iBox Spectra 310C Small Animal Imaging System

Installation and User Instructions

Introduction

- The iBox 310C Small Animal Imaging System is designed as a quick screening device for accurate, repeatable imaging of small animals.

- The iBox system incorporates the light tight darkroom, Manual BioLite and matched excitation (455-495nm) and emission (515 long pass) filters.

- The darkroom has an UV blocking window, built-in overhead white light and an emission filter tray.

- The iBox system comes equipped with a warming plate to help maintain the animal at a constant 37°C.

- The Manual BioLite offers a direct lighting source using fiber optic bundles to tightly control the output spectrum for consistent, repeatable measurements

- The iBox offers a color camera and motorized lens for in vivo applications and supplies real time, live preview images.

System Components

Components

Refer to the packing slip and pictured components for parts included with the system.

LCD Touch Screen

Gel Camera with Motorized Lens (behind the LCD touch screen)

Filter Tray (located under the camera) with 515 long pass filter

Main Power Switch

Power switches

USB Drive

BioLite tray and light sources

Viewport

Warming Plate

Manual BioLite Multispectral Source

Access port

Pull-out tray
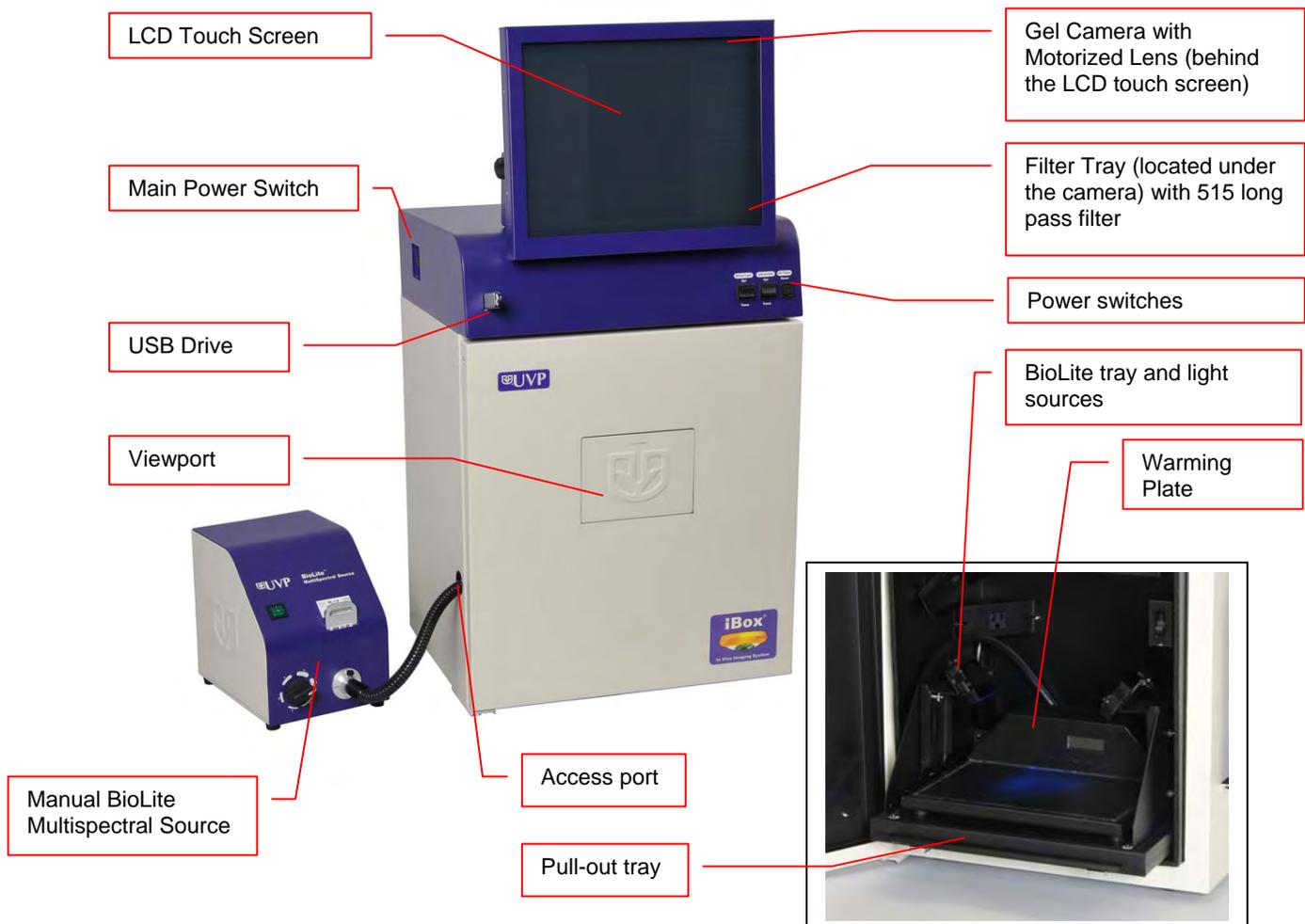
Computer

Operating System:	Windows XP
Processor:	1.5GHz (minimum)
USB storage device capacity:	1G (minimum)
Internal storage (hard disk):	60GB (minimum)
USB 2.0 ports:	1 front, 4 in the back
Software Options:	VisionWorks®LS software

Camera

The MultiCam 310C camera is a CCD color model with a resolution of 1600 x 1200. The camera is controlled via the computer through a USB 2.0 PC interface. All camera settings are factory pre-set for optimum performance for imaging live animals. UVP Technical Support should be contacted before making any adjustments to the camera settings.

Motorized Lens Kit

The motorized zoom lens is fitted with a close-up diopter. The diopter is used for focusing on objects at the focal length of the iBox. The lens is software controlled for aperture, zoom, and focus settings.

BioLite™ MultiSpectral Source

The Manual BioLite Multispectral Source is a 150-Watt quartz halogen visible light source designed for use with ferrule fiber optic bundles. It features a closed optical path to tightly control the output spectrum, allowing consistent repeatable measurements with superior signal to noise. The BioLite features a 6 position dimmer permitting variable intensity. The user simply inserts the excitation filter into the slot at the front of the BioLite to control the wavelength of light emitted.

Filter

The 515 long pass filter (50mm sq.) transmits all wavelengths of light above 515nm. The filter is placed in the filter tray below the camera assembly. The filter can be substituted for other specific fluorophore filters or removed when imaging non-fluorescent media (protein gels, colony plates, etc.) in order to produce brighter images.

Darkroom

The darkroom is light tight for optimum imaging conditions. The darkroom features:
- Overhead white light
- Roll out tray for the transilluminator
- Gel viewer window
- Side pocket for storage of materials
- Brackets for installing optional UV lamps for overhead UV illumination
- Built in power cord for an optional LED white light tray

Warming Plate

The warming plate houses electrical heating elements which maintain the surface of the warming plate at a constant temperature of 37°C to keep animals warm during the imaging process. The warming plate plugs into a dedicated port inside the iBox darkroom.

LCD Touch Screen

The display is a 15-inch VGA color touch screen connected to the darkroom cabinet with tilt adjustment. The touch screen allows the user to preview, snap, save and print images, as well as select certain preference options, without the need of an external mouse or keyboard.

A stylus pen is included for increased pointer control in selecting software options on the touch screen.

VisionWorksLS Acquisition and Analysis Software

The iBox Spectra 310C Imaging System is configured with VisionWorks®LS software for analysis of small animals. The software features image enhancement, complete analysis tools and reporting capabilities.

Optional Equipment

Refer to the ordering information section of this manual for optional equipment part numbers.

Thermal Printer

The thermal printer provides archive quality, 256 grayscale prints, and five optional cost-effective print sizes.

UV Handheld Lamps for Overhead lighting

A set of two 4-watt ultraviolet lamps can be connected inside the darkroom for UV epi-illumination. The lamps can be switched On/Off using the switch on the front of the darkroom.

Converter Plates

The **White Light Tray** plugs into the darkroom for uniform white light transillumination.

The **UV/White Converter Plate** allows imaging of non-fluorescent stained media with an ultraviolet transilluminator (transilluminator required). The converter plate is specially coated to convert the 302nm UV output to white light, rather than using a separate white light box.

The **Visi-Blue Converter Plate** converts UV to 460-470nm designed for use with blue excitation samples and SYBR green, SYPRO orange and GFP stains.

Transilluminators

If the system does not include a transilluminator (check the packing slip), contact UVP for ordering information or go to UVP's web site at www.uvp.com. A large selection of transilluminators is available from UVP. These units include compact 8-watt models to our high performance FirstLight Transilluminator.

Printer

UV Lamp

UV/White Converter Plate

Mouse and Keyboard

An external keyboard and mouse can be connected to the iBox Spectra 310C system. These components connect to any available USB port in the back of the darkroom.

Set-up Instructions

Components

- Camera with zoom lens, bracket, filter, cables
- iBox darkroom
- Windows XP operating system and software to control the iBox Spectra 310C
- USB storage device, 1GB (minimum)

WARNING: DO NOT ATTEMPT TO CONNECT ANY WIRING WHILE THE EQUIPMENT IS CONNECTED TO ANY POWER SUPPLY

CAUTION
Do not install the system in places with high moisture, dust, or high temperature. Do not use any oil or petroleum based cleaner for the cabinet. Use only mild soap or detergent solution for cleaning. Ensure that the system is turned OFF during cleaning. Keep the equipment away from motors or other large magnetic equipment apparatus.

Installing the Filter

To install the 50mm sq filter:

- Carefully remove the filter from the protective plastic case, holding the filter at the edges to prevent fingerprints.

- The filter tray is located under the camera bracket on the right side top of the darkroom. Slide the tray open.

- Place the filter inside the filter tray so that the text on the edge of the filter is positioned so the letters are right side up when facing you.
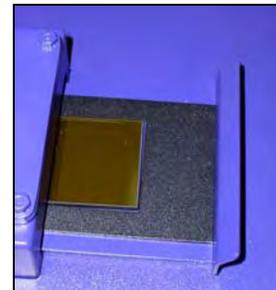
Additional filters are available. Refer to Accessories for ordering information.

Camera Set-up

The camera, zoom lens, and diopter are assembled at the UVP factory. Remove the cap from the lens if in place.

- Using the four thumb screws provided, secure the bracket to the base.

- Slide the camera and lens assembly into the camera bracket.

Camera and motorized lens assembly

Thumb screws secures the bracket to the base
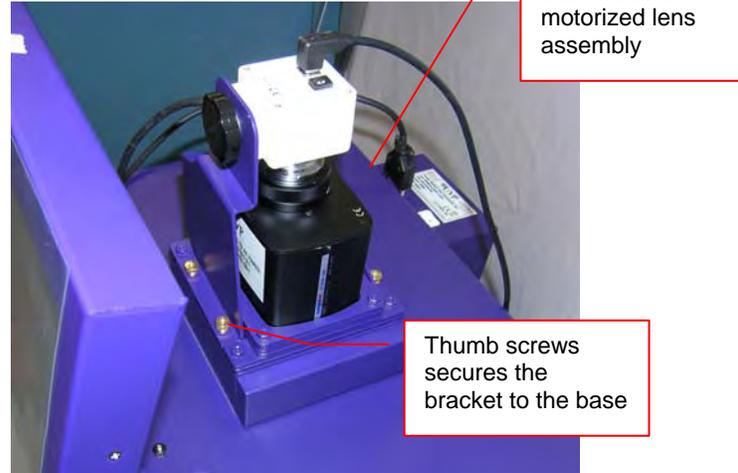
Camera cable

- Insert and tighten the knob/washer in the central hole in the camera to secure the camera to the bracket.
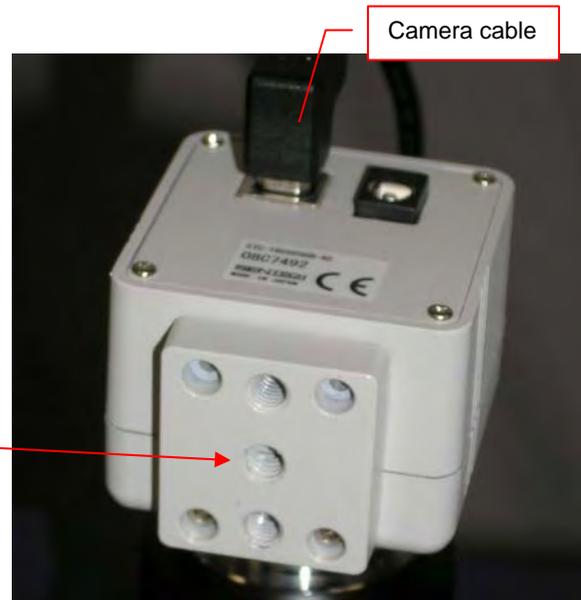
- Plug the camera cable into the top the camera and the other end into the UBS port on back of the darkroom.

- Mount the lens control box on the hook located at the back of the darkroom.

Power switch for the Lens Control Box
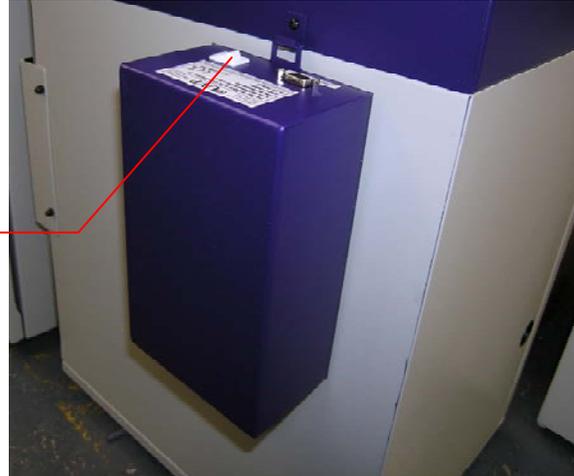
- Plug in the serial cable from the motorized lens to the lens control box.

- Connect the PC connection cable to the PC connection port on the lens control box and plug the other end into the PC.

- Connect the power supply to the lens control box and into the power outlet.

Power Connection on the Lens Control Box

PC Connection on the Lens Control Box

BioLite MultiSpectral Source Setup

- Plug the power cord into the receptacle on the back of the unit and to a power outlet.

- Insert the filter cartridge into the filter port.

  NOTE: **Filters and their cartridges are directional. Make sure that the label is facing the front. Because of the intense light of the BioLite, only tempered interference filters should be used.**

Filter cartridge
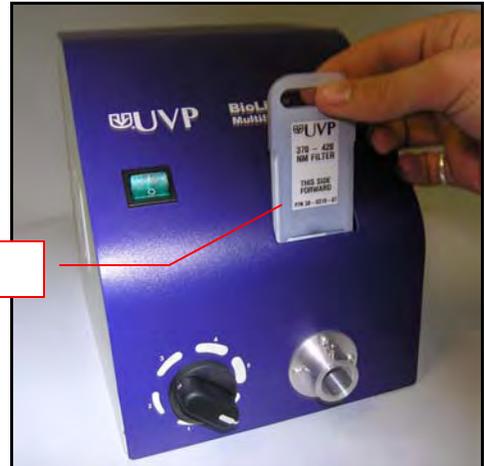
- Place the BioLite tray with the epi light guides onto the black platform at the bottom of the darkroom. (The warming plate will be placed on the top of the BioLite tray at a later point in the installation.)

- Remove the plug from the access port at the lower left side of the darkroom.

- Thread the knurled (non-smooth) side of the fiber optic cable from the inside of the darkroom through the access port until the large stopper separating the smooth and rough side of the fiber optic cable can no longer be pushed through the opening.
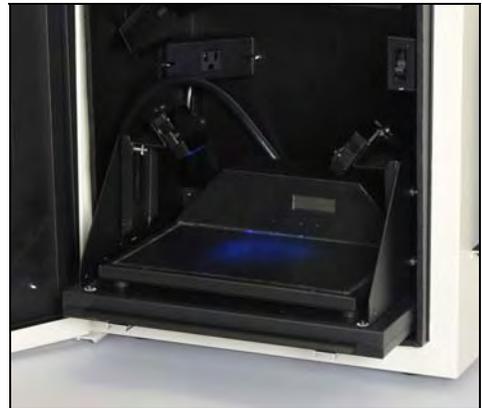
- Insert the fiber optic bundle into the silver connector.

■ Attach the cable to the silver connector with the screw.

Warming Plate Setup

■ Place the warming plate inside the darkroom on top of the BioLite tray. Plug the jumper cord into the outlet located in the upper left back panel of the darkroom. Plug the other end into the warming plate.

NOTE: When the warming plate is plugged into the outlet in the darkroom (and the darkroom is turned on) the warming plate will receive a constant supply of power.
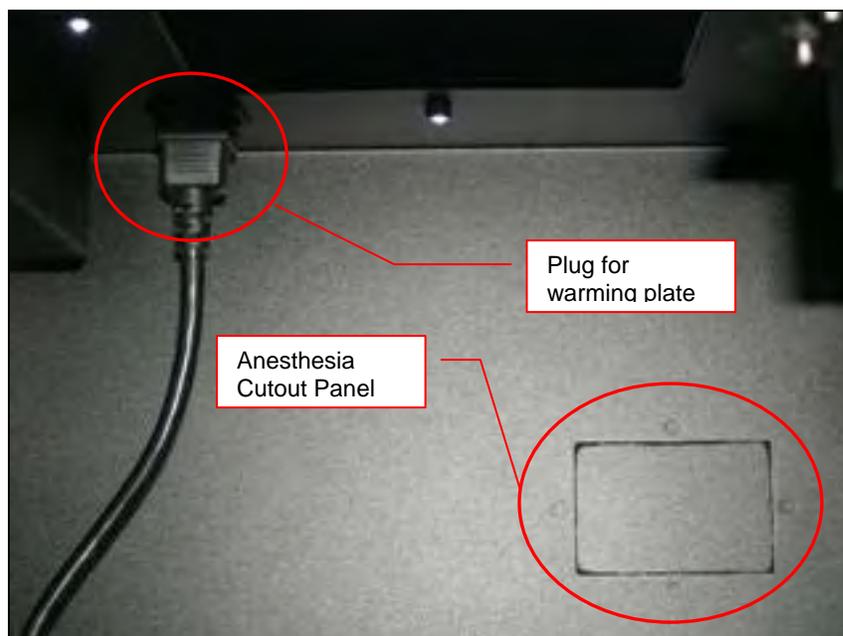
Stylus and Holder

The screen is touch sensitive. Use the stylus included with system to operate the software controls. For easy access to the stylus when operating the system, remove the tape from the back of the holder and adhere it to the iBox. Slide the stylus into the holder.

Software Installation

Registering the Software

- Double click the VisionWorks software icon on the desktop.

- To activate the software, registration is required. To immediately activate the software through the internet, choose **On the fly activation**. If the computer is not connected to the internet, please follow the instructions for Offline activation or call UVP to register the software.

- Click Next to continue.
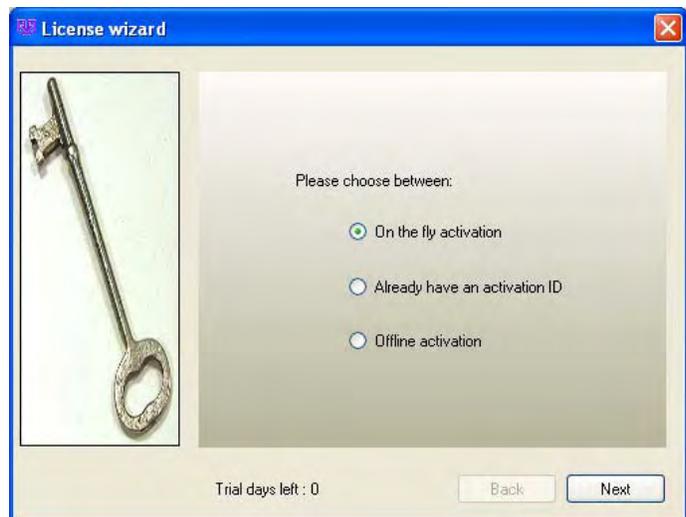
- Complete all required information on the form.

- Fill out the Serial Number located on the CD. The number should be four sets of six numbers.

- Click onto Get Activation No. and then click onto Activate when the Activation Number appears in the box.

- **Already have an activation ID** is useful when reloading the software after receiving an initial activation code.

- If the computer is not connected to the internet, click **Offline activation** to register the software. This allows the user to obtain the activation code and enter it at another time.

- Click Next to continue.

- Click the link provided and complete the form to obtain instructions. Click Finish.
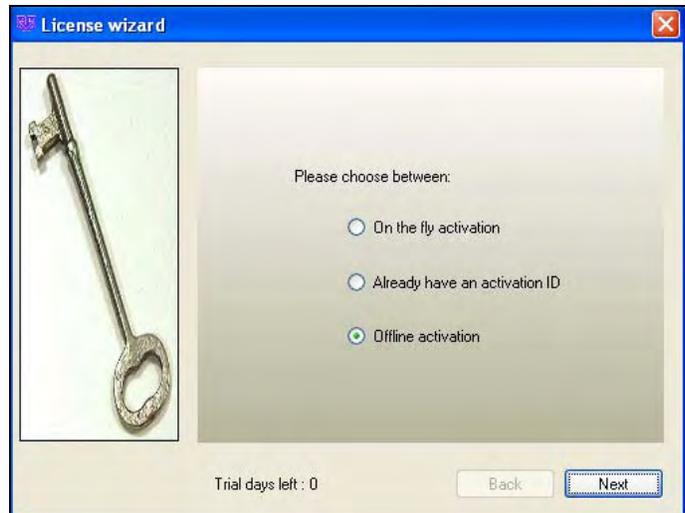
Load Camera Plugin

- Open VisionWorks software by clicking on the UVP icon on the desktop (where it loads by default).

- Load the camera plugin by selecting View > Plugins > 210/310 camera plugin and drag the new window to the right side.

Using the System

Powering Up the System

Power up the system by pushing once on the **MAIN POWER** button located on the left side of the unit. All internal components will now have power.

NOTE: The VisionWorks software will need to be activated before use. Once clicking onto the UVP icon on the touch screen, the software will load and the user will be asked register the software. Keep the serial number printed on the software case readily available to submit to UVP for an activation number.

To power down the system push the main power button.

Warming Plate Setup

NOTE: When the warming plate is plugged into the outlet in the darkroom (and the darkroom is turned on) the warming plate will receive a constant supply of power.

- Ensure that the warming plate on/off switch is turned on.

- The warming plate will show the temperature of the warming plate in the display. In several minutes, the warming plate will reach 37°C.

NOTE: The warming plate must be turned off or unplugged after use. Software does not control the function of the warming plate.

NOTE: The warming plate has an over limit switch that prevents the unit from exceeding 41°C. Should the unit reach 41°C, the plate must be returned to a temperature of 25°C before the unit reheats.

Capturing an Image

- The mouse should be under anesthesia to prevent movement.

- It is highly recommended that the mouse be hairless for imaging. The researcher may remove the hair on the target areas prior to imaging or purchase hairless mice at the beginning of the experiment.

- Position the mouse on the warming plate so that the fluorescent target is closest to the camera. (For example, brain tumor with the mouse on its feet; pancreatic cancer with mouse on its back)

- In the software select the option to **Preview**.

- While watching the LCD screen, adjust the **aperture** slider bar in VisionWorks so that the image is bright enough to see on the screen.

- Adjust the **focus** slider bar so that the image appears in clear focus on the LCD monitor. Note: Once the proper zoom range is set, the lens will have to be refocused when zoomed in completely.

- Adjust the **zoom** slider bar so that the image is as big as possible. Readjust the focus slider bar, making the image clear. Adjust the zoom so that the object of interest is within the picture on the LCD monitor.

- Ensure that the BioLite is turned on and set the **Intensity** on the BioLite to six with no filter inserted into the filter holder slot.

- Set **Exposure time** to 50msec.

- Insert the appropriate filters into the BioLite and Darkroom. Other filters may be ordered to accommodate varying applications.

- Change the **Exposure time** to 1 second.

- **Capture** the image.

- If the captured image is inadequate, slightly alter the exposure time.

- If the captured image shows a bright image looking no different from the white light image, the fluorescent signal might not be strong enough to be observed. (Fluorescent proteins can take 48 hours to express. Implanted, in-depth, fluorescent tissue can take one week to grow to a discernible size. In these two cases, one might just have to wait another day to image again.)

Adjusting the Screen Angle

- To adjust the angle of the screen, loosen the knobs on each side of the monitor. Twist each knob counter-clockwise (Note: the knobs will turn in the opposite direction from each other).

- Tilt the screen to the desired angle.

- Turn each knob clockwise to tighten.

Using the Overhead White Light

To operate the overhead white light*,* press the White Light switch to either the HI or LO setting.

Using the Gel Viewing Window

The Gel Viewer has a pressure-sensitive clasp. Press firmly to open the viewer. The glass is UV blocking while providing a clear view to the transilluminator surface for visibility of samples without opening the door.

Using the (Optional) Transilluminator

Remove the warming plate (if present) to image gels with the transilluminator. Plug in the transilluminator inside the darkroom. Once the darkroom power is turned on, power is supplied to the transilluminator. The transilluminator has a power switch. Turn on the power switch to supply power to the transilluminator.

For UV protection, there is a 10-minute timer installed in the system. The timer shuts off the transilluminator after 10 minutes of operation. A switch on the front of the darkroom allows the user to reset the timer. When the darkroom door is opened, this automatically resets the timer. When the timer runs out, press the timer again. This prevents the transilluminator from being on for too long and prevents damage to gels.

Refer to the Transilluminator Manual for additional instructions on using the transilluminator.

Service Procedures

Return Procedure

A **Returned Goods Authorization (RGA)** number must be obtained from UVP Customer Service before returning any product.

Replacement Parts and Accessories

To order accessories or replacement parts for the GelDoc-It TS System, contact UVP's offices.

Part Description	Part Number
UV Lamp, UVGL-25, 254/365nm, 4 watt (2 recommended – 115V)	95-0021-12
UV Lamp, UVGL-25, 254/365nm, 4 watt (2 recommended – 230V)	95-0021-10
Filter, Ethidium Bromide, 50mm Square	38-0220-01
Filter, SYBR Green, 50mm Square	38-0219-01
Filter, SYBR Gold, 50mm Square	38-0221-01
White Light Tray	95-0476-01
White Light Converter Plate, 21x26cm	38-0191-01
Visi-Blue Converter Plate, 21x26cm	38-0200-01
Gel-Cutter	85-0002-01
Gel-Ruler	85-0003-01
Gel-Scooper	85-0006-01
Gel-Tray, small	85-0007-01
Gel-Sentry DNA Preparation Plate	97-0076-01
Fluorescent Standard Step Tablet	33-0014-02
Spectacles, UV Blocking (UVC-303)	98-0002-01
Goggles, UV Blocking (UVC-503)	98-0002-02
Faceshield, UV Blocking (UVC-803)	98-0002-04

TroubleShooting

No Power to the Darkroom

Recheck main power cord connections to the iBox darkroom.

Check fuses, located at the back of the unit, near the power port. A flat-head screwdriver will be needed. Turn the cap and the fuse holder will "pop-out". Inspect the thin wire within the glass fuse to see if there is a break in the wire. If so, replace fuse(s). If fuses are blown repeatedly, contact UVP Technical Support Department for additional troubleshooting.

No Image on the LCD Screen

Make sure the internal LEDs have power since this includes power to the screen. To power up the system, push **once** on the button located on the left side of the unit.

Touch Screen not Accurate

If touching or clicking on the buttons becomes inaccurate, recalibrate the touch screen. Contact UVP Technical Support Department for additional troubleshooting.

Transilluminator Will Not Turn On

In addition to the "Ultraviolet Trans" (which controls the transilluminator power), switch on the front of the iBox, the transilluminator itself has a power switch; make sure that the transilluminator switch is in the On position.

There is a 10-minute timer that turns off the transilluminator automatically after 10-minutes of use. The timer switch located at the front of the darkroom can be reset (which restarts the 10-minute count).

Error Messages Pop Up on the Screen

Messages appear on the screen that might be related to the software interface, or Microsoft Windows. If the message is related to Microsoft Windows, such as a reminder to activate or update Windows, please contact a system administrator for assistance.

If an error message appears repetitively, and a system administrator does not recognize it as a Microsoft Windows error, contact UVP Technical Support for further assistance.

Technical Support

UVP offers technical support on all of its products. If you have any questions about the product's use, operation or repair, please contact our offices at the locations below. Or go to UVP's web site and click the Tech Support > BioImaging Systems.

If you are in North America, South America, East Asia or Australia:	If you are in Europe, Africa, the Middle East of Western Asia:
Call (800) 452-6788 or (909) 946-3197, and ask for **Customer Service** during regular business days, between 7:00 am and 5:00 pm, PST.	**Call +44(0) 1223-420022**, and ask for **Customer Service** during regular business days between 9:00 am and 5:30 pm.
E-mail your message to: info@uvp.com	**E-mail** your message to: uvp@uvp.co.uk
Fax Customer Service, and send it to **(909) 946-3597**	**Fax** Customer Service, and send it to: **+44(0) 1223-420561**
Write to: UVP, LLC 2066 W. 11th Street, Upland, CA 91786 USA	**Write to**: **Ultra-Violet Products Ltd** Unit 1, Trinity Hall Farm Estate, Nuffield Road, Cambridge CB4 1TG UK

Warranty

UVP's products are guaranteed to be free of defects in materials, workmanship and manufacture for one (1) year from date of purchase. Consumable and disposable parts including, but not limited to tubes and filters, are guaranteed to be free from defects in manufacture and materials for ninety (90) days from date of purchase. Transilluminators carry a two (2) year warranty from date of purchase. If equipment failure or malfunction occurs during the warranty period, UVP shall examine the inoperative equipment and have the option of repairing or replacing any part(s) which, in the judgment of UVP, were originally defective or became so under conditions of normal usage and service.

No warranty shall apply to this instrument, or part thereof, that has been subject to accident, negligence, alteration, abuse or misuse by the end-user. Moreover, UVP makes no warranties whatsoever with respect to parts not supplied by UVP or that have been installed, used and/or serviced other than in strict compliance with instructions appearing in this manual.

In no event shall UVP be responsible to the end-user for any incidental or consequential damages, whether foreseeable or not, including but not limited to property damage, inability to use equipment, lost business, lost profits, or inconvenience arising out of or connected with the use of instruments produced by UVP. Nor is UVP liable or responsible for any personal injuries occurring as a result of the use, installation and/or servicing of equipment.

This warranty does not supersede any statutory rights that may be available in certain countries.