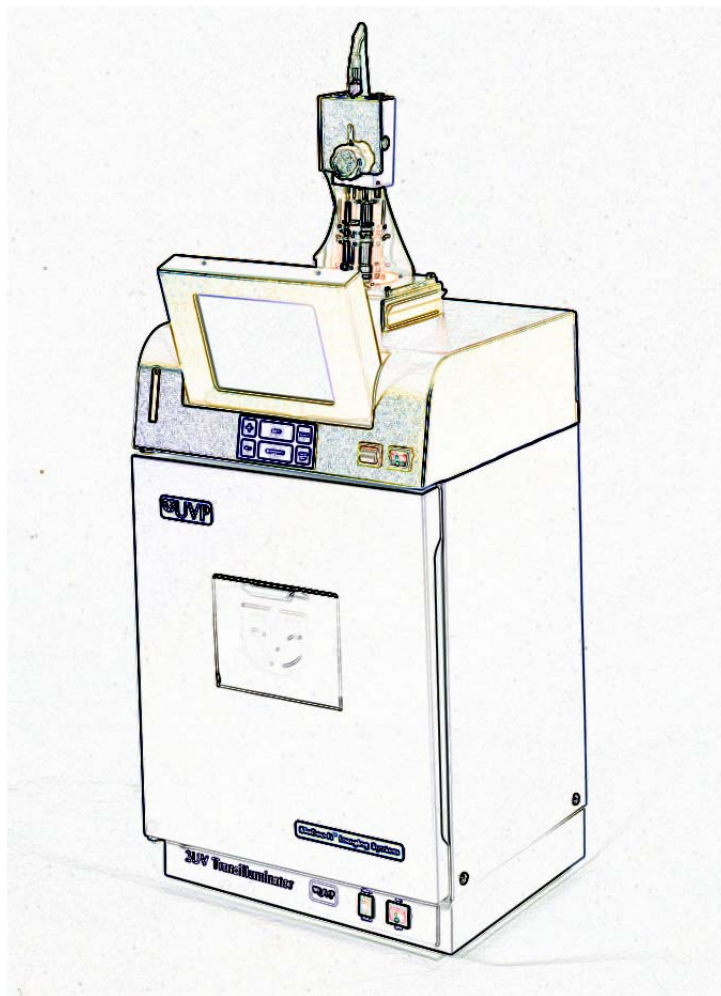# *BioDoc-It™ and VisiDoc-It™ Gel Documentation Systems*

Operating Instructions

IMPORTANT: Please read these instructions before operating your
UVP BioImaging System to familiarize yourself with set-up and operation procedures.
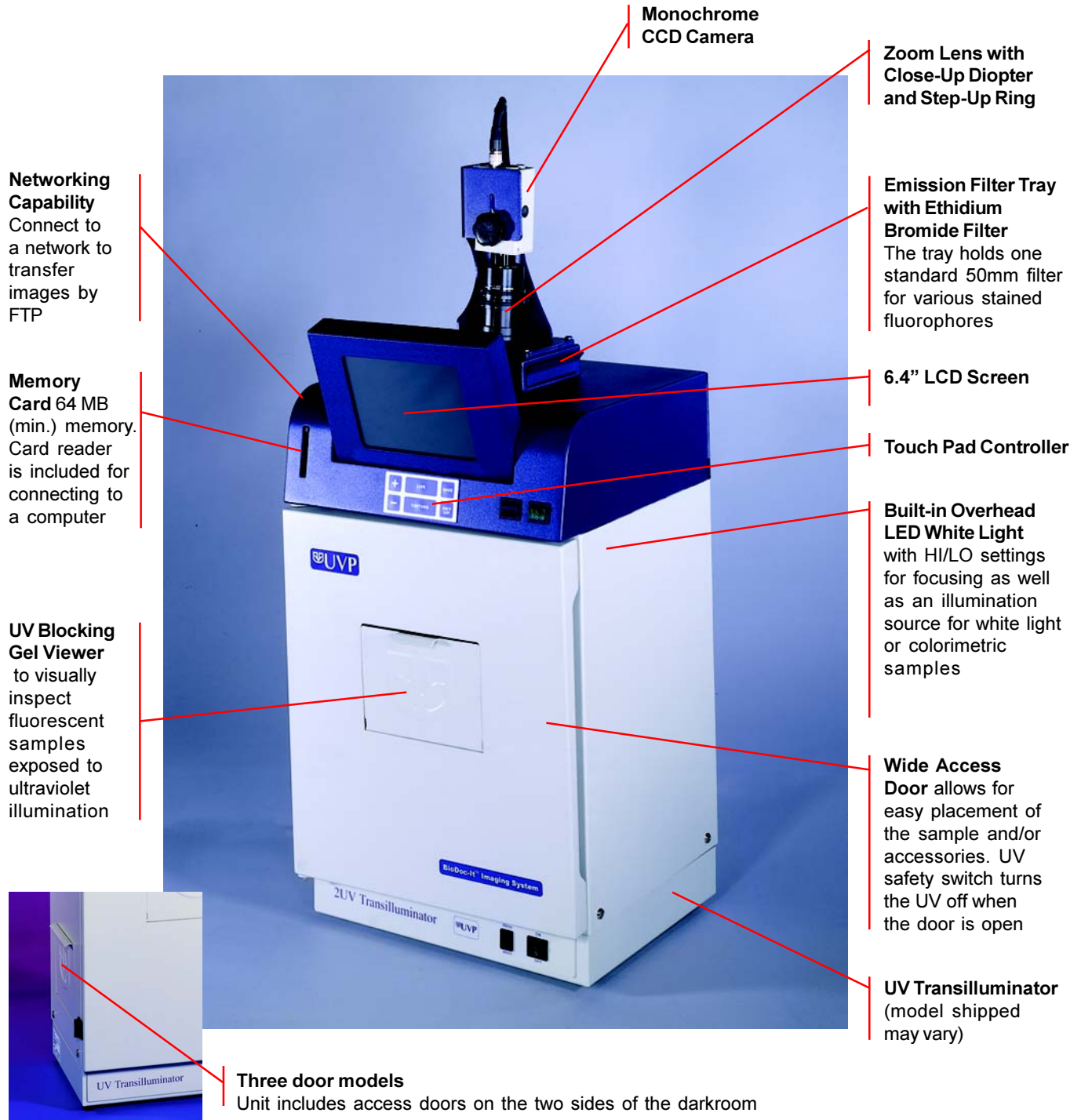
UVP

Table of Contents

System Introduction

BioDoc-It Imaging System

The BioDoc-It Imaging System enables simple documentation of fluorescent and non-fluorescent gels, membranes, blots, film plates and assays with the ability to save images to disk for later quantitative analysis or enhancement for publication.

Images are saved in 8-bit or 12-bit TIFF or JPEG formats allowing the images to be read by most PC or MAC programs. The BioDoc-It System is a cost effective solution for archiving quality images in a compact stand-alone package. No computer is required.

BioDoc-It System features:

Monochrome CCD Camera

Zoom Lens with Close-Up Diopter and Step-Up Ring

Networking Capability
Connect to a network to transfer images by FTP

Emission Filter Tray with Ethidium Bromide Filter
The tray holds one standard 50mm filter for various stained fluorophores

6.4" LCD Screen

Memory Card 64 MB (min.) memory. Card reader is included for connecting to a computer

Touch Pad Controller

Built-in Overhead LED White Light
with HI/LO settings for focusing as well as an illumination source for white light or colorimetric samples

UV Blocking Gel Viewer
to visually inspect fluorescent samples exposed to ultraviolet illumination

Wide Access Door allows for easy placement of the sample and/or accessories. UV safety switch turns the UV off when the door is open

UV Transilluminator
(model shipped may vary)

Three door models
Unit includes access doors on the two sides of the darkroom

VisiDoc-It System

The VisiDoc-It System is designed for researchers who already have a transilluminator in the lab. Configurations include a compact hood or camera stand. The compact hood fits on top of UVP's High Performance and Benchtop Transilluminators. The VisiDoc-It System is similar to the BioDoc-It in its functions for simple documentation of fluorescent and non-fluorescent gels, membranes, blots, film plates and assays with the ability to save images to the memory card for later quantitative analysis or enhancement for publication.

VisiDoc-It with hood and optional transilluminator

System Specifications and Components

Specifications

The built-in processor features the specifications:

Memory card capacity:	64MB (min.)
Internal memory:	30MB
Ethernet adapter:	10 Base-T

The systems are comprised of the following components:

Camera

This is a CCD video camera with a resolution of 732 x 574 (PAL/CCIR). All camera settings are factory pre-set for optimum performance when viewing gels, films, or membranes under low light level conditions. UVP Technical Support should be contacted before making any adjustments to the camera settings.


CCD Camera

Lens Kit

The **8-48mm zoom lens** is fitted with a **close-up diopter** and **step-up ring**. The camera can then be held in a fixed position. The diopter is for focusing on objects at the focus length of the BioDoc-It system.

Zoom Lens Kit

50mm UV Blocking Ethidium Bromide Filter

The UV blocking band pass interference filter is blocks UV and IR radiation emitted from the transilluminator. The filter is placed into the emission filter tray located on top of the darkroom, under the camera assembly. The filter allows visualization of fluorophores from 580-630nm, targeting the Ethidium Bromide emission to a maximum of 605nm. These filters 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.
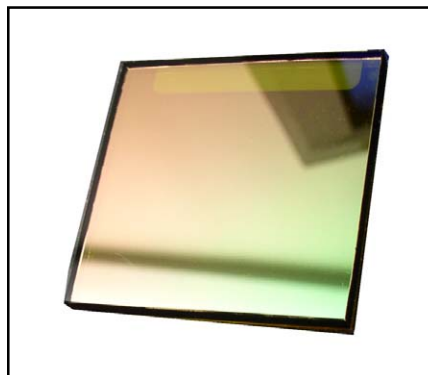
Ethidium Bromide Filter

Transilluminator

The BioDoc-It includes a transilluminator (check your packaging slip for the model type). If white light transillumination is needed, an optional UV to White Light Converter Screen should be used.

For the VisiDoc-It System, a transilluminator is ordered separately.

Transilluminator

Darkroom Cabinet of the BioDoc-It

The BioDoc-It's small format darkroom comes with LED white light, with Hi/Lo settings, built into the unit for overhead illumination. The transilluminator is activated when the darkroom door is closed provided the transilluminator and darkroom have been cross-connected by the jumper power cord. The camera with zoom lens is mounted on top of the darkroom.

Model may include access doors on each side of the darkroom as shown in the picture on the right.

Three door model

Hood Enclosure or Camera Stand for the VisiDoc-It System

The compact hood enclosure is manufactured of lightweight plastic for portability. Handles are positioned on two sides of the hood to make it easy to move the hood for access to the transilluminator surface. The camera with zoom lens is mounted on top of the hood or camera stand.

LCD Monitor

The monitor is a 6.4 inch monochrome LCD display connected to the darkroom cabinet allowing live or integrated viewing of images from the CCD camera. This assures that the images are acceptable before saving or printing.

Memory Card and Reader

The Memory Card has 64 MB memory (minimum). A card reader, included with the system, connects to your computer allowing transfer of images to your computer from the Memory Card. The CompactFlash Memory Card is the most widely available type of flash memory.

VisiDoc-It Hood Enclosure

TIFF Reader Software

The TIFF Reader Software is proprietary software that opens images captured with the BioDoc-It and VisiDoc-It systems. Other software programs may be able to open 8-bit TIFF and JPEG files, however, UVP recommends using this software to open 12-bit TIFF files.

LCD Monitor

Optional Equipment

UVP offers optional equipment for use with the BioDoc-It and VisiDoc-It Imaging Systems. Refer to the ordering information for part numbers.

Thermal Printer

> The thermal printer provides archive quality, 256 grayscale prints.

Thermal Printer

Converter Plates

> The **UV/White Light Converter Plate** allows imaging of non-fluorescent stained media with an ultraviolet transilluminator. 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 for designed for use with blue excitation samples and SYBR green, SYPRO orange and GFP stains.

Converter Plate

Transilluminators

> A transilluminator is included with each BioDoc-It System.
>
> For VisiDoc-It systems, transilluminators are optional equipment. A large selection of transilluminators are available from UVP. These units include High Performance 25 watt models to compact 8-watt Benchtop Transilluminators. Go to UVP's web site www.uvp.com or call for information.

Transilluminator

Doc-It® LS Analysis Software

> An optional Doc-It LS analysis software package is available for loading onto your own computer. This easy-to-use software for analysis of gels, plates, and membranes features enhancement, complete analysis tools and reporting capabilities.
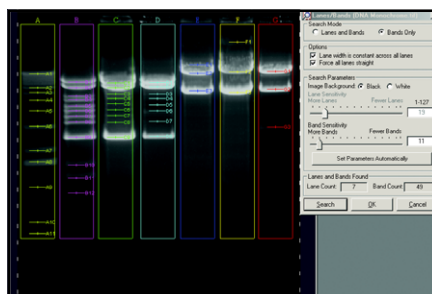
Doc-It LS Analysis Software

Set-Up Instructions

Components

- Camera with lens kit and cables
- Monitor/processor
- Darkroom for the BioDoc-It; Hood or Stand for the VisiDoc-It System
- Transilluminator (optional for VisiDoc-It System)
- Memory Card and Card Reader

**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.

System Set-Up

To set up the BioDoc-It system, remove the darkroom assembly from the box. The transilluminator is connected to the darkroom at the UVP factory.

1. Remove the four screws from the bracket base.

2. Place the rubber light sealing **gasket** on top of the darkroom lens opening, aligning the holes.

   Position the **bracket base** over the gasket, aligning the holes. Install in the four screws to secure the base to the top of the darkroom.

3. Attach the **bracket** to the bracket base with the four thumb screws.

4. Attach the **step-up ring** to the lens, then attach the **diopter** to the step-up ring.

5. Before attaching the **zoom lens** to the camera, remove the protective plug fitted to the lens. Attach the zoom lens to the **CCD camera**. Screw the lens onto the CCD camera clockwise until snug.

Bracket   *Thumb Screws*

Bracket Base
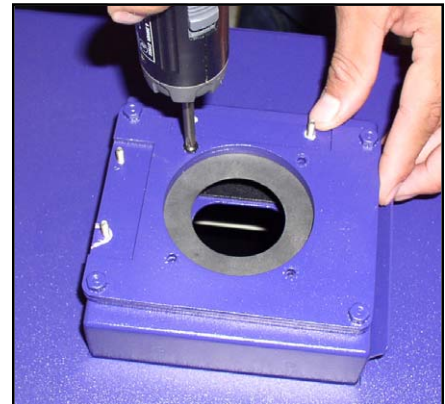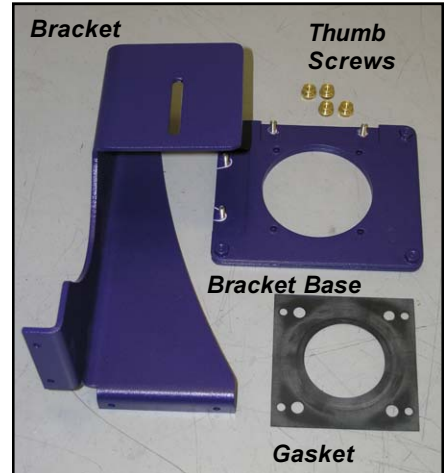
Gasket

Gasket and bracket base
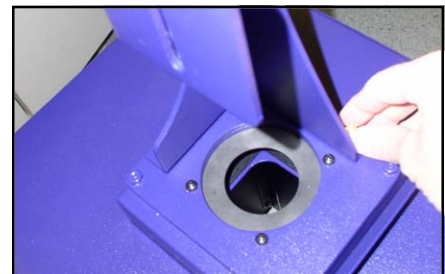
Bracket

Screw the step-up ring and diopter onto the lens

6. Attach the **camera cable** to the camera.

7. Slide the camera/lens into the camera bracket on top of the darkroom cabinet. Turn the mounting knob clockwise into the threaded mounting hole on the front of the camera. Slightly loosen the CCD camera's mounting knob and slide the camera and lens through the rubber gasket approximately ¼" then pull it back up about 1/8", which leaves about 1/8" of the lens front in the darkroom cabinet.

   Retighten the camera's mounting knob. This provides the proper light seal to perform integrated exposures for faint fluorescent bands.

8. Open the filter tray and insert **Ethidium Bromide Filter** into the slot. Hold the filter along the edges to avoid marking the filter with fingerprints.

   When assembling the VisiDoc-It, the Ethidium Bromide Filter screws onto the lens assembly.

9. Locate the 9-Pin end of the CCD camera's cable. Insert the cable into the 9-pin connection located on the top-back of the processor.

   Secure the tightening screws on the cable.

10. To enable the networking capabilities of the BioDoc-It, it is necessary to connect it to an existing network at your facility using a network cable. Connect the cable in the network port of the BioDoc-It or VisiDoc-It and the other end into a wall outlet or a hub/switch/router/gateway. UVP recommends contacting your network administrator for this process.

    NOTE: Step 10 is not required if you only want to capture images and save to the memory card.

11. The power ports are located on the back-top of the darkroom.
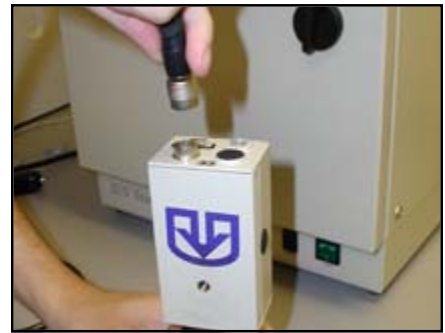
    One port receives power from the wall (surge protector) and the other port takes power to the transilluminator via a jumper power cable.

    Connect the jumper cable to the transilluminator, then the darkroom cabinet's main power port.

    Connect the main power into the darkroom cabinet, being sure to connect to the wall (surge protector) last.
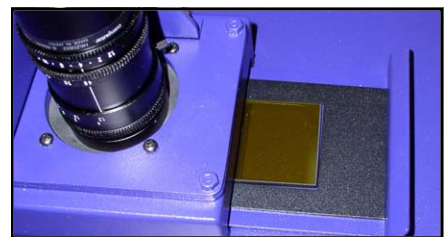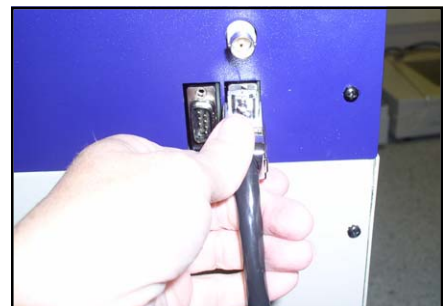

Screw the lens onto the Camera

Connect the Camera Cable

Connect the Camera to the Bracket

Ethidium Bromide Filter

Connect the Camera Cable to the Darkroom

Connecting the System to a Network

BioDoc-It is the first imaging device of its kind to have built-in networkability. While it is simple to connect the device to the network, we highly recommend assistance from your network administrator.

Configuring the Network Program

To enable the networking capabilities of the BioDoc-It, it is necessary to connect it to an existing network at your facility using a network cable. Connect the cable in the network port of the BioDoc-It or VisiDoc-It and the other end into a wall outlet or a hub/switch/router/gateway. UVP recommends contacting your network administrator for this process.

NOTE: This step is not required if you only want to capture images and save to the memory card.

After the BioDoc-It is set-up and turned on, an IP address and Subnet-mask must be assigned and set-up on the BioDoc-It processor.

1. Ask your network administrator (or the IT department) to give you:

    A "Static IP address" e.g. 101.3.32.254

    A subnet-mask. It will be similar in format to the IP address e.g. 255.255.255.0

2. Press the **Set Up** button on the touch-pad buttons. A few line entries will display on the screen, with one entry on each line.

3. Using the **'-'** and **'+'** buttons on the touch-pad, navigate to the entry that says "Network Config". Once selected, the entry will be marked by two arrows on the sides.

4. Press **Set Up** again. A screen shows up, titled 'Network Setup', with the first line 'IP_ADD' selected.

5. Press **Set Up**. This will highlight the first of the four parts of the IP address. Use the **'+'** and **'-'** buttons to increment and decrease (respectively) the number. Pressing the buttons quickly, skips numbers faster.

6. Press **Set Up** when done, which will jump to next part of the IP address. Continue setting each part of the IP address this way.

7. Navigate to the next entry 'IP_SUB' and enter the subnet mask, just the same way as described above.

8. Navigate to **Quit** to quit the set up menu.

Left cable: Main Power cable;
Right: Transilluminator jumper cable

Touch-Pad Buttons

How to Know the Physical Address
of the System

Your network administrator may need this address to correctly network the system. It is also called the MAC address OR Ethernet address OR address of the network adapter. To retrieve it:

1. Press **Set Up** on the keypad. A configuration screen titled Main Setup displays.
2. Using **'+' and '-' keys**, navigate to the line that says **INFORMATION**.
3. Press **Set Up** to view the settings. These settings cannot be changed from this screen:
    a. Bio Doc-It VNNN – shows the current version of BioDocIt
    b. IP: - shows the currently assigned IP address
    c. SUB: - shows the currently assigned subnet mask
    d. MAC: - shows the Physical address

NOTE: The MAC address does not appear until the network is connected to the imaging system.

Other settings

Selecting a File-Type

In version 4.00 of BioDoc-It, three file-types are available:
>**12-bit TIFF**
>**8-bit TIFF**
>**JPEG**

Please follow these steps to select the one you want:

1. Press **Set Up** on the keypad. A configuration screen titled 'Main Setup' shows up.
2. Using the **'+'** and **'-'** keys, navigate to the entry that says **IMAGE**. It will show the current file-type.
3. Press **Set Up** to display available file-types.
4. Navigate to the desired file-type using **'+'** and **'-'**keys.
5. Pres **Set Up** to select and exit the menu.

Setting or Changing the Date and Time

Setting the BioDocIt clock is important to ensure that the images captured come out with the correct time-stamp. Please follow these steps to set the clock:

1. Press **Set Up** on the keypad. A configuration screen titled 'Main Setup' shows up.
2. Using **'+'** and **'-'** keys, navigate to the line that says **CLOCK SET**. Press **Set Up** to view the current settings for Date (Year, Month, Day) and Time (Hour, Minute).
3. Using **'+'** and **'-'** keys, navigate to the entry that needs to be changed. Press 'Set Up' to highlight the current value.
4. Use **'+'** and **'-'** keys to change the current value to desired value. Pressing the **'+'** and **'-'**keys faster skips numbers faster. Press **Set Up** to set the value in.
5. When done, navigate to 'QUIT' and press **Set Up** to exit the menu.

System Operation

Image Focusing and Set-up

1. Turn on the main power switch on the processor. Once the power is switched on, power is applied to all internal components. The jumper power cable powers the transilluminator.

2. Turn on the transilluminator and insert the supplied *Fluorescent Focus Target* on the transilluminator surface. **NOTE FOR THE BIODOC-IT: The darkroom has a UV safety switch that turns the transilluminator off when the door is open.**

    After closing the BioDoc-It door, be sure the overhead white light switch is turned off. To verify the overhead white light is turned off, check to see that the white light power switch is not illuminated green. If so, move the switch to the off position so that the switch and light do not illuminate.

Fluorescent Focus Target

3. While watching the LCD monitor, rotate the lens f-stop adjustment *(top ring)* so that the image is bright enough to see on the screen.

4. Rotate the lens focus adjustment *(bottom ring)* on the lens. Adjust this 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. Then the lens will remain in focus, even as the zoom is readjusted.

5. Rotate the zoom lens adjustment *(middle ring)* on the lens, so that the image is as big as possible. Readjust the focus ring (bottom ring) on the lens, making the image clear. Once the focus is set when zoomed all the way in, the lens will remain in focus throughout the zoom range. Adjust the zoom so that the object of interest is within the picture on the LCD monitor.

Zoom lens control

Integration Control

1. The touch-pad buttons on the darkroom are to control the exposure times and save images to the memory card.

2. When imaging dim samples, integration of the CCD camera may be necessary to capture the more faint bands or objects. If the image on screen is too dark, start by adjusting the f-stop adjustment (top lens ring) on the lens to increase the brightness of the image.

    Note: The lower the f-stop number, the brighter the image will be.

3. To further increase the brightness of the image on screen, press the **"+"** button on the touch-pad controller. Each time the **"+"** button is pressed, the camera is set to the next increasing exposure time. There are 17 different exposure time steps from 0.033 to 10 seconds.

4. To decrease the exposure time and to avoid over-saturation of the image, press the **"-"** button on the touch-pad.

    If the image is still too bright after reaching **"Live"** mode (no integration), adjust the f-stop (top lens ring) on the lens to decrease the brightness of the image.

5. Once the image on the screen is satisfactory, press the **Capture** button on the touch-pad. The word **(Frz)** displays on the bottom of the screen. This will hold the image on screen to be viewed, saved, or printed.

Zoom Lens Control

6. To save images to the CF card, insert the card into the card slot. Press the **Save** button to save the image in the chosen format.

    Once the file is saved to the diskette, a unique number/file name will display on the screen. When the next image is saved, it will automatically be saved in the last used file format.

7. Press the **Live** button on the touch-pad buttons to return the camera to live mode. If necessary repeat steps 3 and 4 to adjust for the brightness of each sample to be imaged.

Touch-Pad Buttons

8. For printing the images on a thermal printer (optional), press the **Print** on the printer. (See separate printer manual for complete details on the printer operation). To order a thermal printer or thermal paper, contact UVP's offices.

Oversaturation Detection

BioDoc-It can show you if the camera is over-exposed and hence the image oversaturated:

1. Press **Live** button to see a preview (streaming flow) from the camera. If oversaturation reporting is turned on, the oversaturated pixels will flash on the LCD screen.

Thermal Printer

2. To turn the over-saturation feature on or off:

    a. Press **Set Up** on the keypad. A configuration screen titled 'Main Setup' shows up.

    b. Using **'+' / '-'** keys, navigate to the line that says **SATURATION**. It shows the current state of reporting of over-saturation.

    c. Press **Set Up** to view the available options – '**ON**' or '**OFF**'.

    d. Navigate to the desired option using **'+' / '-'** keys:

        ON – turns on the over-saturation reporting

        OFF - turns it off

    e. Press **Set Up** to set and quit.

3. Flashing pixels also tell you to that you may want to reduce the exposure time (brightness) of your image. You can do so by pressing the **'-'** button.

How to read images from the Memory card

The system can also read images off the memory card, if required. These must be the same images captured by this version of BioDoc-It or VisiDoc-It.

1. Insert the memory card in the slot.

2. Press **Set Up** on the keypad. A configuration screen titled 'Main Setup' shows up.

3. Using **'+' / '-'** keys, navigate to the line that says 'READ IMAGES'. Press **Set Up** to see the listing of images on the CF card. [If the CF card is not present, you will exit from the menu.]

4. Using **'+' / '-'** keys, navigate to the desired image and press **Set Up** to view.

5. If there are too many images to fit in one screen, you may need to go to next page (screen) to see your image. Navigate to the arrow signs and press **Set Up** to go back and forth between different pages.

6. To exit, navigate to **Quit** and press **Set Up**.
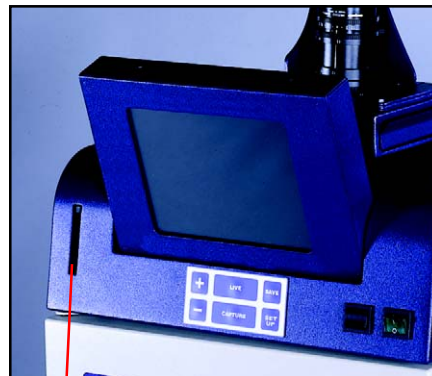
Memory Card Slot

How to Access Images off Imaging System via a Network

Requirements:

1. Only a computer in the same Local Area Network (LAN) as the BioDoc-It system can be used to access the BioDoc-It and retrieve images from it. This is a designed for security of images data.

2. BioDoc-It system uses a single account set up to login onto the BioDoc-It. All users can access the BioDoc-It with the same username and password. The common username is **biodocit** (case sensitive). No password is required.

To transfer images from the BioDoc-It to a networked computer:

1. Computer Operating System recommended: Windows 95 or Win 98 Second Edition (SE) or Win ME or Win 2000 or Win XP.

2. Go to any computer (in the same LAN) and open Internet Explorer.

3. Type the IP address in the address-bar; e.g. ftp://101.2.32.254, Click **Go**.

   Note: Use the IP address you have assigned to BioDoc-It. 101.3.32.254 is just an example address for the purpose of this document.

4. A username and password are required to log into imaging system. The browser may or may not ask you for those. If it does, enter **biodocit** (case sensitive) as tye username, with no password. If it does not, go to **File > Login-As**, enter **biodocit** (case sensitive) as the username, leave the password blank, and press **Enter**.

5. A list of images should appear on the browser screen. **Note:** These are the images in the internal memory of BioDoc-It processor and will display even when the CompactFlash card is not plugged-in.

6. Select and copy image(s) to the computer (anywhere on the hard-disk). Thumbnails of 12-bit images may not be visible. It is also possible to use the computer access to delete unwanted images from the BioDoc-It memory. Note: Images will permanently be deleted from the BioDoc-It.

7. To exit the BioDoc-It access, close the browser window to disconnect the session.

Notes:

You can open the images using the TIFF reader software supplied with imaging system.

BioDoc-It connection time-out is at 120 seconds. This means, that with no activity for continuously 120 seconds, the session will automatically terminate and users will have to login again to transfer images.

Using the browser-based networking is the easiest way to access BioDoc-It images. A command-line FTP can also be used. UVP recommends and supports only the browser-based method.

Troubleshooting

How to locate the version number of BioDoc-It

1. Press **Set Up** on the keypad. A configuration screen titled 'Main Setup' shows up.
2. Using **'+' / '-'** keys, navigate to the line that says 'INFORMATION'.
3. Press **Set Up** to view the settings. These settings cannot be changed from this screen:
   a. **Bio Doc-It VNNN – shows the current version of BioDoc-It**
   b. IP: - shows the currently assigned IP address
   c. SUB: - shows the currently assigned subnet mask
   d. MAC: - shows the Physical address

No power to darkroom cabinet

1. Recheck main power cord connections to the both the BioDoc-It System and the wall power (surge protector).
2. Check the fuse. Located on the main power port, between the main power cord and the jumper power cord is a small pull out drawer. There are two 1.5A fuses in the drawer. The fuse located closest to the darkroom cabinet is the active fuse. The other is a spare. Inspect the thin wire within the glass fuse to see if there is a break in the wire anywhere within the fuse. If so replace the burnt fuse with the spare. If the system continues to blow fuses, call UVP Technical Support Department.

No image appears on the LCD screen

1. Be sure the darkroom cabinet main power switch is lit. If not, refer to "No power to darkroom cabinet."
2. Look on top of the CCD camera to see if he green light is lit. If, not refer to "System Set-Up" section.
3. With the internal overhead white light on, completely rotate the f-stop adjustment (top lens ring adjustment) from side to side to see if there is any brightness change on the LCD. If so, refer to "System Operation - Image focusing and Set-up" section, #'s 4 and 5. Also check on the bottom of the lens to be sure the close-up diopter is present.
4. Call UVP Technical Support Department.

Touch-pad Controller will not respond to commands

Call UVP Technical Support Department

Memory Card will not respond when saving to the card

Call UVP Technical Support Department.

Transilluminator will not turn on.

1. Be sure the darkroom cabinet's door is completely closed. There is a UV exposure safety cut-off switch that turns the transilluminator of when the darkroom cabinet's door is opened.

2. Be sure the darkroom cabinet's main power switch is lit. If not, refer to "No power to darkroom cabinet."

3. Be sure the transilluminator switch is on. When the switch is lit green, the unit is receiving power.

4. Be sure the transilluminator's power jumper cord is securely connected at both the ends of the cable.

5. Call UVP Technical Support Department if the transilluminator still does not turn on.

Replacement Parts and Accessories

Contact UVP's offices at the telephone numbers under technical support for replacement parts for accessories. For transilluminator replacement parts refer to the separate Transilluminator manual included with your shipment.

Replacement Parts	*Part Number*
Gasket, Seal for camera	72-0055-01
Fuse, 2amp/250V, SLO-BLO (2 required)	56-0022-03
Software, BioDoc-ItLS, 12 bitt Tiff reader	89-0219-01

Accessories/Optional Equipment	*Part Number*
Doc-It LS Analysis Software	97-0185-02
Thermal Printer, Analog, Mitsubishi (115/230V)	89-0069-02
Thermal Paper, 4 rolls (800 images)	89-0038-01
Thermal paper, 16 rolls (3200 images)	89-0038-04
Thermal Paper, 40 rolls (8000 images)	89-0038-05
Thermal Printer, Analog, Sony (230V for Europe)	89-0175-02
Thermal paper, High Gloss, 5 rolls	89-0174-01
UV to White Light Converter Plate (21x26cm)	38-0191-01
Visi-Blue Converter Plate (21x26cm)	38-0200-01
Filter, SYBR Green and EGFP sq. (BioDoc-It)	38-0219-01
Filter, SYBR Green and EGFP round (VisiDoc-It)	38-0299-01
Filter, EtBr, 50mm sq. (BioDoc-It)	38-0220-01
Filter, EtBr, 55mm round (VisiDoc-It)	38-0297-01
Memory Card (64MB minimum)	86-0027-01

Technical Assistance

UVP offers technical support for all of its products. If you have any questions about the product's use, operation or repair, please call or fax UVP Customer Service or Technical Support. **Note:** Prior to contacting UVP, please have the system serial number on hand. The serial number is located on the back of the BioDoc-It darkroom or VisiDoc-It processor .

UVP, Inc. In the US 2066 W. 11th Street, Upland, CA 91786 Toll free (800) 452-6788 or (909) 946-3197, fax: (909) 946-3597 info@uvp.com or techsupport@uvp.com
Ultra-Violet Products Ltd. In Europe/UK Call +44(0)1223-420022 or fax: +44(0)1223-420561 Unit 1, Trinity Hall Farm Estate, Nuffield Road, Cambridge CB4 1TG UK	uvp@uvp.co.uk

A **Returned Goods Authorization (RGA) number** must be obtained from UVP's Customer Service Department prior to returning any product to UVP.

Wiring Diagrams

for BioDoc-It
and VisiDoc-It
Processors