WEALTEC

Dolphin-Doc^{Plus} Gel Image System

Installation and Operation Manual

Version 2.3

Item# 01070

__This instrument is intended for laboratory use only__

<u>Index</u>

A. Important Notice

Before setting up and operating the instruments of Dolphin-Doc^{Plus} gel image system, please carefully read these instructions to get familiarized with the installation and operation process. Instructions should be read by experienced individuals before operating the instruments.

Any improper usage of the instruments may cause damage. Please refer to the safety notice included with this equipment.

The instruments shall not be modified or altered in any way. Any modification or alteration will void the warranty, void the regulatory certifications and create potential safety hazard. Wealtec is not responsible for any injury or damage caused by using the instruments for any non-intended purpose or injury as a result of modification of the instruments by any person who is not authorized by Wealtec Corp.

A-1. Warranty

Dolphin-Doc^{Plus} gel image system is warranted to be free from defects in materials or workmanship for a period of one year from the original invoice date, under normal usage. Any defects occurring during warranty period, Wealtec Corp. will repair or replace defective products or parts without charge unless the defects arise from conditions outlined below. The defects described below are specially excluded from Wealtec warranty policy.

1. Improper operation of the instrument.
2. Repair or modification by any person who is not authorized by Wealtec Corp.
3. Damage caused by any (in)-direct accident, neglect or misuse.
4. Damage caused by disaster.
5. Damage caused by any improper solvents or samples

A-2. Technical and Service Contact

Most of the operation details are described in this instruction manual to assist and guide operator for an appropriate solution. For any other technical/ service questions, please contact your local representative or contact Wealtec international technical/ service specialist by E-mail: support@wealtec.com.

A-3. <u>Safety Notice</u>

A-3-1. Certification

The Dolphin-Doc^{Plus} gel image system is designed to meet the international electrical safety standards EN61010-1 and EMC regulations. This product meets CE requirements and if operated according to the guidance of the instruction manual, is certified safe. Any modification or alteration will void the warranty, void the regulatory certifications and create potential safety hazards.

A-3-2. Safety Information

Warning
★ UV transilluminator provides high ultraviolet radiation which can cause serious damage to unprotected eyes and skin. Before operating be sure all personnel in the area are properly protected.

Dolphin-Doc^{Plus} image system uses UV illumination for sample visualization. Transilluminators and other ultraviolet equipment or lamps are powerful sources of ultraviolet radiation which can cause serious damage to unprotected eyes and skin. Always read the product manual before operating the unit.

Before operating any unit, be sure all personnel in the area are properly protected. Personnel should protect skin and eyes by wearing ultraviolet protection eyewear, gloves and clothing when operating the UV equipment.

When using a transilluminator, it is recommended that the transilluminator be installed and operated in a darkroom where access and exposure to UV is limited. Each transilluminator is shipped with an ultraviolet blocking cover. **Even though this cover blocks the UV radiation emitted by the unit, it is strongly recommended that the UV Blocking Eyewear should be worn as well.** For details in UV transilluminator operation, please refer to Wealtec UV transilluminator instructions.

B. Introduction

Dolphin-Doc^{Plus} is a standard image capturing unit for laboratory use. The compact darkroom with integrated Epi-white light and 312 nm UV transilluminator allows using the system for various applications. Applicable samples for image capturing includes EtBr stained gel, SYBR Green stained gels, Coomassie Blue stained SDS-PAGE, Silver stain samples, X-ray film, colony petridish, blotting membrane and microtiter plate with colorimetric assay. Dolphin-Doc^{Plus} is operated with Dolphin-1D software.
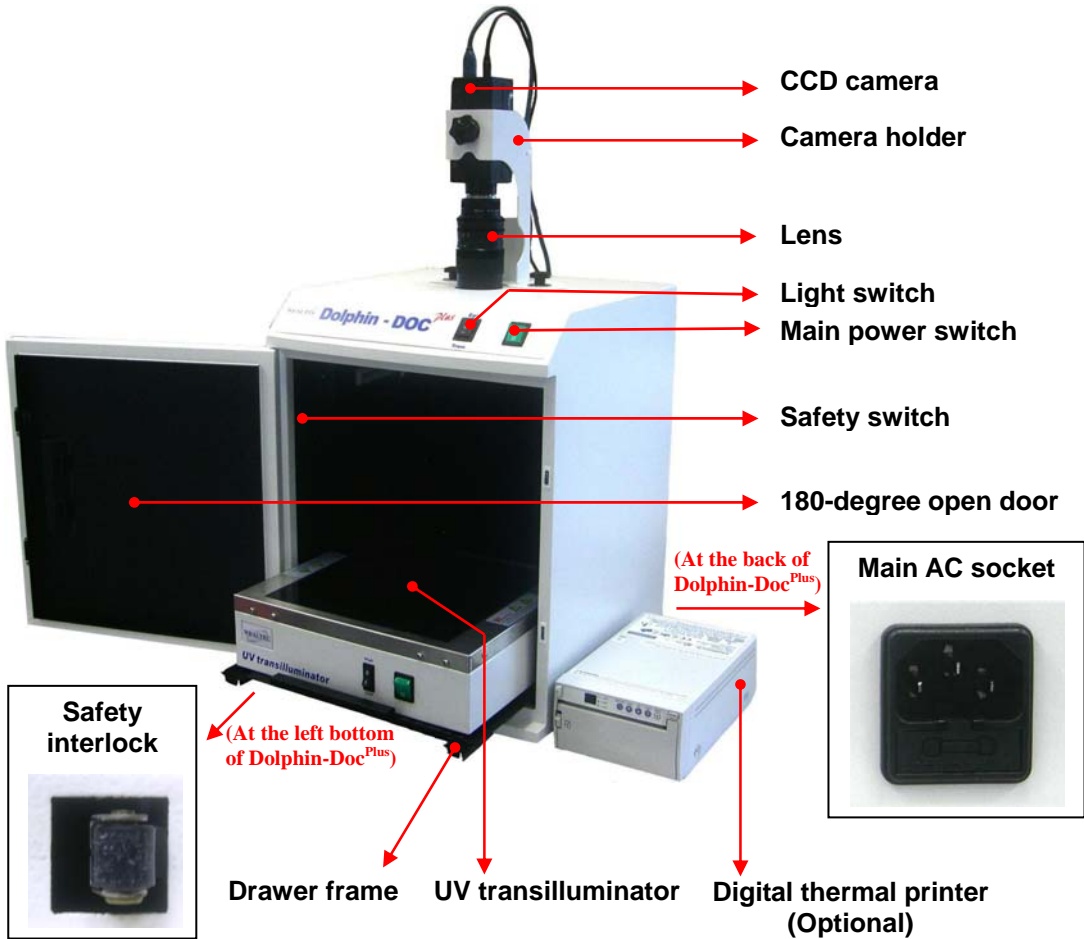
B-1. <u>Specifications</u>

<u>CCD Camera</u>	
Sensor size	7.60 mm x 6.20 mm
Sensor	1/2" Mono CCD
Pixel resolution	1360 x 1024
S/N ratio	70 dB
Data	12 bit
Dynamic range	3.6
Zoom lens	12.5 ~ 75 f1.2
Filter	High transparent amber filter and close-up lens
<u>Darkroom</u>	
Drawer frame	Built-in drawer frame
Illumination type	Epi-white light
UV transilluminator	312 nm, 6 x 8W tubes, 25 x 25 cm filter size
Power	100V/ 120V/ 230V, 50-60Hz
Dimensions (LxWxH)	38 x 38 x 82 cm
<u>Image acquisition</u>	IEEE 1394 FireWire 6 pin PCI Card
<u>PC analysis software</u>	Dolphin-1D software
<u>Optional</u>	
Thermal printer	Digital thermal printer
Converter plate	UV/White light converter plate
UV protection cover	Gel excision, visualization
<u>Operating conditions</u>	Temperature : 0 – 40 ℃ Humidity : 10% to 90% R.H. Non-condensing

* Minimum computer system requirement for software analysis: PIII$^{\#}$-500MHz, 128M RAM with **<u>English version</u>** Windows$^{\#}$ 2000/XP system or higher, USB (2.0) supported.

\# Pentium is a registered trademark of Intel Corp. Windows and Windows 2000/XP are trademarks of Microsoft, Inc.

B-2. <u>Product Description</u>

B-2-1. Dolphin-Doc^{Plus} Image System Hardware Overview

- CCD camera
- Camera holder
- Lens
- Light switch
- Main power switch
- Safety switch
- 180-degree open door

(At the back of Dolphin-Doc^{Plus})

Main AC socket

Safety interlock

(At the left bottom of Dolphin-Doc^{Plus})

Drawer frame **UV transilluminator** **Digital thermal printer (Optional)**

CCD camera

The CCD camera is a monochrome IEEE 1394 digital camera suitable for a wide array of both low-light and bright-field scientific imaging applications. The IEEE 1394 interface, also known as FireWire, allows for extremely easy interfacing to both desktop and notebook computers. The camera has 1360 x 1024 pixel resolution with dynamic range of 12 bits.

Lens with in-darkroom lens hood

12.5-75 mm manual zoom lens provides manual adjustments of focal length and iris (f1.2-16C). The close-up lens and high transparent amber filter provides quality image- capturing. An in-darkroom lens hood assembly prevents all possible light leakage.

Light source

Dolphin-Doc^{Plus} epi-white light provides uniform illumination for visualization of colorimetric samples, X-ray film and negative film. For fluorescence samples, UV transilluminator with 6 x 8Watt tubes emits 312 nm of UV light to excite the dye up to 25x25cm filter area.

Darkroom

The compact darkroom is designed for convenient gel documentation applications. Epi-white light and trans-UV light suitable for applications such as fluorescence samples, colorimetric samples, densitometric samples and colony samples. Its compact design offers space saving and portable convenience.

B-2-2. Dolphin-1D Software Features Overview

Features	Descriptions
Automatic lane, band, colony and spot detection	Automatic detection capability, allows Dolphin-1D software for gel data analysis. It is also convenient for colony counting, and spot image assay.
User-friendly quick guide operation	The step-by-step quick guide function provides the user guidance from capturing image to fast image analysis. Ability to learn a complicated software operation is not necessary.
Compatible image files format	Various images file format JPG, BMP, JPEG, DFN, TIF, TIFF, PCX, GIF, and TGA is supported as can be loaded, analyzed and saved.
Short time(Within one minute) data analysis	Various options under "Analysis" function allows user to run the software automatically for various analysis and reports.
Traceable image enhancement function	While analyzing image, Dolphin-1D software provides convenient tools such as text, line, color adjustment, rotation, flipping, invert etc. With all this convenient tools, "Record" function allows users to track previous action easily.

Ability to identify smiling gel accurately	Dolphin-1D software can identify bands, even if the gel is deformed as smiling gel.
Image profile & 3-D display	Image data can be visualized in lane profile and 3-D display
Support GLP/GMP mode	Image data can be protected by password log-in setting to avoid uncertain modification

Minimum computer system requirement for Dolphin-1D software

PIII-500 MHz, 128 RAM with English version Windows 2000/XP system or higher, USB (2.0) supported.

B-2-3. Printer (Optional)

An optional digital thermal printer or inject printer is applicable for Dolphin-Doc^{Plus}. It is controllable using PC through Dolphin-1D software.
Recommended model: P-93DW Digital Thermal Printer.

C. Installation of Dolphin-Doc^{Plus} Gel Image System and Dolphin-1D Software

C-1. Package List

Item	Quantity
Dolphin-Doc^{Plus} darkroom	1
Camera holder with 4 plastic head screw and 4 metal washer	1
CCD camera	1
IEEE 1394 FireWire 6 pin cable	1

AC adaptor	1
IEEE 1394 FireWire 6 pin PCI Card	1
Lens (High transparent amber filter & close-up lens assembled)	1
Lens hood	1

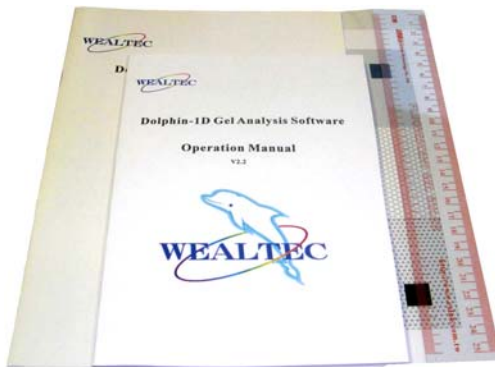|	
UV transilluminator (25 x 25 cm filter size)	1
Power cable	1
Instruction package (One Instruction and Operation Manual, one Gel Analysis Software Operation Manual, one ruler, and one calibration chart.)	1
Dolphin-1D software (Including installation CD and USB protection key [USB key-pro])	1
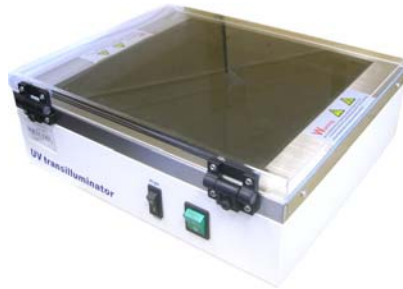
C-2. <u>Installation of Dolphin-Doc^{Plus} Image System</u>
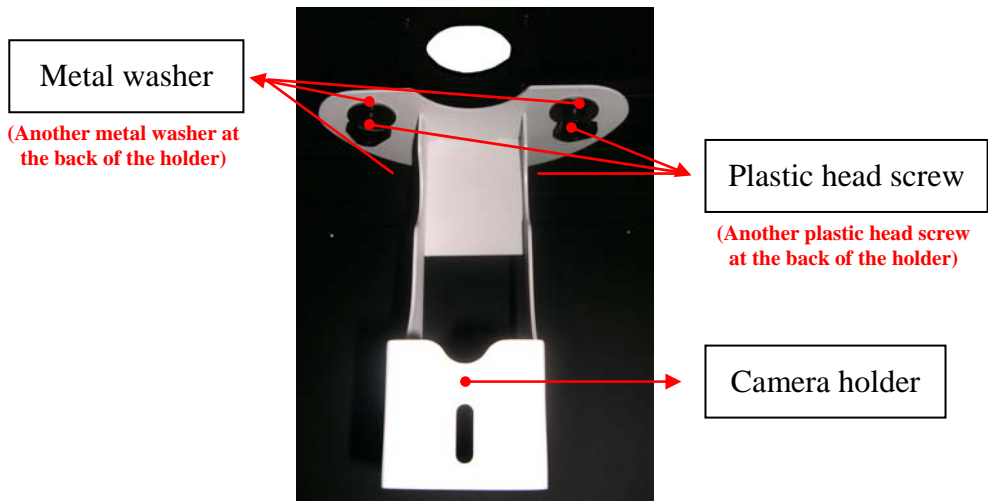
C-2-1. Space Requirement
Minimum area of 38cm (L) x 38cm (W) x 82cm (H) is required, excluding computer and printer.
Recommended dimension is 60cm (L) x 60cm (W) x 90cm (H).

C-2-3 Installation Procedure
1. **Place Darkroom unit:** Carefully pull the darkroom out of the package box and place it at the work bench. The work bench should provide the space with the minimum size of 38cm (L) x 38cm (W) x 82cm (H). The recommended dimension is 60cm (L) x 60cm (W) x 90cm (H).
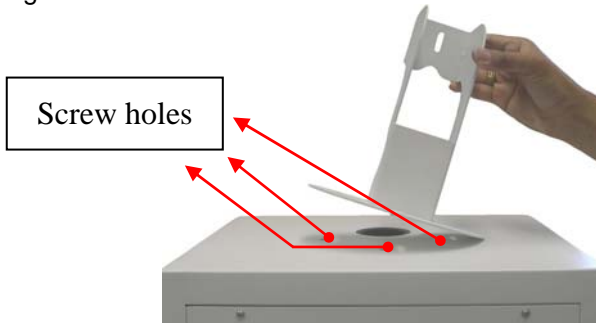
2. **Prepare Camera Holder:**
   The camera holder is shipped with the darkroom unit. Open the darkroom cabinet door. Grip the camera holder inside the darkroom and unscrew the three plastic head screw and remove the camera holder.

Metal washer

(Another metal washer at the back of the holder)

Plastic head screw

(Another plastic head screw at the back of the holder)

Camera holder

⚠️**Caution: Be careful do not damage the white light.**

3. **Mount Camera Holder:**
   Place and align the camera holder to the three screw holes on top of the darkroom unit.

Screw holes

Tighten the camera holder with metal washer and plastic head screw.

Dolphin-Doc^{Plus} V2.3

Plastic head screw

Metal washer
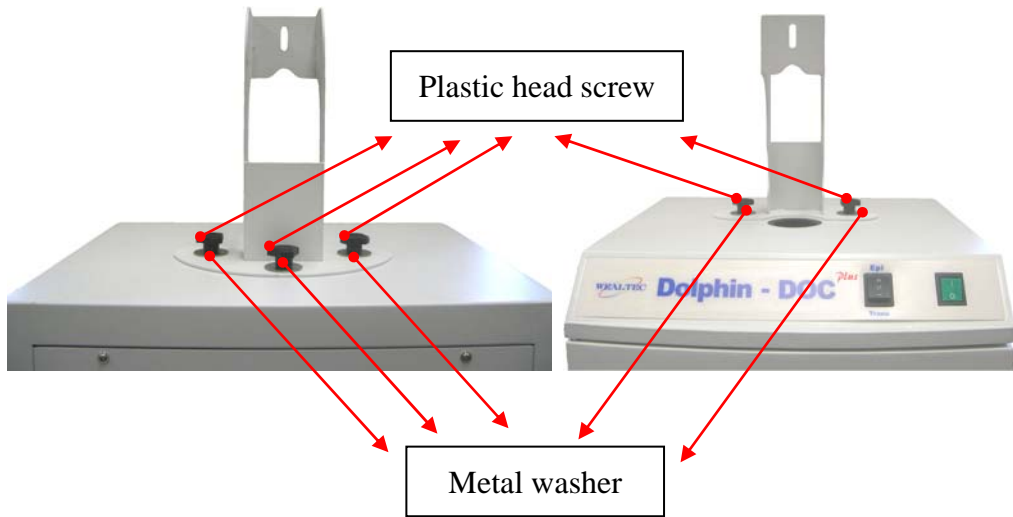
4. Set up Camera Assembly:
Prepare the camera, lens unit with IEEE 1394 FireWire 6 pin cable and power cable from AC adaptor. Remove both caps of camera and lens units. Attach lens unit to camera.

Focal   Zoom   Iris

IEEE 1394 FireWire 6 pin cable inlet

Power indicator
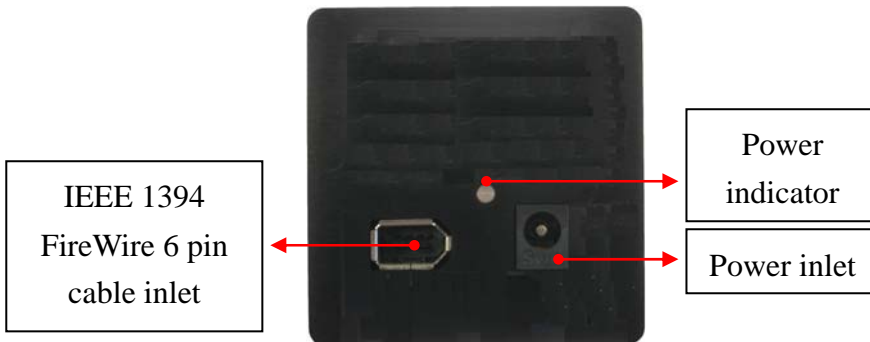
Power inlet

Connect IEEE 1394 FireWire 6 pin cable to IEEE 1394 FireWire 6 pin cable inlet on the camera.
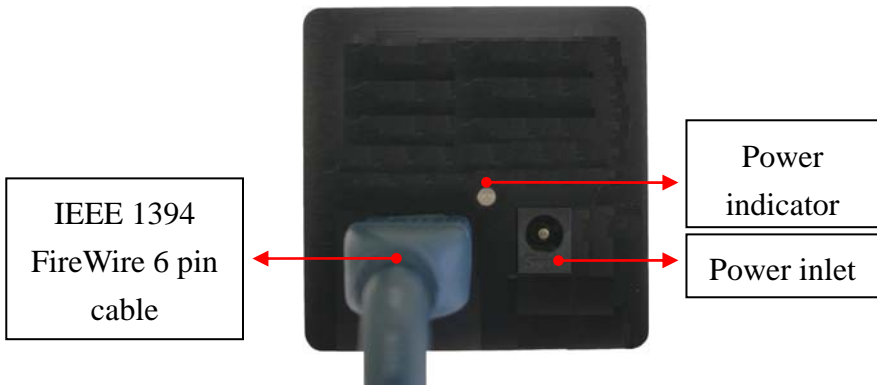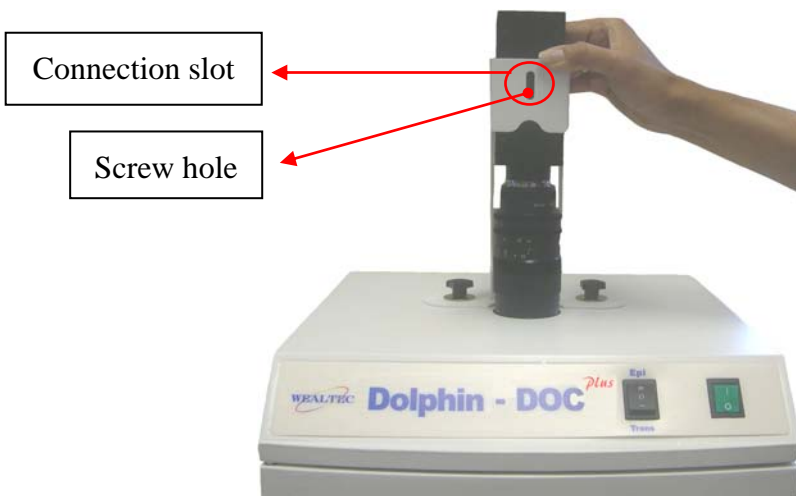
Connect power cable from AC adaptor to power inlet on the camera.
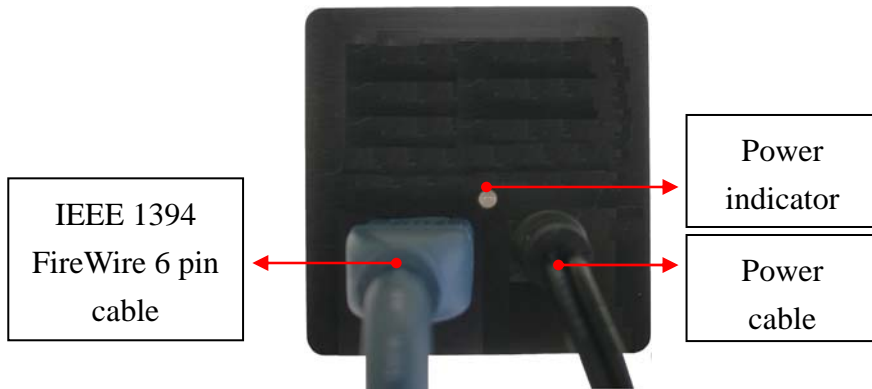

5. Connect Camera Assembly to Darkroom Unit:
Remove the front cap of the lens unit attaching to camera unit. Align the screw hole of the camera to the bottom edge of the connection slot of the camera holder.

Tighten the camera assembly and camera holder with metal washer and plastic head screw.

Plastic head screw
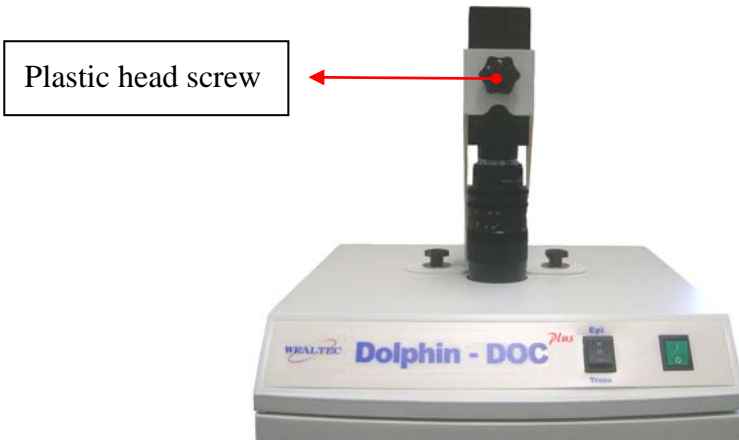
Inside darkroom unit fix the lens hood on the lens assembly which is connected to the camera and the darkroom unit.

Close-up lens
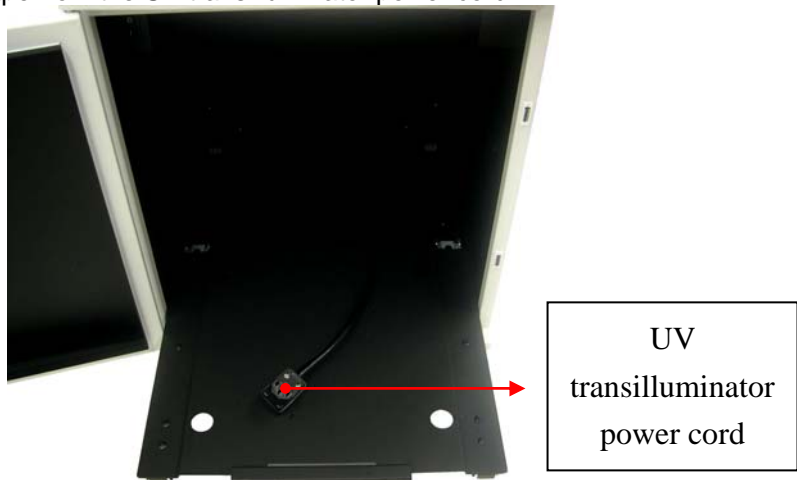
High transparent amber filter
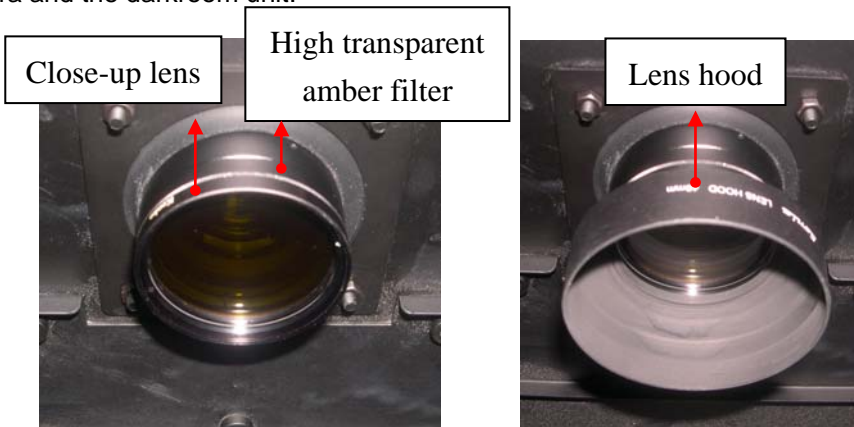
Lens hood

Before lens hood is attached   After lens hood is attached

6. Install UV Transilluminator:
Open Dolphin-Doc^{Plus} darkroom cabinet door and pull out the drawer frame from darkroom unit. Remove the tape from the UV transilluminator power cord.
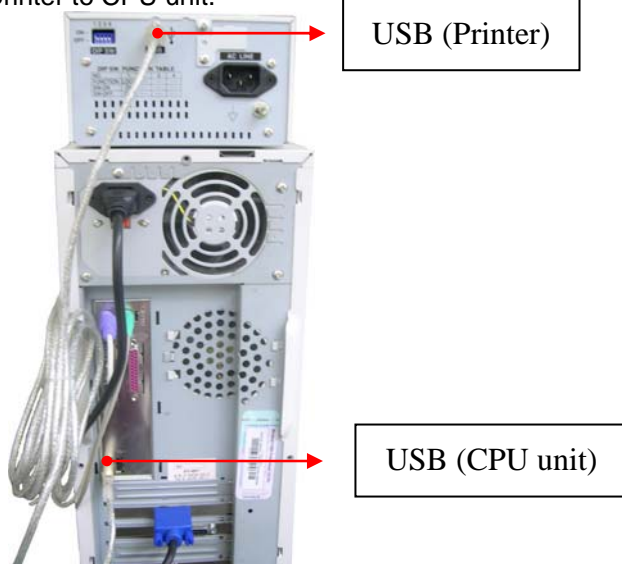

UV transilluminator power cord

Position the UV transillumintor on the drawer of the darkroom with the UV transilluminator power switch facing the installer. Inside the darkroom unit, plug the UV transilluminator power cord to the UV transilluminator AC socket at the rear side of the UV transilluminator.

UV transilluminator
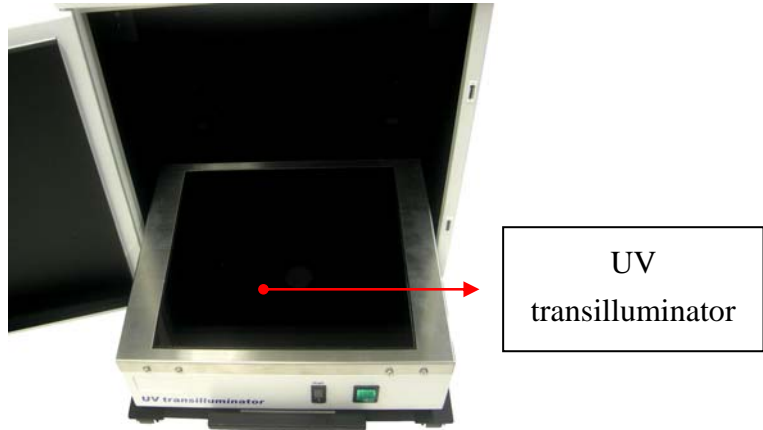
7. Install Thermal Printer (Skip this step if printer is not purchased):
Connect the USB cable from printer to CPU unit.

USB (Printer)

USB (CPU unit)

**8. Setting Default Switching Positions:**
UV Transilluminator:
Ensure the UV transilluminator light intensity switch is switched to low and switch ON the UV transilluminator power (marked "I") as shown in the following picture.

UV transilluminator light intensity switch

UV transilluminator power switch

Safety Switch

The safety switch is located at the left side of 6W PL lamp. Ensure the switch is switched OFF (marked "O") indicates safety is ON.
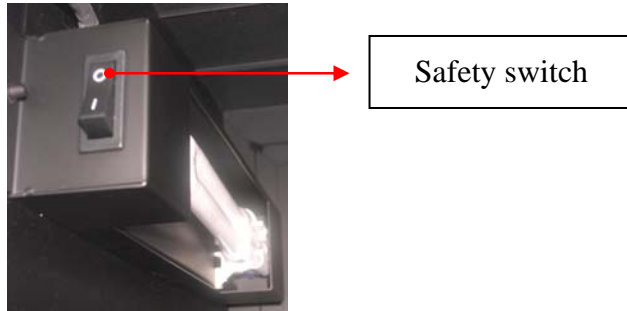
Safety switch

Note: In the case where safety is ON, the UV transilluminator will turned off automatically if darkroom cabinet door is opened.

Front Panel Switches:

Ensure the light switch is switched at neutral (marked "O") and main power switch is switched off (marked "O") as shown in the following picture.

Light switch

Main power switch

9. Connect Power Cable:

Ensure the working voltage of the image system matches the local voltage. The AC socket is located at the rear side of the darkroom unit and thermal printer (If printer is purchased). Connect power cable to the AC socket and plug it into main power source.

10. Examine Installation Functionality:

⚠ **Caution:** Before examining the Epi or UV light, be sure all personnel in the area are properly protected. Personnel should protect skin and eyes by wearing ultraviolet protection eyewear, gloves and clothing when operating the UV equipment. Even personnel close to the Dolphin-Doc^{Plus} should be properly protected. **It is strongly recommended not to operate the unit without UV-blocking cover installed.**

Turn on the front panel main power switch and ensure the light switch is switched at different positions to verify the Epi and UV lights are functional.

# C-3. <u>Integrating Dolphin-Doc^{Plus} Image system with Computer</u> <u>System</u> (NOTE: If your personal computer / notebook support IEEE 1394 FireWire 6 pin cable, you may skip this procedure and connect the IEEE 1394 FireWire 6 pin cable to you computer system)

⚠️**Caution!** Operator should shut down the computer before installing the PCI card. Possible damages to PCI card and computer may arise during installation if the power is turned on during the installation.

1. Minimum computer system requirement: Personal computer with English version windows 2000 or higher. Effective frame rate is computer dependent. For best results on windows, a Pentium IV or better computer with at least 256Mb of RAM is recommended.

2. Open the outer shell of your computer CPU hardware unit.
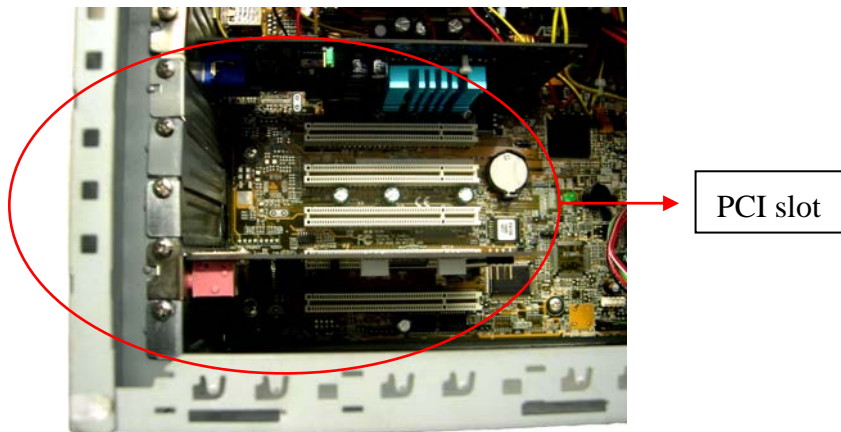
PCI slot

3. Unscrew and remove any of the PCI slot cover.

PCI slot cover
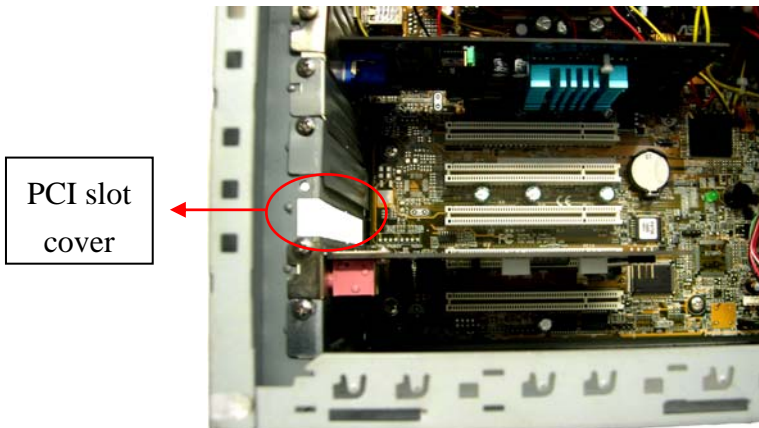
4. Insert IEEE 1394 FireWire 6 pin PCI Card to PCI slot. Tighten the screw attaching the IEEE 1394 FireWire 6 pin PCI Card to CPU unit.
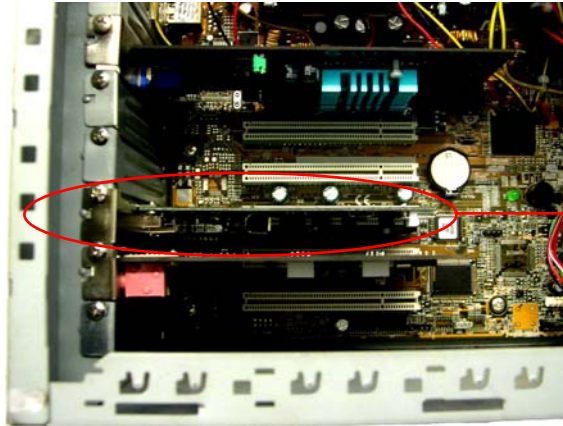
IEEE 1394 FireWire 6 pin PCI Card is inserted into the PCI slot

5. Close the outer shell and place the CPU close to the Dolphin-Doc^{Plus} image system.

6. Connect the IEEE 1394 FireWire 6 pin cable from CCD camera to any of the IEEE 1394 FireWire 6 pin cable inlet of CPU IEEE 1394 FireWire 6 pin PCI Card previously installed.
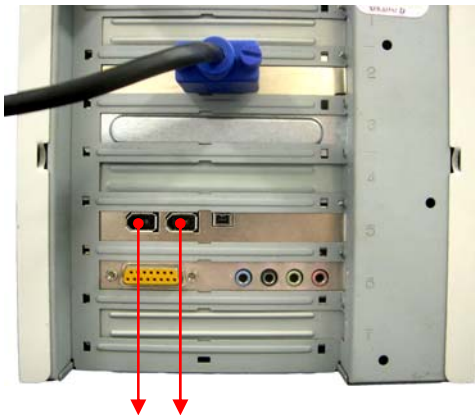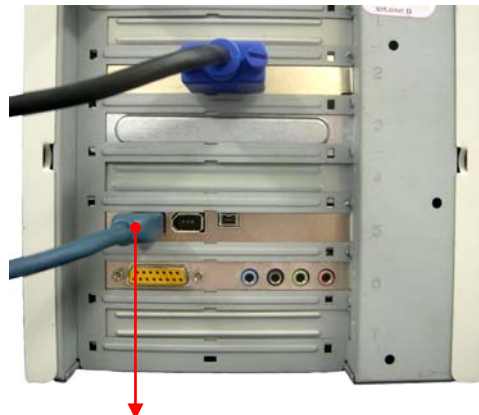
IEEE 1394 FireWire 6 pin cable inlet	IEEE 1394 FireWire 6 pin cable

C-4. <u>Re-Adjustment of CCD Camera Position</u>

1. Turn on the instrument and the computer and initiate Dolphin-1D software.
    Note: Please refer to Dolphin-1D software installation and operation manual.

2. Open Dolphin-Doc^{Plus} darkroom cabinet door. Place the fluorescence ruler on the UV transilluminator, close the darkroom cabinet door and turn the UV-light on.

3. Initiate the image capture window and observe in live mode and verify the distance and the position of the CCD camera.

4. Loosen the adjustment plastic head screw attaching CCD camera to the holder to re-adjust the position of CCD camera.

5. Upon adjusting, re-tighten the adjustment plastic head screw to fix the position.
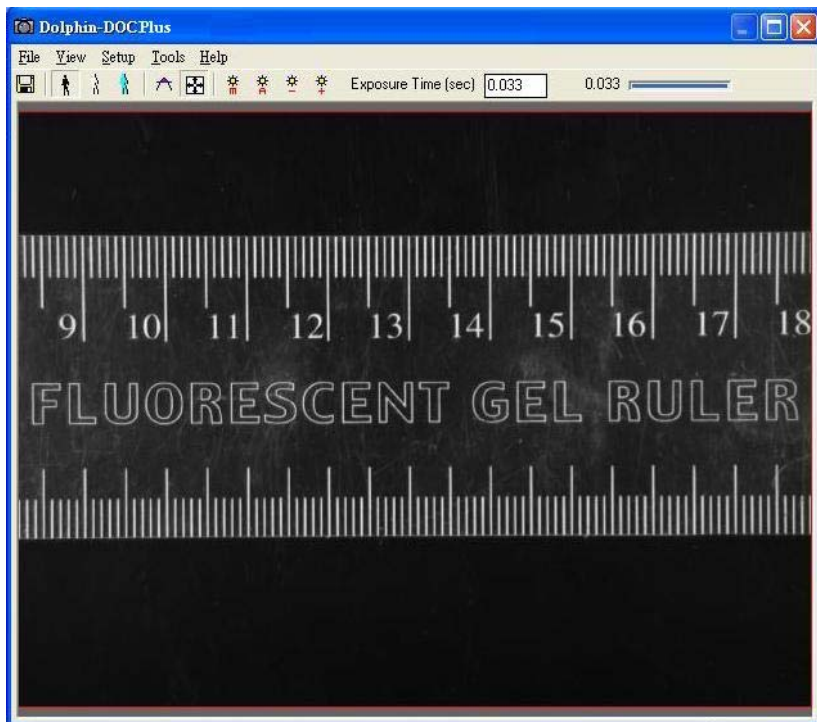
D. Operation

D-1. <u>Dolphin-1D Software</u>

Please refer to Dolphin-1D software installation and operation manual for details.

D-2. <u>Dolphin-Doc^{Plus} Image System Hardware Operation</u>

D-2-1. General Operation:

1. Turn on the computer system and start the Dolphin-1D software. Turn on Dolphin-Doc^{Plus} main power switch (Green switch located at darkroom's front top right side).

2. Open Dolphin-Doc^{Plus} darkroom cabinet door and pull out the drawer.

3. For trans-white light applications, operator shall place the optional UV/white light converter plate (Item# 1146001) on the UV transilluminator to transform UV light to visible white light.

4. Place and position the capturing target on the surface of UV transilluminator.

5. Push the drawer back into darkroom and close the darkroom cabinet door. Select the preferred light source of Epi- or Trans- light.

6. Start Dolphin-1D software with image capturing window and select live mode for image visualization. (Please refer to Dolphin-1D software operation manual for details)

7. Adjust the lens assembly to the perfect iris, zoom and focal on the targeted sample image.

8. Capture image using Dolphin-1D software and save the image data to process or for further analysis.

9. Turn off the main power switch upon capturing the image. Open the darkroom cabinet door and remove the captured target from Dolphin-Doc^{Plus} gel image system.

10. Touched sample surface shall be cleaned with pre-moistened soft tissue after every use to

avoid any possible contaminations and damages to the instrument.

11. Use Dolphin-1D software to analyze the experiment data.

D-2-2. Gel Excision

⚠ **Caution:** Before opening the darkroom cabinet door under UV light excitation mode, be sure all personnel in the area are properly protected. Personnel should protect skin and eyes by wearing ultraviolet protection eyewear, gloves and clothing when operating the UV equipment. Even personnel close to the Dolphin-Doc^{Plus} should be properly protected. **It is strongly recommended not to operate the unit without UV-blocking cover installed.**

1. Turn on the Dolphin-Doc^{Plus} main power switch (Green switch located at darkroom's front top right side) and the system will be initiated.

2. Open Dolphin-Doc^{Plus} darkroom cabinet door and pull out the drawer.

3. Place and position the capturing target on the surface of UV transilluminator.

4. Switch the UV transilluminator light intensity switch to low intensity.

5. Turn the safety switch to "SAFETY OFF" mode (Front top right epi-white light marked "I") to deactivate the darkroom cabinet door-open control safety interlock so as trans-UV light will continue to ON when darkroom cabinet door is opened during gel excision.

6. Select the light source by switching the light switch from "EPI" to "Trans" UV light.

7. Gel Excision. (**Note**: Do not scratch the UV transilluminator filter during gel excision).

8. Push the drawer back into darkroom and close the darkroom cabinet door.

9. Turn the safety switch back to "SAFETY ON" mode (marked "O") and turn off the main power switch upon completing gel excision.

10. Touched sample surface shall be cleaned with pre-moistened soft tissue after every use to avoid any possible contaminations and damages to the instrument.

E. Care and Maintenance

⊃ Darkroom of Dolphin-Doc^{Plus} can be cleaned with pre-moistened soft tissue soaked with clean water. Organic solvents or strong detergents may damage the instrument and should not be used.

⊃ CCD camera should be protected from all possible moisture, organic solvents and detergents. Use special cleaning solutions and tissues to clean camera lens.

⊃ Sample touched surface of Dolphin-Doc^{Plus} should be cleaned with pre-moistened soft tissues after every usage to avoid all possible contaminations and damages to the instruments.

F. Order Information

Dolphin-Doc^{Plus} Image system

Item #	Description
1141004	Dolphin-Doc^{Plus} Gel Image System, 120V, 50-60Hz, includes CCD camera, lens, IEEE 1394 FireWire 6 pin PCI Card, darkroom, MD-25 UV transilluminator (25x25cm), Dolphin-1D software
1141005	Dolphin-Doc^{Plus} Gel Image System, 230V, 50-60Hz, includes CCD camera, lens, IEEE 1394 FireWire 6 pin PCI Card, darkroom, MD-25 UV transilluminator (25x25cm), Dolphin-1D software
1141006	Dolphin-Doc^{Plus} Gel Image System, 100V, 50-60Hz, includes CCD camera, lens, IEEE 1394 FireWire 6 pin PCI Card, darkroom, MD-25 UV transilluminator (25x25cm), Dolphin-1D software

Optional Accessories

Item #	Description
1142001	MD-20 UV transilluminator, 120V/ 50-60 Hz, 312 nm, 20 x 20cm filter size
1142002	MD-20 UV transilluminator, 230V/ 50-60 Hz, 312 nm, 20 x 20cm filter size
1142003	MD-25 UV transilluminator, 120V/ 50-60 Hz, 312 nm, 25 x 25cm filter size
1142004	MD-25 UV transilluminator, 230V/ 50-60 Hz, 312 nm, 25 x 25cm filter size
1142005	MD-20 UV transilluminator, 100V/ 50-60 Hz, 312 nm, 20 x 20cm filter size
1142006	MD-25 UV transilluminator, 100V/ 50-60 Hz, 312 nm, 25 x 25cm filter size
1142007	HD-20 UV transilluminator, 120V/ 50-60 Hz, 365 nm, 20 x 20cm filter size
1142008	HD-20 UV transilluminator, 230V/ 50-60 Hz, 365 nm, 20 x 20cm filter size
1142009	HD-25 UV transilluminator, 120V/ 50-60 Hz, 365 nm, 25 x 25cm filter size
1142010	HD-25 UV transilluminator, 230V/ 50-60 Hz, 365 nm, 25 x 25cm filter size
1142011	HD-20 UV transilluminator, 100V/ 50-60 Hz, 365 nm, 20 x 20cm filter size
1142012	HD-25 UV transilluminator, 100V/ 50-60 Hz, 365 nm, 25 x 25cm filter size
1146001	UV/ White light converter plate
1146002	Protection cover for gel excision
1146003	Digital thermal printer for Dolphin-Doc / -Doc^{Plus} / -Chemi Image System
1147006	Mitsubishi K-65HM blue dye image print pack, 215 print/ roll, 4 rolls/ box
1147007	Sony UPP-110HG high glossy thermal paper, 240 print/ roll, 5 rolls/ box