

U:GENIUS³



S Y N G E N E

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Chapter One- Introduction

The U:Genius³ system has been designed to make your gel imaging simple, quick and easy. This system is the perfect choice for a low budget gel imaging system and features a compact darkroom which has a sliding front door and internal LED white light.

The U:Genius³ system supports multiple applications including DNA/RNA gel imaging such as EtBr, SYBR Green and visible stained gels i.e. coomassie blue and silver stain.

1.1 Applications supported

Transilluminator UV	Visible Light Converter	Blue LED Transilluminator
Ethidium Bromide SYBR Green SYBR Gold SYBR Safe Gel Green Gel Red SYPRO Ruby	Coomassie blue stain Copper stain Zinc stain Silver stain	SYBR Gold SYBR Green SYBR Safe UltraSafe blue

1.2 Hardware

1.2.1 Specification

Camera	12/16 bit
CCD	1/3 inch
Zoom	Manual zoom 6.5-39, F1.4 , aperture and focus
Display	8" colour touch screen
Filter Draw	Yes UV filter as standard
Max gel size	20 x 20 cm
Data types	TIFF and JPEG
CCD resolution	3M pixels
Image storage	USB
Image enhancements	Rotation and inversion, sharpen, smooth and many more
Illumination	Slide in and out UV transilluminator, visible light converter and blue LED transilluminator (Ultra-Slim), Epi white LED

1.2.2 System Components



1.2.2.1 Darkroom

The darkroom has a sliding door. The darkroom features:

- Slide out mid wave 302nm UV transilluminator
- Internal white light LED
- Safety switch to protect from accidental UV exposure

1.2.2.3 UV Transilluminator

The UV transilluminator will excite many fluorescent stains such as Ethidium bromide, SYBR™ stains, Gel Red™. The standard wavelength is 302nm. To protect users from accidental exposure, the UV light is automatically shut off if the door is opened. The transilluminator can be slid easily in and out of the cabinet.

1.2.2.4 Filter Drawer

Interchange a range of filters for extensive choice of fluorescent applications.

1.2.2.5 LCD Touch Screen

A built-in 8 inch VGA colour LCD touch-screen allows users to preview, capture, print and save images, as well as to select various processing functions, without the connection of an external keyboard or mouse.

1.2.2.6 USB Flash Drive

The USB flash drive on the front of the U:Genius³ for the easy storage of images.

1.2.3 Accessories

1.2.3.1 Visible light converter



Syngene offers a visible light converter that can be placed on top of the UV transilluminator for imaging coomassie and silver stained gels.

1.2.3.2 Blue LED transilluminator



The UltraSlim blue LED transilluminator is ideal for safely imaging gels stained with SYBR Safe, Gold and Green, GelGreen and UltraSafe blue.

1.2.3.3 Thermal printer

You may attach a thermal printer, either Mitsubishi P93D or Sony UPD897.

When you first attach the printer you will see the following window



Select 'No, not this time' and press Next button
The drivers will automatically install.

1.2.3.4 Analysis software

The U:Genius³ system is supplied with a copy of GeneTools analysis software from Syngene. This may be loaded on a PC of your choice. Please see the loading instructions within the CD cover.

1.2.4 Set-up

Please refer to the Installation quick guide on how to set up the camera and darkroom.

Chapter Two- Image Acquisition

2.1 Capturing an image of an agarose EtBr or similar gel

(For rapid capture see Quick Guide-Capture)

Step One

Position the sample on the centre of the transilluminator, close the door, ensure the UV filter has been placed in the filter draw and then manually turn UV on by pressing the 'UV On' switch on the front of the unit. Then press the 'Live' button icon.



Figure 1- LIVE view icon

Step Two

Manually adjust the camera settings such as the aperture, zoom and focus. Adjust the aperture, zoom and focus settings until a suitable image is displayed, preferably with the sample filling the screen for maximum resolution.

Please note that opening the aperture too far may result in areas of the sample being saturated.



Figure 2- Lens control

Step Three

The exposure time can either be set manually or automatically. Adjusting the exposure time will alter the brightness of the image. To manually increase or decrease the exposure time use the following icons.



Figure 3- Manual Exposure controls

The auto-exposure function sets the exposure time to a level that ensures no saturation of the image occurs. To use the auto-exposure function select the following icon.



Figure 4- Auto Expose icon

Step Four

To capture the image press the Capture button. If you have selected auto-expose then you will not need to press the Capture button.



Figure 5- Capture button

2.2 Capturing an image of a protein gel (coomassie, silver stained) or other white light image (Colony plate, autorad, microtitre plate etc)

Step One

Make sure that you place the visible light converter on top of the transilluminator. Position your sample on the centre of the visible light converter and close the door. Manually turn on UV by pressing the 'UV On' switch.

Step Two

Manually adjust the camera settings such as the aperture, zoom and focus. Adjust the aperture, zoom and focus settings until a suitable image is displayed, preferably with the sample filling the screen for maximum resolution.

Please note that opening the aperture too far may result in areas of the sample being saturated.



Figure 6- Lens control

Step Three

The exposure time can either be set manually or automatically. Adjusting the exposure time will alter the brightness of the image. To manually increase or decrease the exposure time use the following icons.



Figure 7- Manual Exposure controls

The auto-exposure function sets the exposure time to a level that ensures no saturation of the image occurs. To use the auto-exposure function select the following icon.



Figure 8- Auto Expose icon

Step Four

To capture the image press the Capture button. If you have selected auto expose then you will not need to press the Capture button.



Figure 9- Capture button

Chapter Three- Saving/ Opening and Printing Images

3.1 Saving images

To save a captured image press the 'Save' button. **N.B.** You can only save an image to a USB device or your local area network (LAN). Images can be saved in the following formats TIFF and JPEG.



Figure 10- Save Button

3.2 Opening Images

From the front screen select 'Open Image' to browse captured images.



Figure 11- Open Images Icon

3.3 Printing Images

If you have a thermal printer attached to your U:Genius³ press the following button.



Figure 12- Print button

Chapter Four- Image Enhancement

The U:Genius³ system offers a variety of functions ranging from image enhancement to annotation.

4.1 Image enhancement

To access the enhance functions select the Enhance button via the Edit Menu button. From this menu you can select to smooth, sharpen, invert or rotate your image.



Figure 13- Enhance icon



Click on this icon to apply a smoothing filter. This is useful when the image has specks of dust or bubbles present. However, this will make bands appear less sharp.



Click on this icon to apply a sharpening filter to your image. When this filter has been applied band edges should become more pronounced but you may also observe an increase in the graininess of the image.



The Invert icon will reverse the image to give black bands on a white background or vice versa. This icon is particularly useful when trying to see faint bands.



To freely rotate your images press the Rotate icon.



Press the Undo button to remove any enhancement that you may have performed.



Use the Back button to navigate between the menus.

4.2 Annotate

To access the annotation functions select the Annotate button via the Edit Menu button. From this menu you can add text, change the font, select to have your text horizontal or vertical or remove text.



Figure 14- Annotate button



Use this icon to add text to your image. Press or place the mouse cursor on your image and type your text.



To change the font style press this icon.



If you wish to have your text displayed horizontally select this button.



If you wish to have your text displayed vertically select this button.



To remove any annotation select this button.



Use the Back button to navigate between menus.

4.3 Digital Zoom

To zoom in or out on your image select the Zoom button from the screen once you have captured your image.



Figure 15- Zoom button



Digitally zoom in on your image to see faint bands.



Digitally zoom out on your sample.



Zoom settings can reset at any time.



Use the Back button to navigate between the menus.

Chapter Five- User Preferences

To access U:Genius³ settings and set user preferences for neutral fielding, EDR, to view external keyboard and to set regional power frequency settings.



Figure 16- Preferences icon

You will be directed to a new screen (**Figure 17**).

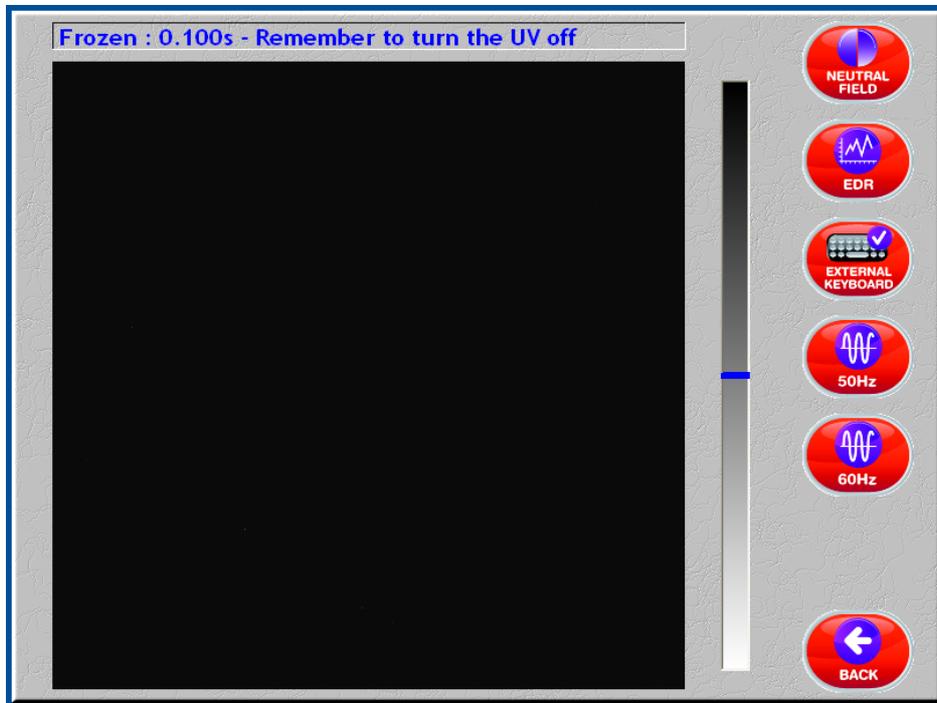


Figure 17- Preferences screen

5.1 Neutral fielding

The neutral field function is based on powerful algorithms which corrects for uneven illumination. This results in an image with a flat, even background whilst maintaining GLP compliance. To neutral field check the box (**Figure 18**) then follow the on-screen instructions (**Figure 19**)



Figure 18- Neutral fielding button

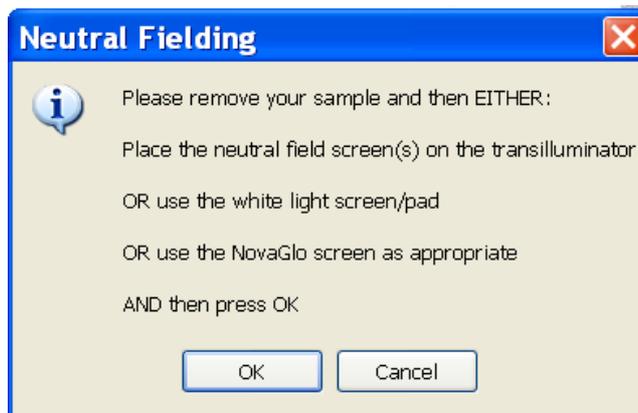


Figure 19- Neutral fielding on-screen instructions

5.2 Extended Dynamic Range (EDR)

Many gels contain areas that are too bright or too dark to be successfully captured. Closing the iris to cut down the light may prevent the viewing of dark or faint bands, whilst opening it may lead to saturation. EDR solves this problem by automatically capturing a series of images of different exposure times. The content of each image is assessed and those areas that are within the dynamic range of the camera are combined. The result is an image with a large dynamic range (up to 65536 grey levels) that encompasses all the brightness ranges existing within the sample without saturation.



Figure 20- EDR button

5.3 External Keyboard

If you wish to connect an external keyboard to the U:Genius³ system select this button.



Figure 21- External Keyboard button

5.4 Regional Power Frequency Settings

Select your regional power frequency settings - choose between 50Hz or 60Hz.

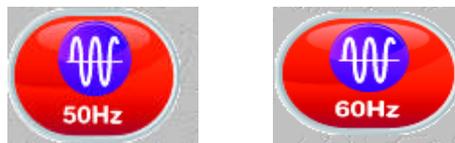


Figure 22- Regional Power Frequency Settings buttons

Chapter Six - Troubleshooting and Contact Information

6.1 Troubleshooting

No power to the darkroom

- Check connection of main power cord to main power port on the rear of the U:Genius³.
- Try another power socket within lab.

Transilluminator will not turn on

- Check power cord by sliding transilluminator fully out from cabinet. If loose push back in.
- If still not on, remove power cord and attach another one plugged in elsewhere. If transilluminator comes on there is an electrical supply problem within the U:Genius³. If it still does not come on it is likely the transilluminator has failed. Contact Syngene.

6.2 Contact Syngene

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