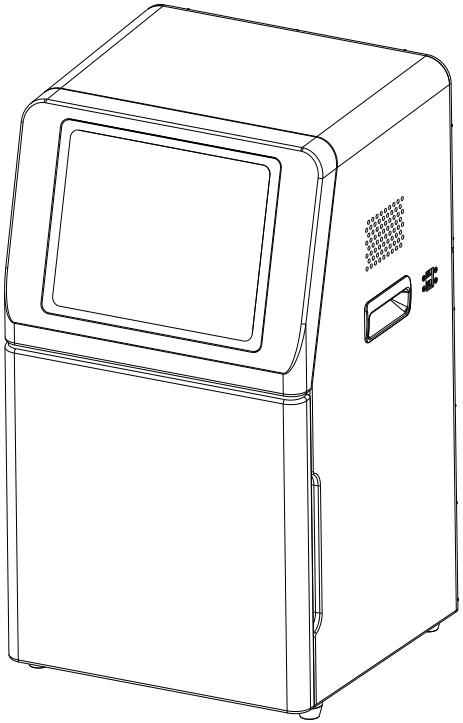
Servicebio®



User Manual

Imaging System

SCG-W5000 Plus

Please read the instructions carefully and keep them properly before using the product for future reference.

Wuhan Servicebio Technology Co.,Ltd.

CONTENTS

01 Introduction

SCG-W5000 Plus is a device that combines chemiluminescence technology imaging and gel imaging for detection and analysis. It is equipped with a high-sensitivity cooled camera with 9 million pixels, enabling rapid, accurate, and high-throughput detection and imaging of samples. It is widely used in the fields of life sciences, medicine, and environmental protection.

02 Technical Specifications and Precautions

Technical Specifications

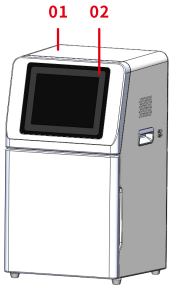
Product Name		Imaging System
Cat.No.		SCG-W5000 Plus
Dimensions		400×371×700 mm
Camera	Pixel Resolution	9 million pixels
	Resolution	2992×3000
	Pixel Size	3.76×3.76 μm
	Target Size	1“(11.28×11.28 mm)
	Full Well Capacity	16.5ke-(HCG),50.5ke-(LCG)
	Sensitivity	877mv@1/30s
	Readout Noise	1.24e-(HCG)，3.22e-(LCG)
	Dark Current	0.0003e-/s/pixel@-15℃
	Signal-to-Noise Ratio	42.2dB(HCG)，47dB(LCG)
	Exposure Time	0.1ms-1h
	Binning Mode	1×1，2×2，3×3
	Grayscale	16-bit (65536 levels)
	Cooling	Relative to Ambient Temperature -40℃
	Camera Type	Black and White Camera
Lens	Aperture	F0.95~F16
	Focal Length	17 mm
	Type	Motorized lens

Light Source	Bright Field Light Source	Downward-facing LED white light source, symmetrically distributed on both sides
	Ultraviolet light source	310nm LED array with uniform transmitted illumination, 254nm/365nm LED ultraviolet light sources (symmetrically distributed on both sides)
	Dual blue/white light sources	Optional accessories: Blue/white transmitted light switching, each featuring 3-stage power cycling adjustment
Dark Box	Light Isolation	Fully light-sealed, isolates environmental light
	Door Control	Door control sensor can control the on/off of the bright field light source
	Rotating disc	Switch the filter according to the current mode to match the applications of chemiluminescence and gel imaging
	Field of View	Effective field of view for membrane imaging is 140mm×140mm Effective field of view for protein gel imaging is 140mm×140mm Effective field of view for nucleic acid gel imaging is 140mm×140mm
	Gel Cutting	After opening the door, the UV light source can be extracted and used with a UV protective board for cutting adhesive
Software Functions	Exposure Modes	High Quality: Highest image quality Standard: Balances image quality and exposure speed High Sensitivity: Fastest exposure speed
	Auto Exposure	Intelligent exposure technology quickly determines the optimal exposure time.Auto-binning.With the combination of time imaging and time accumulation functions, users can achieve the best image results with just one operation
	Real-time Imaging	Real-time presentation of the changes in sample signals during the exposure process, allowing for the observation of every detail of the capture. Overexposed areas will be indicated for samples with overexposure
	Time Imaging	After exposure is complete, each frame image within the exposure time can be generated.Through precise retrospective adjustments, users can choose any frame image within that exposure time as the final output
	Time Accumulation	For samples with insufficient exposure, users can choose to continue exposure after the initial exposure is completed, enabling the sample to receive additional exposure on top of the already exposed time
Industrial Computer		10.4" display (1024×768) | Windows 10 OS 16GB RAM, 512GB SSD, Integrated Bluetooth/Wi-Fi
External Interfaces		USB 3.0×2
Operating Voltage		90~132VAC/180~264VAC (selectable via switch), 47~63Hz
Product Power		⩽300W
Product Net Weight		30.65Kg

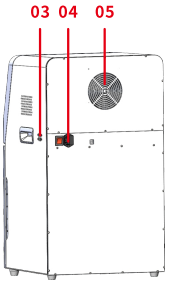
Notes

- It is prohibited to touch or scratch the internal lenses of the dark box with hands or sharp objects.
- After placing the experimental samples, make sure to close the instrument's flip door to prevent external light from entering the dark box and affecting the experimental results.
- During imaging experiments, shaking the experimental table or instrument is prohibited to avoid impacting the image quality.
- Pay attention to electrical safety. Pulling or moving the power cord during the experiment is prohibited.
- After the experiment is completed, clean the samples and any residues inside the dark box thoroughly.

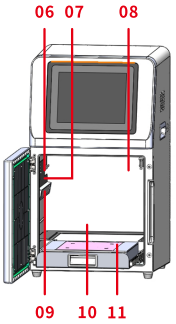
03 Functional Description



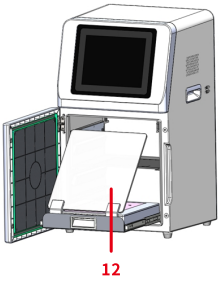
Positive structure



Back structure



Dark fragrance structure



Gel Cutting

01 Internal camera lens assembly, which is the core component of the imaging system

02 10.4-inch industrial computer with user software operating interface

03 External USB 3.0 interface

04 Power socket and switch

05 Cooling device

06 254nm&365nm UV Light Sources

07 LED white light source for illumination

08 High-quality light-shielded imaging dark box

09 Rotating disc

10 Sample tray,used to hold sample trays that can be taken out for placing sample

11 UV light source and drawer

12 UV protection shield

04 Operating Procedures

4.1 Chemiluminescence Imaging Application

4.1.1 Power On

Plug in the power cord and turn on the power switch at the back of the instrument. The industrial computer will start up.

4.1.2 Sample Loading

Open the instrument door, take out the sample tray, place the prepared text sample on the tray, and then place the tray flat in the groove inside the instrument dark box. Close the instrument door.

4.1.3 Launching Imaging Software

After the industrial computer starts up, the application software will be automatically loaded. Once the software is successfully launched, it will navigate to the main page.

The top-left section displays the company logo.

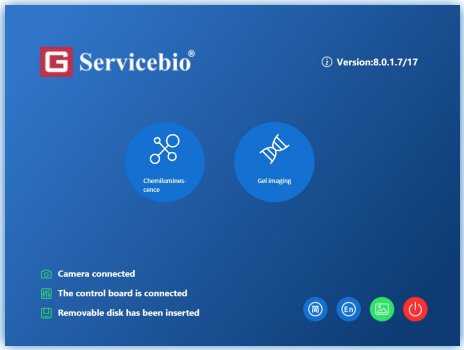
The bottom-left section is the status bar, showing the current camera and control board connection status, as well as detection of the inserted removable disk.

The top-right section displays the software version number.

The bottom-right section includes buttons for switching between simplified/traditional Chinese, switching to English, exporting the page, and closing the program.

Clicking on the central icon will enter the preview and capture page.

Clicking on the Chemiluminescence will enter the preview and capture page.



Main Page

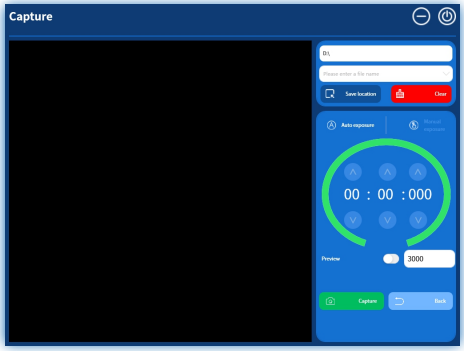
4.1.4 Preview and Capture Page

On the preview page, the user needs to input the location for storing the experimental results. The file name is optional and facilitates file retrieval for the user.

The user can choose between manual exposure and automatic exposure as the current experimental mode. For manual exposure, the user needs to input the exposure time, while for automatic exposure, the algorithm calculates the optimal exposure time.

On the right side of the preview, the user can input a time value in microseconds (us). This time represents the exposure time for the bright field image. Clicking the preview switch initiates the preview, and the preview time can be adjusted as needed.

Clicking the capture button starts the exposure for capturing the image, while clicking the return button takes the user back to the main page.



Preview and Capture Page

4.1.5 Shooting Process

1. Select automatic exposure and set the preview time

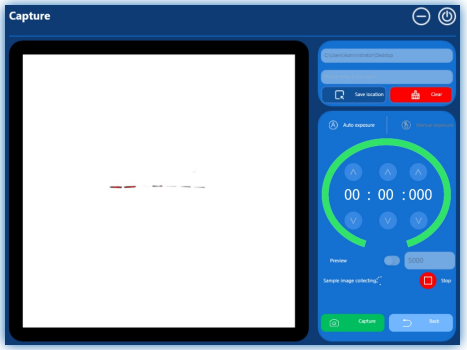
Automatic exposure Intelligent exposure technology can quickly determine the optimal exposure time.During preview, colored markers are visible, which correspond to the bright-field image in the final exposure result.

2. Real-time Imaging

Click on the capture button to start the exposure. A strip is displayed on the left, and a countdown of the exposure time is shown on the right. As the countdown progresses, real-time imaging of the sample signal changes is displayed on the left.

Real-time imaging Presents the changes in the sample signal during the exposure process in real-time, allowing users to grasp every detail of the capture. This breakthrough feature not only enhances shooting efficiency but also greatly improves user interaction experience.

During real-time imaging, areas in the strip that are overexposed will be displayed in red. If it is determined that the strip meets the requirements, you can click on the stop button in the lower right corner to end the exposure early.



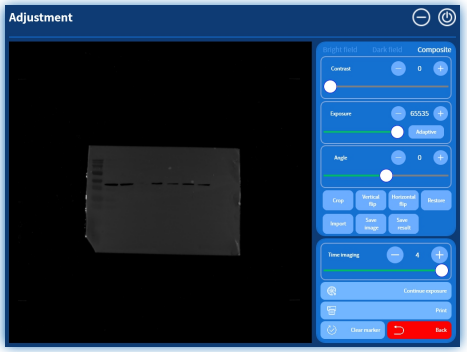
Real-time imaging

3. Temporal Imaging,Time Accumulation

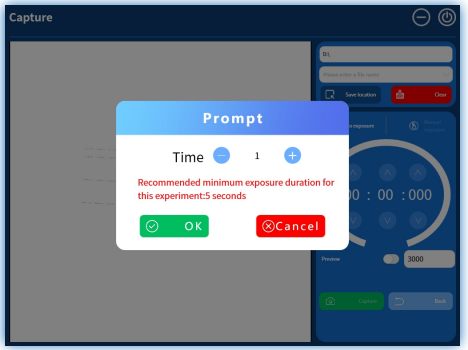
After the exposure is complete, it automatically enters the results page, where adjustments can be made to the captured results.

Temporal Imaging Through precise retrospective adjustment, users can select any frame within the exposure time as the final output result.

Time Accumulation Even after the exposure is complete, users can choose to continue the exposure, allowing the sample to receive additional exposure based on the already-exposed time. When clicking "Continue Exposure," there is a prompt for the minimum exposure time. The set time needs to be greater than this minimum time. If the set time is shorter than this minimum time, the actual exposure time will be the minimum exposure time indicated by the prompt.



Temporal imaging



Temporal accumulation

4. Image adjustments, result saving

After obtaining satisfactory images through automatic exposure, continued exposure, and temporal imaging, adjustments can be made to the bright field image, dark field image, and composite image on the results page.

Contrast Adjust the contrast of the bright field image

Exposure Adjust the lightness and darkness of the dark field image. Clicking on "auto-adapt" can recommend the most suitable value

Rotation Rotate the image

Invert Apply an inverted color effect to the image, turning black into white and white into black

Crop Clicking on crop will generate a region on the image. This region can be resized, and after selecting the appropriate size, clicking on crop again will crop out the desired area

Vertical flip Flips the image vertically

Horizontal flip Flips the image horizontally

Restore Restores the image to its original state

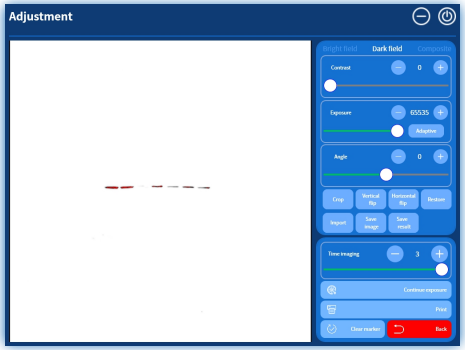
Import Select the file automatically saved by the program to import it into the program for further operations

Image saving Save the image and also save the bright field image, dark field image, and composite image

Result saving Save the adjusted image as an encrypted file

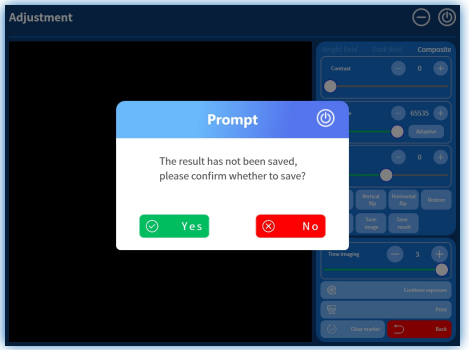
If any adjustments are made to the image on the results page

Bright field image



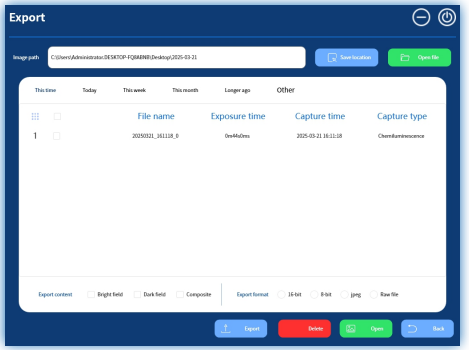
Dark field image

Composite Image



Result saving

4.1.6 Export page



Export page

Storage location Select the location of the image files automatically saved by the system, and the contents of the files will be displayed in a list format in the system

Open file Open the selected directory

Export Select the export content and format to export the images

Delete Select the image file to be deleted, and it will be deleted

Open Select the corresponding file in the list to open and jump to the result page. You can operate on the image on the result page, or double-click the corresponding file to open it

Back Click "return" to return to the main page

4.2 Gel Imaging Application

4.2.1 Power On

Plug in the power cord, turn on the power switch at the back of the instrument, and the industrial computer will start up.

4.2.2 Sample Loading

Nucleic Acid Gel Open the instrument door, place the sample on the ultraviolet transmissive glass of the ultraviolet light source module, with markings on the surface of the ultraviolet glass indicating the range for placing the sample.

Protein Gel Open the instrument door, take out the white sample tray, place the prepared sample to be tested on the tray, then place the tray flat in the groove inside the instrument dark box, and close the instrument door.

4.2.3 Load Application Software

After the industrial computer starts up, the application software is automatically loaded. Once the software starts up normally, it will navigate to the main page.

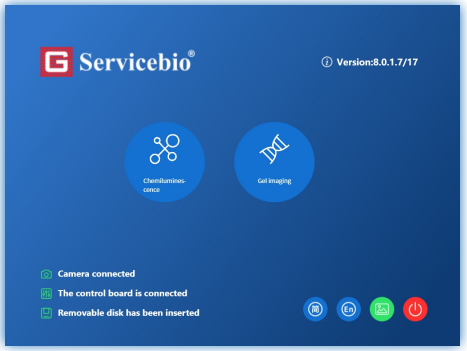
The upper left part displays the company logo;

The lower left part is the status bar, showing the connection status of the current camera and control board, as well as the detection of inserted removable disks;

The upper right part displays the software version number;

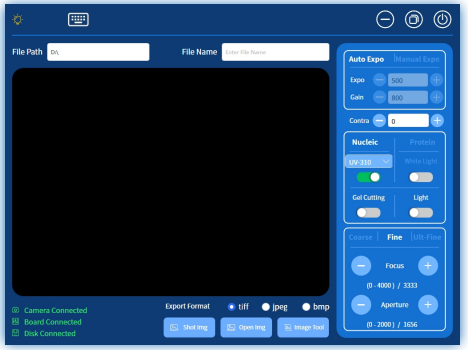
The lower right part includes buttons for switching between simplified and traditional Chinese, switching to English, accessing the export page, and closing the program;

Clicking on the icon in the middle and selecting "Gel Imaging" will take you to the preview and capture page.



Main Page

4.2.4 Preview and Capture Page



Preview and Capture Page

Preview and capture pages include status display information, camera settings, lens settings, mode settings, image saving, and cropping, etc.

The top bar consists of UV light source status indicator, keyboard open button, minimize, window restore, exit gel imaging; file path input to save the location of the image, file name input to save the name of the image.

The middle window displays real-time captured images from the camera.

The bottom bar includes camera/control board/mobile disk connection status display information, image format selection for saving (tiff/jpeg/bmp), save image button, open image path, and image cropping button.

The right sidebar is for camera settings, mode settings, and lens settings, which are described as follows:

Auto Exposure Automatic exposure mode where the camera self-adjusts exposure time and gain

Manual Exposure Manual mode for setting exposure time and gain

Exposure Sets camera exposure time (unit: ms). Increasing exposure time manually brightens images

Gain Adjustable range: 100%-5000%. Higher gain amplifies both signal and noise - avoid excessive settings

Contrast Adjustment range: -100~100 (default: 0)

Nucleic Acid Gel Imaging Auto-activates UV light (door must be closed) Selectable wavelengths: 310/254/365nm

UV-310 Toggle UV light (door-locked operation) for nucleic acid gel mode

Gel Cutting Door-open operation only,Activates UV light box automatically.Requires UV shield placement before activation

Protein Gel Imaging Auto-activates white LED strips + lifts filter Supports color imaging

White Light Toggle white LEDs for protein gel imaging

Light General LED lighting operable in all modes

Adjustment Modes Select the adjustment step sizes for the motorized lens's focus, and aperture

Coarse Adjustment Larger step sizes: focus step size 400, aperture step size 200. When the image is completely blurred, coarse adjustment can quickly bring it to a relatively clear state

Fine Adjustment Moderate step sizes: focus step size 100, aperture step size 50. After coarse adjustment, fine tuning refines the image to a sharper state

Ultra-Fine Adjustment Smaller step sizes: focus step size 25, aperture step size 10. Achieves the sharpest image clarity

Focus "-/+" buttons adjust clarity

Aperture "-/+" buttons adjust brightness

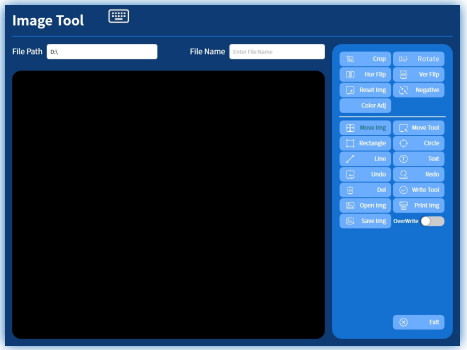


Image Tool

The image tool interface mainly comprises image manipulation and annotation tools.

1.Image manipulation includes:image cropping, image rotation,horizontal flipping,vertical flipping,image restoration, and image centering.

Crop Click the image cropping icon, select the area of interest in the image, and double-click the image to crop out the selected area

Rotate Click the image rotation icon and draw a red rotation line on the image. The image will rotate along the red rotation line

Hor Flip (Horizontal Flipping) Click the horizontal flipping icon to flip the image horizontally

Ver Flip (Vertical Flipping) Click the vertical flipping icon to flip the image vertically

Image Restoration If dissatisfied with previous image manipulations, click the image restoration to revert the image to its original state

Negative Invert the colors of the image (black and white reversal)

Color Adj (Adjustment) Adjust the brightness, contrast, and grayscale of the image

2.Annotation tools include: tool movement, image movement, rectangle tool, circle tool, line tool, text tool, delete tool, write-in tool, open image, open path, save image, overwrite original image.

Tool Movement Used to move rectangles, circles, lines, and text annotations within the image. Press and drag the desired annotation with the left mouse button. While in this mode, scrolling the mouse wheel can zoom in or out of the image

Image Movement Used to move and scale the entire image. Hold the left mouse button and drag to move the image. While in this mode, scrolling the mouse wheel can zoom in or out of the image

Rectangle Tool Draws a rectangle in the image. Press the left mouse button to set the rectangle's starting point and drag to set the end point

Circle Tool Draws a circle/ellipse in the image. Press the left mouse button to set the circle's starting point and drag to set the end point

Line Tool Draws a line in the image. Press the left mouse button to set the line's starting point and drag to set the end point

Text Tool Adds a text box to the image for inputting text. Clicking the text tool button will display a text editing box at the bottom of the software. Enter text in the editing box, and after completing, drag the text on the image with the mouse

Undo Move Markers Reverse the latest annotation action

Redo Move Markers Reapply the latest annotation action

Delete Move Markers In "Move Markers" mode, select a marker and click Delete to remove it

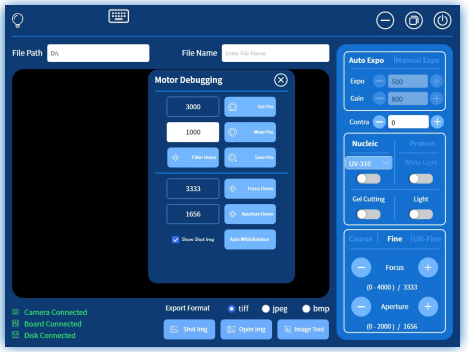
Burn-in Markers Permanently merge annotations with the image (non-editable afterward)

Open Image Open an image with existing annotations displayed

Print Image Opens the system print dialog to print the image

Save Image Saves the image with annotations (editable only within this software)

Overwrite Original When enabled, saving replaces the original file



Parameter Configuration Window

Click the blank area to the left of "Export" to open the configuration window. Operators can adjust the following settings:

Show Shot Img When enabled: Automatically switches to the image editing interface after capture. When disabled: Remains in preview mode for continuous image capture

Auto White Balance When protein gel colors appear inaccurat. Remove all samples from the white sample tray. Click to perform camera white balance calibration

Gray/Color Mode Chose Gray, Displays protein gel images in grayscale. Chose Color, Displays protein gel images in full color

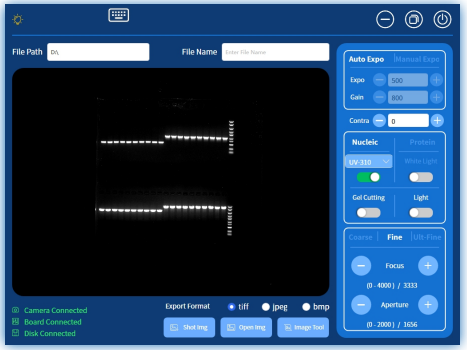
Lens Adjust Click to reset all lens adjustment values to zero, providing a reference point for tracking the number of adjustment steps made during operation

4.2.5 Shooting Process

1.Select automatic exposure, default contrast is 0, default exposure is 500 Max., and default gain is 800 Max.;

2.For nucleic acid gel: Click Nucleic Acid Gel Shooting, turn on the UV light source, then the bands can be seen in the window;

For protein gel: Click Protein Gel Shooting, turn on the bright field light source, then the bands can be seen in the window;



Nucleic Acid Gel Shooting Settings

Protein Gel Shooting Settings

Protein Gel Shooting Results

3.If the exposure time and gain have reached their default maximum values but the bands remain too dark, adjust the "Aperture" by clicking "+" until the band brightness is satisfactory;

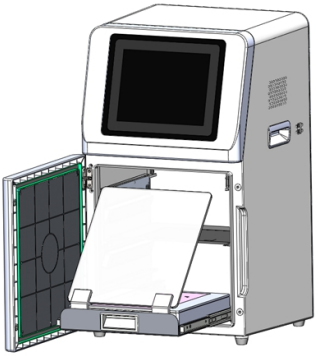
4.In Fine Adjustment mode，adjust "Focus" to achieve optimal image clarity (sufficient for most cases) In rare cases where Fine and Ultra-fine adjustments still don't provide sufficient clarity, decrease the "Aperture" setting Readjust focus to obtain the sharpest possible image;

5.Enter the file path and file name, click "Save Image" to save the current image;

4.2.6 Gel Cutting

1.Open the instrument door, and the UV light source will automatically turn off.

2.Pull out the drawer containing the UV light source and place the UV protective shield diagonally on the drawer and the instrument to block the UV light source from direct exposure to the eyes.



Get Cutting

3.Click on "Cutting Gel," the UV light source will turn on, and at this point, the bands of nucleic acid gel can be observed, and the gel cutting action can be carried out.

4.2.7 Optional Blue/White Light transilluminator

1.Power the Blue/White Light transilluminator;

2.For nucleic acid gel imaging.Place the gel on the sample tray.Position the tray on the imager platform.Press the "Blue Light" button to observe nucleic acid band patterns.

Blue/White Light transilluminator

05 Product Packing List

No.	Name	Specifications	Quantity
1	Imaging System	SCG-W5000 Plus	1
2	Black Sample Tray		2
3	White Sample Tray		2
4	UV Light Proof		1
5	Mouse		1
6	Power Cord	250V-10A	1
7	Certificate of Conformity		1
8	User Manual		1

06 Warranty and Service Description

If any damage occurs to the instrument or components during the warranty period, our company is responsible for free repair or replacement of the damaged parts.

The following damages are excluded:

Damages caused by improper use.

Repairs or modifications not performed by our company.

Replacements made using non-original or unauthorized parts.

If you need more services, please visit Servicebio official website (https://www.servicebio.com/) or Email to info@servicebio.com.

Please fill in the following warranty card information carefully and keep it properly when purchasing the product.

Product Name	
Cat.No.	
Date of Purchase	
Address	
Product Number	
Quality Feedback	

Servicebio®

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