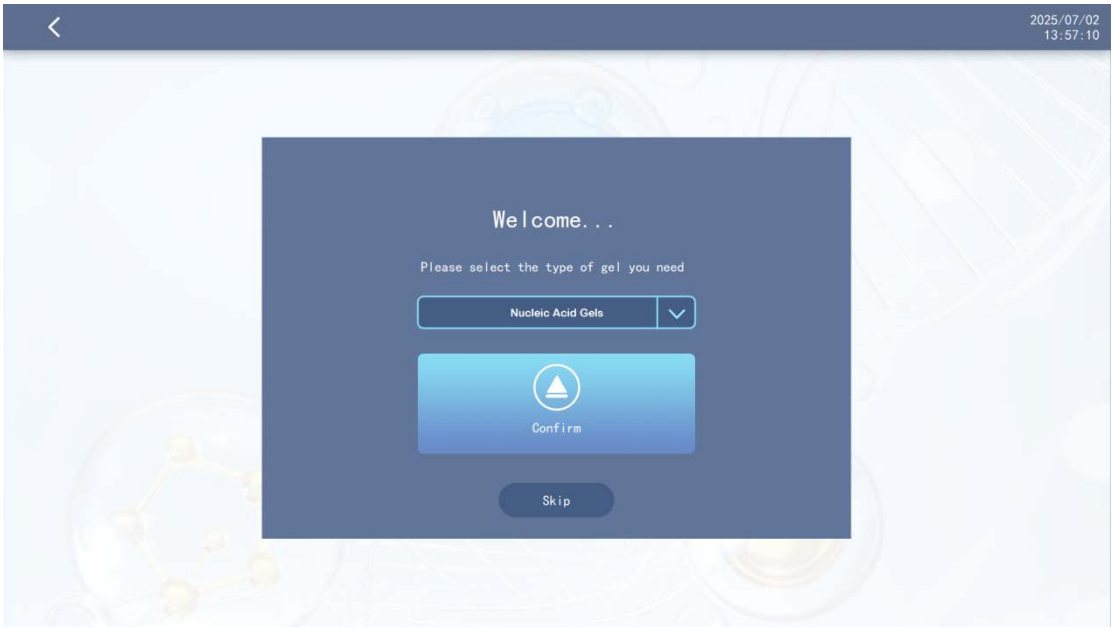
Note: Before clicking Run, place the gel sample inside the imaging chamber and select the appropriate UV illumination!



QUALITATIVE AND QUANTITATIVE ANALYSIS MODES

Users can also select Qualitative Analysis or Quantitative Analysis from the main interface to access the corresponding configuration interface for the standard analysis workflow.

Note: BT3802 does not automatically load dye-specific parameters upon selection, as the instrument does not feature a motorized adjustment mechanism. Click Confirm or Skip to proceed directly to the standard detection workflow.



When prompted, select the type of gel on this interface to expand the list of available dyes for selection.

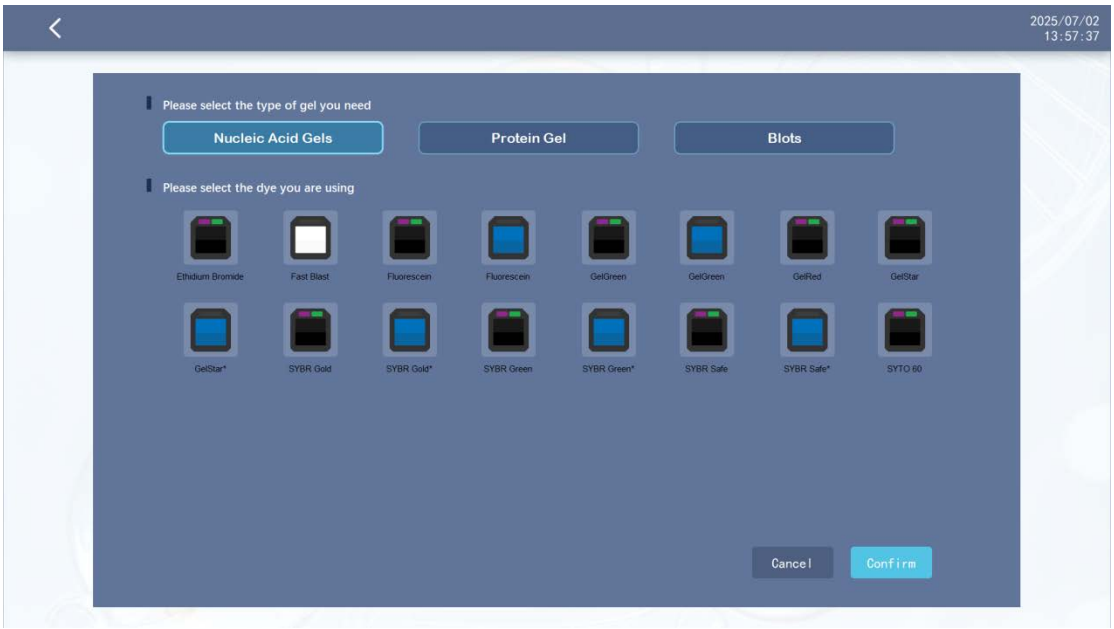


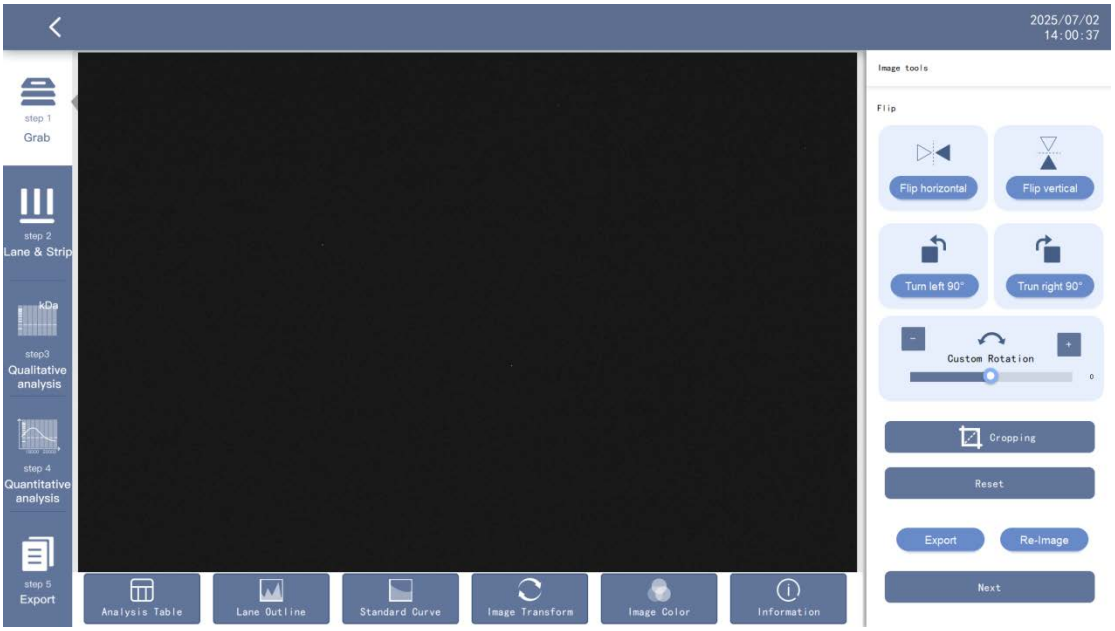
Image Acquisition

Upon entering the detection interface, image acquisition must be completed before subsequent analysis steps become available. Users can select either Automatic or Manual acquisition mode.

In Manual mode, enter the desired exposure time and click Acquire to capture the image.



Once acquisition is complete, the right-side function panel automatically switches to the image editing toolbar, allowing users to rotate, flip, crop, and perform other image adjustments.



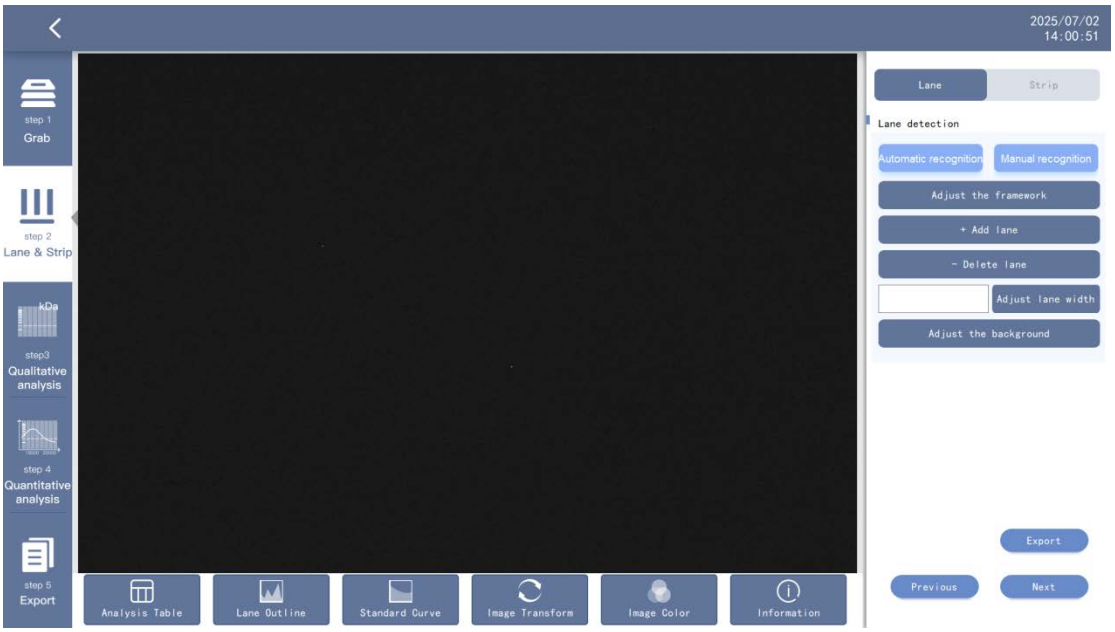
After completing image processing, click Next to proceed to the Lane and Band Analysis step.

Lane and Band Detection

This step begins with lane detection, followed by band detection. Lane detection can be performed in either Automatic or Manual mode.

In Manual mode, enter the number of lanes, then adjust the lane boundaries and drag each lane to align with its corresponding position in the gel image.

Lanes can also be added or deleted as needed.

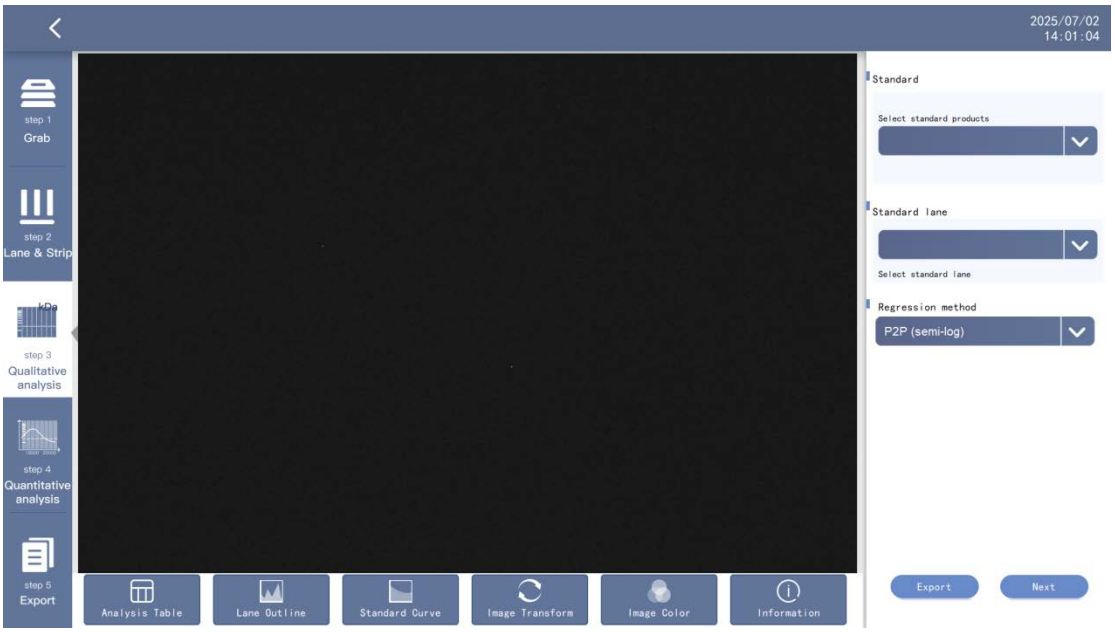


Once lane detection is complete, click Band to proceed to the band detection interface.

After lane and band detection is complete, select Export if no further analysis is required, or Next to continue to qualitative analysis.

Qualitative Analysis

Select the appropriate standard sample (molecular weight marker) and specify the lane containing the standard. The software will automatically perform qualitative analysis and display the results.

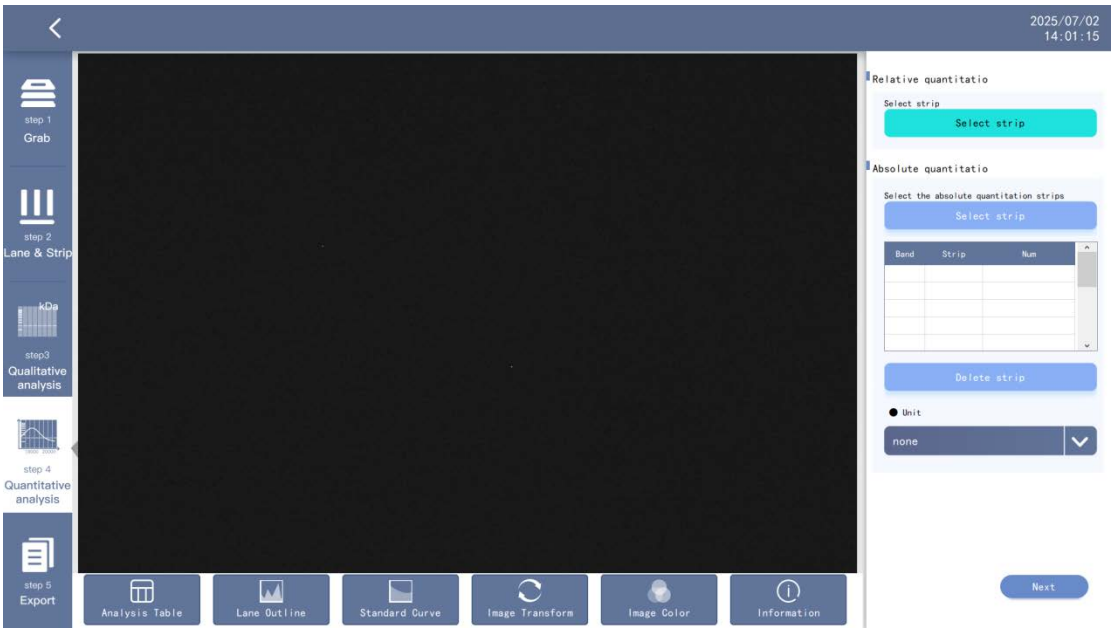


Click the Analysis Table at the bottom to view detailed results and associated data.

Once the qualitative analysis is complete, click Next to proceed to the Quantitative Analysis step.

Quantitative Analysis

The software supports both Relative Quantification and Absolute Quantification of gel bands.



Relative Quantification

Click Select Band under Relative Quantification, then select a band in the gel image to use as the reference standard.

The software will automatically calculate the relative quantities of the detected bands and display the results in the Analysis Table.

Absolute Quantification

Click Add Band under Absolute Quantification, then select the desired band in the gel image.

Enter the known quantity of the selected band and click Confirm to add it to the absolute quantification reference list. Repeat for additional reference bands.

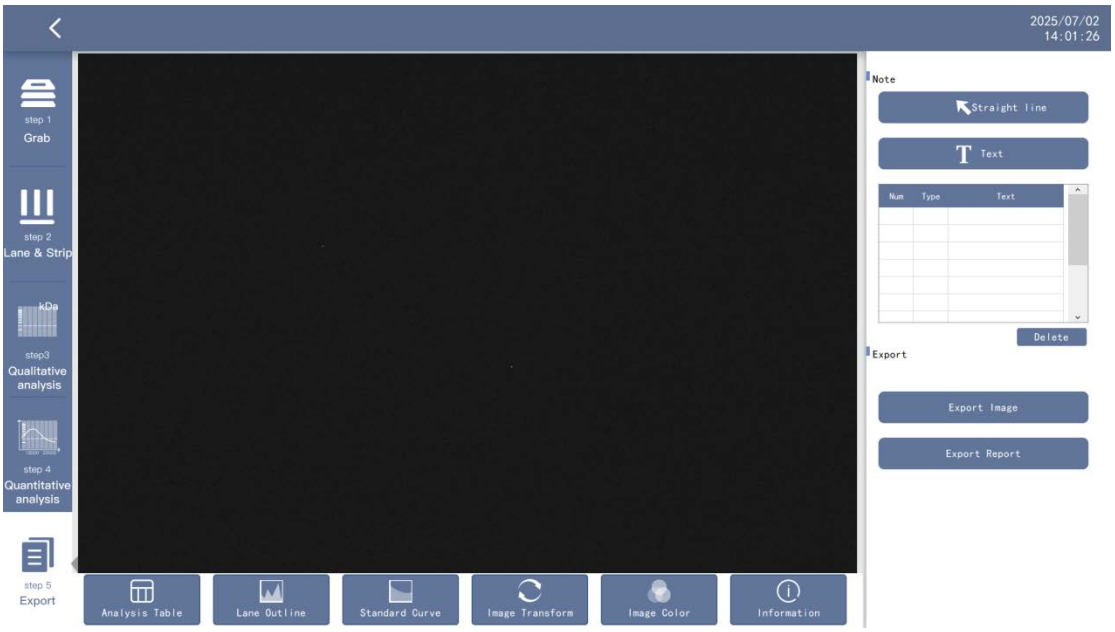
Note: A minimum of two reference bands must be selected for absolute quantitative analysis.

The software will perform the analysis and display the results in the Analysis Table.

Once quantitative analysis is complete, click Next to proceed to the Export interface.

Annotations and Export

In the Export interface, click on the Line or Text tool, then select the desired location on the image to insert a line or text annotation.



Annotations added to the image will be included in the exported images and reports.

To remove an annotation, select the corresponding item from the annotation list on the right-hand panel, then click Delete.

TROUBLESHOOTING

The following table outlines common operating issues, their possible causes, and recommended corrective actions.

Fault / Problem	Possible Cause	Recommended Action
Power indicator does not illuminate	Power supply is disconnected.	Verify unit is securely connected to the power supply.
	Power switch is not activated or is defective.	Ensure the power switch is turned on. If the issue persists, contact BT Lab Systems
Door indicator does not illuminate when the drawer or door is opened	Door detection switch is defective.	Contact BT Lab Systems
Iris control does not respond	USB cable is improperly connected.	Check and securely reconnect the USB cable.
	Button failure or internal circuit malfunction.	Contact BT Lab Systems
Zoom (+/−) buttons do not respond.	USB cable is improperly connected.	Check and securely reconnect the USB cable.
	Button failure or internal circuit malfunction.	Contact BT Lab Systems
TRANS UV/WHITE button does not respond, or the drawer illumination does not activate.	Button failure or internal circuit malfunction.	Press the button gently. If the issue persists, contact BT Lab Systems
EPI-UV 254 nm button does not respond, or the 254 nm UV lamp does not illuminate.	Button failure or internal circuit malfunction.	Press the button gently. If the issue persists, contact BT Lab Systems
EPI-UV 365 nm button does not respond, or the 365 nm UV lamp does not illuminate.	Button failure or internal circuit malfunction.	Press the button gently. If the issue persists, contact BT Lab Systems
EPI WHITE button does not respond, or the white light does not illuminate.	Button failure or internal circuit malfunction.	Press the button gently. If the issue persists, contact BT Lab Systems

Safety Note: Disconnect power before inspection or maintenance. Electrical and UV-system repairs should be performed only by qualified personnel.

WARRANTY

Our company warrants this product against defects in materials and workmanship for a period of one year from the date of shipment. During the warranty period, we will repair or replace defective equipment at no charge, provided that the equipment has been operated under normal laboratory conditions and in accordance with the instructions provided in this manual.

The warranty does **not** cover damage or defects resulting from:

- Accident, misuse, or abuse.
- Natural disasters or other events beyond reasonable control.
- Unauthorized repair, modification, or alteration of the equipment.
- Corrosion or damage caused by using incompatible solvents, samples, or chemicals.
- Improper installation, operation, or maintenance.
- Use of fittings, replacement parts, or accessories supplied by other manufacturers.

Platinum wire, accessories, and consumable components are excluded from this warranty.

RETURNS AND SERVICE

A Return Authorization must be obtained from our company before returning any product for repair.

For technical support, warranty assistance, or repair service, please contact:

Email: info@BTLabSystems.com

WIRING DIAGRAM

The wiring diagram is for reference only. Product specifications and design are subject to change without prior notice.

