

# ColonyDoc-It™ Imaging Station

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## *Instruction Manual*



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## Introduction

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This manual covers the installation and user instructions for the ColonyDoc-It Imaging Station.

The innovative, compact design enables users to process automated, fast and accurate colony counting. The high resolution digital color camera allows users to capture white light and fluorescent marked colonies and a wide array of samples. The sophisticated yet intuitive system offers researchers easy detection and analysis of media.

The software loads on the user's computer for camera control, image capture and colony counting. The software provides automatic and manual counting capabilities plus user defined templates for speeding up research experiments. Users can define specific counting parameters including color differentiation and filter identification by group or size. Once the colonies are counted, the results display on the screen. Images and data can be saved in multiple formats and the data can be exported to Excel. The software supports 21 CFR Part 11 compliance.

## Components

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- Colony counter
- Black plate
- USB cord
- Power cord
- Software CD



## System Requirements

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- Operating System: Windows XP Professional with Service Pack-2 (32 bit only), Vista (32 bit only), Windows 7 (32 bit only)
- Internet Explorer 6.0 or higher (To determine the version of Internet Explorer, open Internet Explorer and click on **Help > About**)
- Minimum resolution: 1024 x 768
- Intel Pentium Processor or equivalent, 1.6 GHz or higher
- 1GB (2GB recommended) of RAM or greater
- 200 MB of available hard disk space for the program, more for data
- To avail the functionality of 21 CFR Part 11, then the partition must be formatted with NTFS.
- CD-ROM drive

## System Specifications

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### Electrical ratings:

Model Numbers:	97-0539-01, 97-0539-04
	100-115V, 60Hz, 0.25 Amps
Model Numbers:	97-0539-02, 97-0539-05
	230V, 50Hz, 0.13 Amps

### Operational Ratings:

Unit intended to be used indoors

Altitude must not exceed 2000 m

Operating temperatures not to exceed 0°C to 40°C (32°F to 104°F)

Operating humidity not to exceed 85%



## Installing the ColonyDoc-It

### Installing the Hardware

Set the ColonyDoc-It Imaging Station on a level surface.

Plug in one end of the power cord to the back of the ColonyDoc-It Imaging Station and the other end into a power outlet. To maintain safety at all times, ensure that the unit is not hard to disconnect at the location chosen.

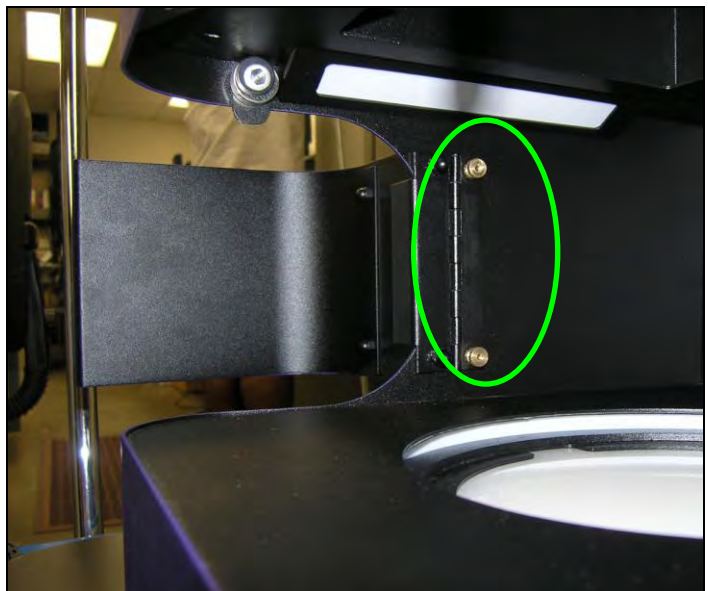
Turn on the ColonyDoc-It by switching the I/O switch to I located at the back of the station.

Plug one end of the USB cord to the back of the ColonyDoc-It and the other end into a USB port in the computer.



### Removing the Doors

The ColonyDoc-It doors can be removed by hand-loosening the two thumbnuts on the inside of each door.



## Installing the Filter

Note: Filters come as an optional accessory so this step is only necessary if an optical filter will be used with the system.

The filter trays are located in the filter box attached to the ceiling of the unit. To access the trays:

Remove the four brass thumbnuts on the filter box and pull the filter box from the housing.



Remove the two thumbnuts that hold the filter frame to the filter box.

- Place the filter over the opening.
- Replace the filter frame and thumbnuts.
- Reinstall the filter box into the unit.

**NOTE:** It is possible to install a filter when the filter box is installed in the unit. However, care must be taken to avoid touching the shiny sides of the filter.



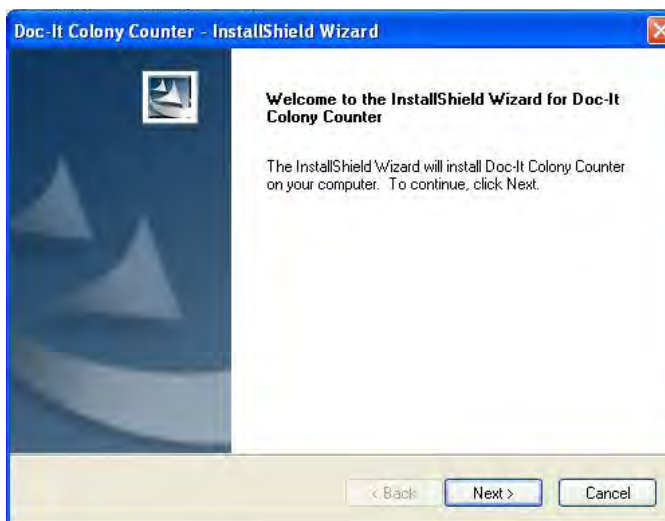
## Installing the Software

Insert the Doc-It® Colony Counter CD into the CD drive in the computer.

The **InstallShield Wizard** window will appear.

Follow the instructions for installation.

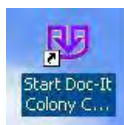
Once installation is complete, refer to the *Registering the Software* in this manual to activate the software.



## Registering the Software

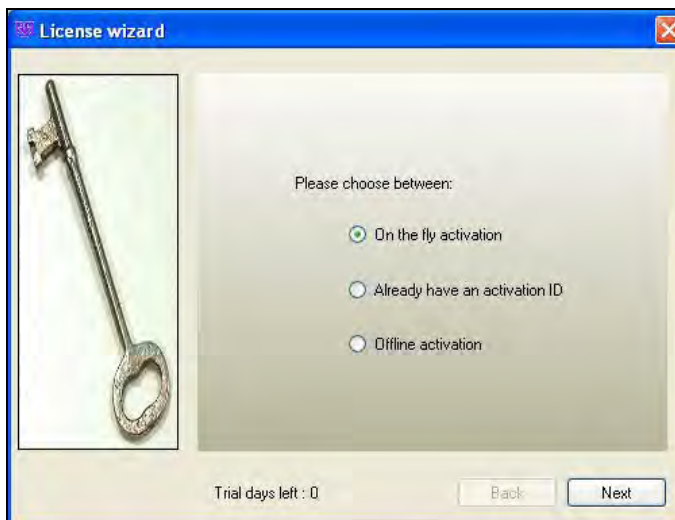
### Opening the Software

Double click the 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.

The screenshot shows a dialog box titled "On The Fly Registration". It contains the following fields and controls:

- Registration info
- First Name: [text box]
- Last Name: [text box]
- Position: [text box]
- Company: [text box]
- Email: [text box]
- Address1: [text box]
- Address2: [text box]
- State/Province: [dropdown menu]
- Postal/Zip Code: [text box]
- Country: [text box]
- Phone: [text box]
- Fax: [text box]
- Serial Number: [text box with dashes]
- Configuration ID: 14A053E45E0A71404B29B98324013536
- Activation Number: [text box]
- Buttons: "Get Activation No.", "Activate", "Cancel"
- Footnote: "\* This fields are required for the activation process"

**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.

The screenshot shows a dialog box titled "License wizard". It contains the following elements:

- Key icon
- Please choose between:
- On the fly activation
- Already have an activation ID
- Offline activation
- Trial days left : 0
- Buttons: "Back", "Next"

Click the link provided and complete the form to obtain instructions. Click **Finish**.

The screenshot shows a dialog box titled "License wizard". It contains the following elements:

- Key icon
- Please fill out the online form by following <http://req.uwp.com/>
- and you will receive an e-mail with instructions, or call Customer Support.
- Configuration ID: 36E2AF2B3DF5DFF6D1637250F4F79E29
- Trial days left : 0
- Buttons: "Back", "Finish"

## Counting Colonies

### Quick Capture

Place the Petri dish to be counted on the transillumination surface.

Select the appropriate lighting option for the sample. If unsure, turn the selector switch (located on the front of the colony counter) to **Base Lighting > Trans** and remove the black plate (if present). The Trans lighting option will apply to most applications.

If the colony counter is not already open, double click onto the **Doc-It Colony Counter icon** on the desktop.

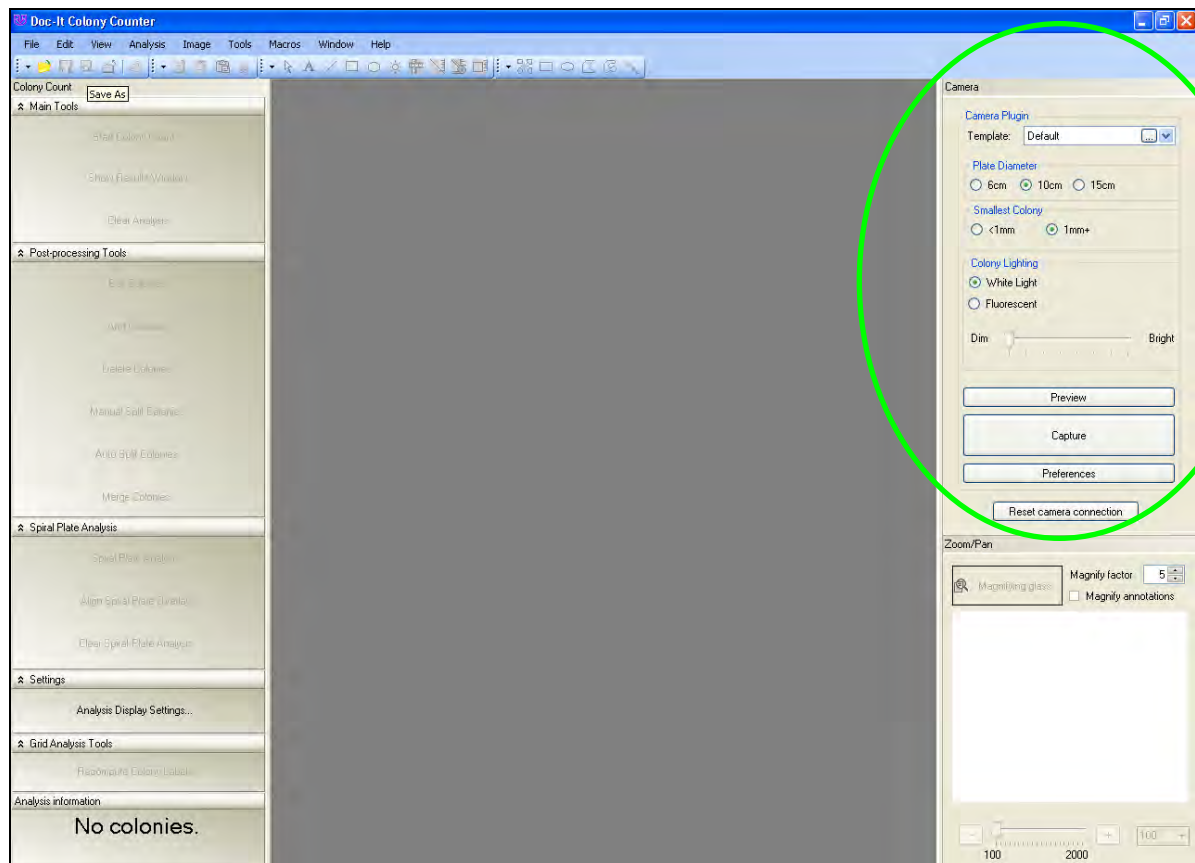


Ensure that the **Camera Control** module is active. See the image of the screen below noted by the green circle. The text must be black as shown. If the **Camera Control** is inactive (with grey text) proceed to the troubleshooting section: *Inactive Camera Window*.

Select the Petri dish plate diameter from the **Camera Control** module. The choices are **6cm**, **10cm**, and **15cm**.

Select the **smallest colony** size for this plate. The choices are **<1mm** and **1mm+**. If **<1mm** is selected the smallest colony size is below 1mm. The count will be faster if 1mm+ is chosen.

Choose the **White Light** option from **Colony Lighting**. The **Dim to Bright** slider will be disabled unless using the **Fluorescent Colony Lighting** option. If counting fluorescent colonies go to the *Fluorescent Colony Counting* section of the manual.

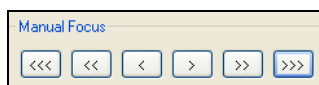






Insert the Petri dish inside the colony counter.

Click the **Preview** button in the **Camera Control** module and move the Petri dish until it is centered inside the red circle. The outer red circle should fall just inside the Petri dish outer edge. If it does not, make sure that the correct **Plate Diameter** size was selected.

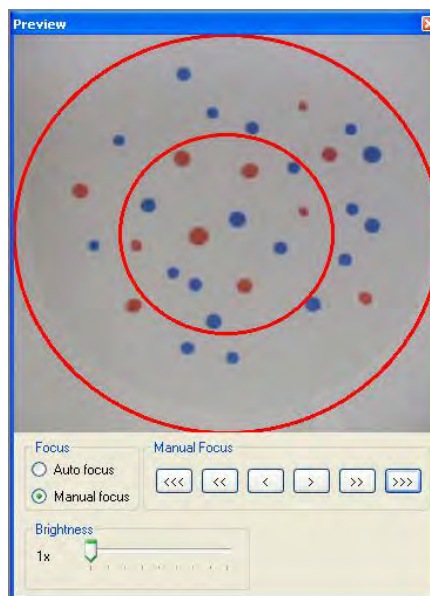
There are two focusing methods provided for imaging. The first is **Auto focus**. Auto focusing allows the camera to automatically find the appropriate focus for the sample.

**Manual focus** is provided should the camera need intervention from the user to more clearly picture the image.



Manual focus buttons allow users to adjust the focus in small increments   or large increments  .

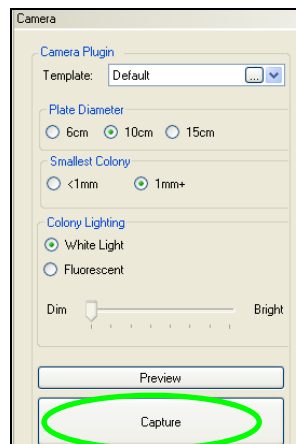
**Brightness** adjusts the brightness of the image.



Click the **Capture** button from the **Camera Control** module to take a picture.

Click **Start Colony Count** in the **Colony Count** module at the left of the screen to start the counting process.

Select **Automated Count** or **Manual Count**. Go to the *Automatic Count* section in the manual to complete steps for automated count. Go to the *Manual Count* section in the manual to complete steps for the manual count.



**NOTE:** The **User Defined Template Count** is grayed out initially because there are no templates created. Template counting allows users to create counting templates for frequently counted Petri dish plates. The manual count process must be performed before template settings can be established.

**TIP:** The ColonyDoc-It doors can be easily removed if fluorescent colonies will not be counted. Go to the *Removing ColonyDoc-It Doors* section in this manual for instructions.

#### Lighting Tips:

There are four options for lighting the Petri dish. **Epi Lighting** options include **White** light and **Blue** light and these sources light the Petri dish from the top. **Base Lighting** options include **Trans** and **Darkfield** and these sources light the Petri dish from the bottom

**Blue** light is used to excite GFP stained colonies.

A majority of samples prepared using the spread method and a transparent substrate that are bacterial, yeast, or mold are best viewed using **Base Lighting > Trans**.

If there is excessive handwriting on the bottom of the Petri dish, membrane paper, or stickers, then use **Epi Lighting > White** or **Base Lighting > Darkfield**.

Use **Base Lighting > Darkfield** when counting a pour plate.

Using the black plate on top of the transillumination surface in combination with **Epi Lighting** sources provides contrast that improves colony counting results.

#### Preparing Samples:

When preparing samples, write on the bottom edge away from the center of the Petri dish to increase counting accuracy.

## Automatic Counting

Before proceeding through the automatic counting steps, ensure that an image of the Petri dish has been captured and is ready for analysis. See instructions on *Quick Capture* in this manual for more information on how to capture an image.

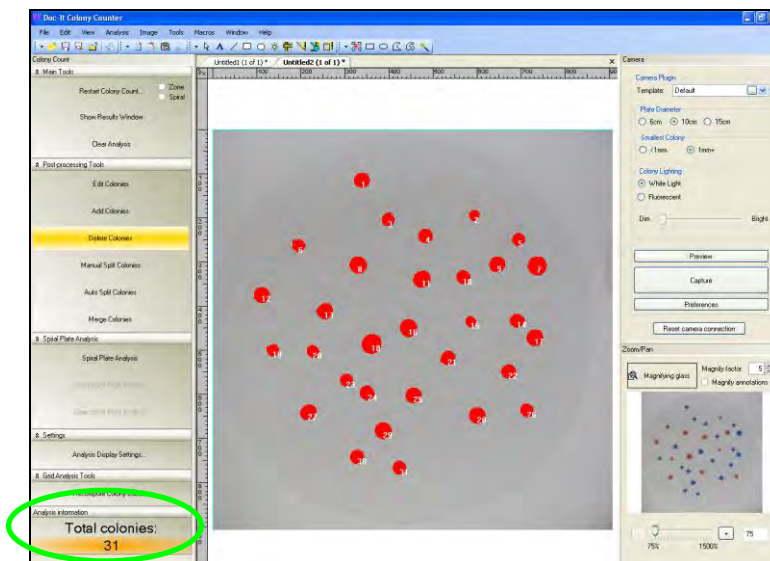
Select **Start Colony Count** along the left side of the screen. A new **Colony Count Type Selection** window appears. Select **Automated Count** and **OK**.



The automated count will be displayed on the left hand side of the screen.

Colonies can be filled in with red (as depicted here) or outlined. Colonies can also be numbered or annotated using multiple colors. Go to the *Preferences* section of this manual for more details concerning changing the appearance of the image.

If desired, colonies can be added, deleted, split, or merged. Refer to the respective sections of this manual for instructions on using these tools.



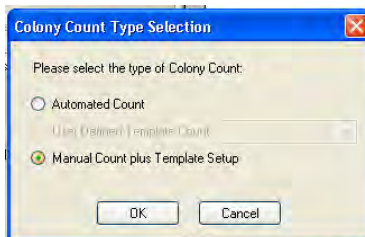
## Manual Counting

Before proceeding through the manual counting steps, ensure that an image of the Petri dish has been captured and is ready for analysis. See instructions on *Quick Capture* in this manual for more information on how to capture an image.

Select **Start Colony Count** along the left side of the screen. A new **Colony Count Type Selection** window appears.

Select **Manual Count** and **OK**.

The **Manual Count Colony Wizard** will open.



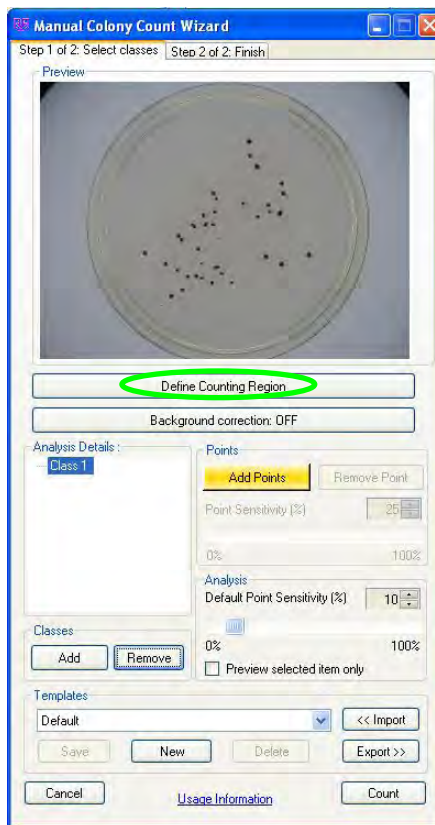


## Step 1: Select Classes

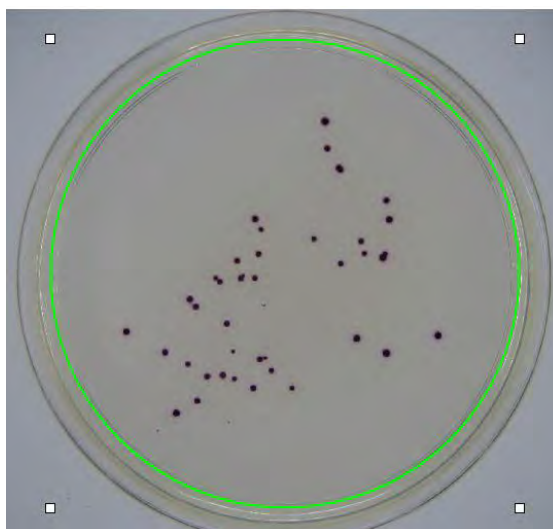
The window that appears after choosing **Manual Count** is the **Manual Count Colony Wizard**. It contains two tabs.

The first tab is Step 1 of 2: Select Classes, the second tab is Step 2 of 2: Finish.

The first tab allows the user to define the region of interest inside the Petri dish to be analyzed. The **region of interest is identified by a green circle** that should include all the colonies of interest in the Petri dish. The software automatically defines the region of interest but by clicking the **Define Counting Region** button the user can increase or decrease the circle size as needed.



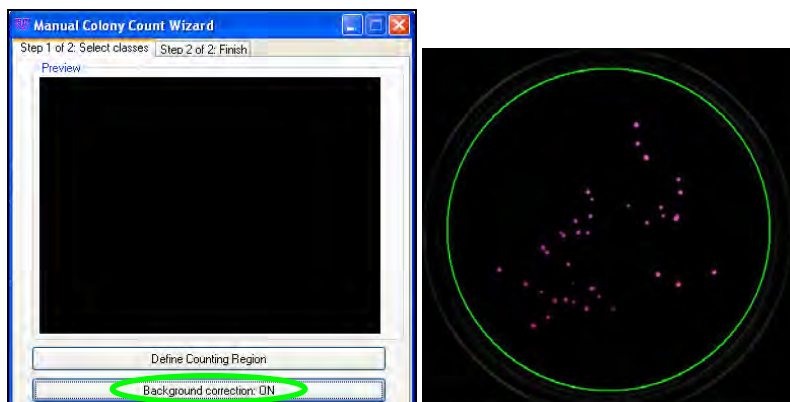
If a smaller or larger region of interest is desired, click onto the **Define Counting Region** button and hold and drag the pointer over one of the corners of the circle to change the size. Or click inside the green circle to move the entire region of interest.



Sometimes applying **Background Correction** to an image improves the count.

To apply background correction click onto the **Background Correction** button.

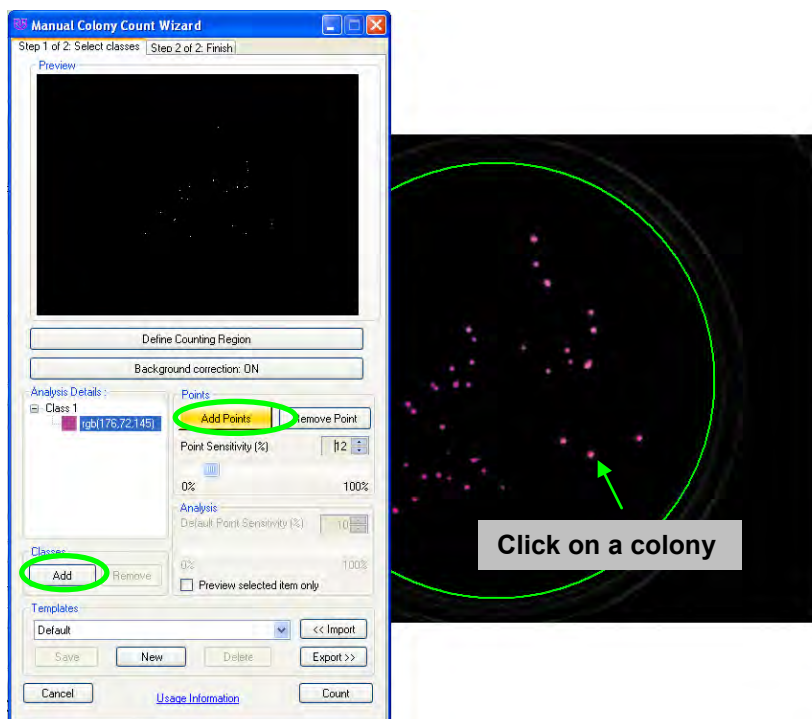
The image to the left depicts the resulting flattened image.



The Select Classes tab allows users to select the number of classes and colonies in the Petri dish sample.

To count the desired colonies, ensure that the **Add Points** button is highlighted in yellow and **click on a colony** to be counted in the **original image** of the Petri dish. (A smaller duplicate image of the original is present in the **Step 1 of 2: Select classes** tab, but a colony cannot be selected from this image.)

Classes are defined as different types of bacteria, yeast, or mold present on the sample. The software can detect various types of classes in one dish. To add a class, click onto the **Add** button in the Classes section of the window.



Once the first colony is selected, the new image in the **Step 1 of 2: Select classes** window will show a black background along with all of the colonies that contain the same color as the point identified in the **Analysis Details** window.

Adjust the **Point Sensitivity** slider to increase or decrease sensitivity. Increasing and decreasing sensitivity almost always improves the final count.

Continue clicking on colonies in the captured image to add points and adjust the **Point Sensitivity** as necessary until the black and white image shows all the colonies of interest identified in white.

To remove points or classes from the **Analysis Details** window, highlight the point and select **Remove Point** or highlight the class and select **Remove**.

Click the **Count** button to proceed to the next tab.

**NOTE:** The **Step 1 of 2: Select classes** tab allows the settings created in this window to be saved in a user defined template. If there are no templates created, the drop down menu will list Default as the only template option. Go to the *Templates* section of this manual for instructions on creating templates.



## Step 2: Finish

The software will automatically move to the second tab **Step 2 of 2: Finish** after **Count** is selected in **Step 1 of 2: Select classes**.

To filter the colonies, adjust the shape or colony size in the **Filter colonies** section.

Change slider buttons for **shape** (from circular to irregular) and **size** (1 pixel to 200 pixels) to capture additional colonies or eliminate colonies.

This window is a second means to save settings into templates. Go to the *Templates* section of this manual for instructions on creating templates.

Click **Finish** to exit the manual count mode and to get the final count.



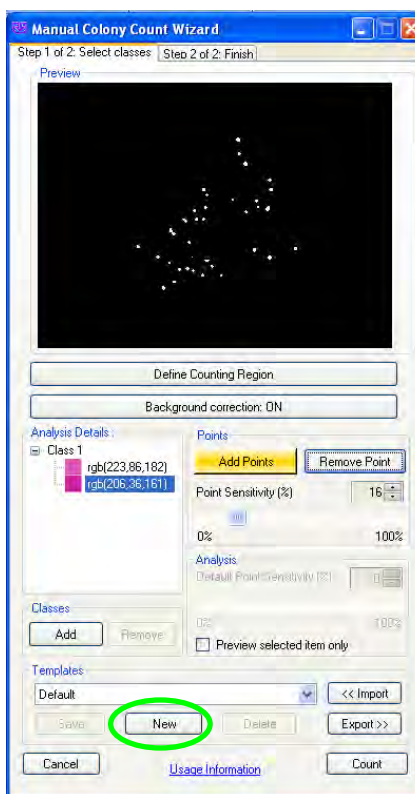
## Creating Templates

Templates allow the user to set colony counting parameters so that plates with similar properties are counted quickly and consistently.

To set a template for any Petri dish, choose **Start Colony Count** (or **Restart Colony Count** if the Petri dish has been counted before) in the **Colony Count** module, then select the **Manual Count** function. A template can be saved during operation **Step 1 of 2: Select classes** or **Step 2 of 2: Finish**.

To save a template in **Step 1 of 2: Select classes**, add the desired points and classes if not already selected) and click the **New** button in the Template section of the window.

If additional information is needed, refer to the *Manual Count* instructions in this manual.



A **New Template** pop-up window will ask for a new **Template name**.

Type in the new name and select **OK**.

The Template name window will close and direct back to the **Step 1 of 2: Select classes** tab.

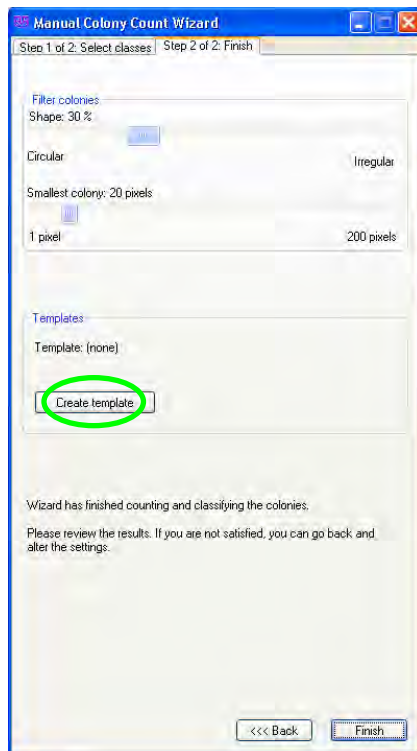
Click on the **Count** button to proceed to the **Step 2 of 2: Finish** tab.



If the shape and size sliders are changed to capture additional colonies, click **Create template** in the Templates section of the window to save the new settings.

Select **Finish** to complete the count and save the template.

**NOTE:** Templates may also be saved directly in **Step 2 of 2: Finish**. Users may bypass the template creation option in **Step 1 of 2: Select classes** and go directly to **Step 2 of 2: Finish** to create a template.



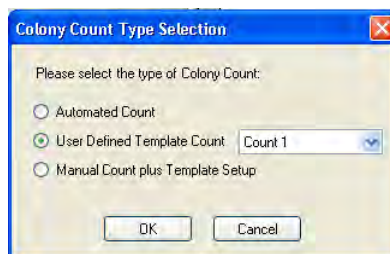
**NOTE:** If a template has been saved previously, the software will pull it in automatically to be used in any Manual Counting process.

## User Defined Template Counting

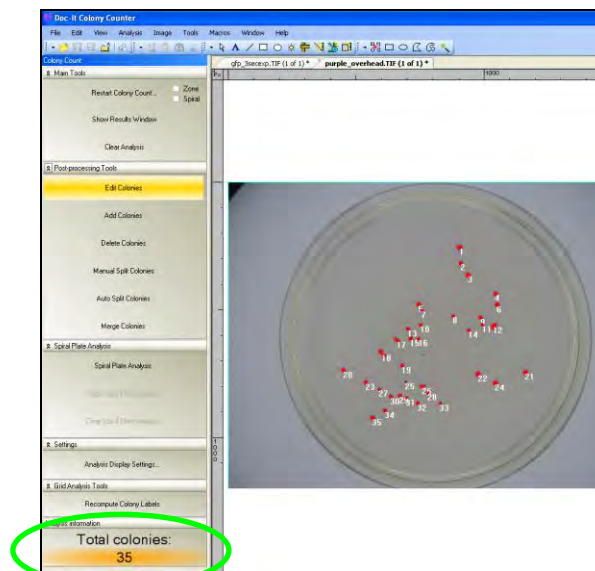
Before proceeding through the next steps, a template must have been saved during the manual count process. If there are no templates, go to the *Creating Templates* section of the manual to create a template.

Select **Start Colony Count**, and then select **User Defined Template Counting**, and use the dropdown menu to select the desired template.

Click **OK**.



The new window will display the **Total colonies** counted.



## Fluorescent Colony Counting

Ensure that the doors are attached to the ColonyDoc-It or turn off the surrounding lights.

Turn the **Epi Lighting** switch on the ColonyDoc-It to **Blue**.

Insert the **Green Fluorescent Protein (GFP) emission filter** into either tray (refer to the *Installing the Filter* section of this manual for instructions) and ensure that the filter is positioned below the camera. (If the GFP filter is in filter position one, the filter slider should be moved all the way to the right position.)

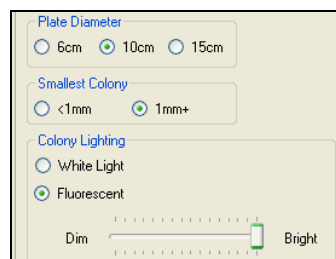
Insert the fluorescently stained sample into the ColonyDoc-It.

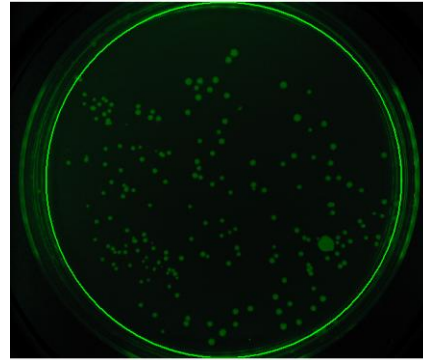


Select the appropriate **Plate Diameter**, the **Smallest Colony** information and choose the **Fluorescent** lighting function of **Colony Lighting** in the Doc-It Colony Counter software.

The slider bar may be adjusted from **Dim** to **Bright** to provide optimum results.

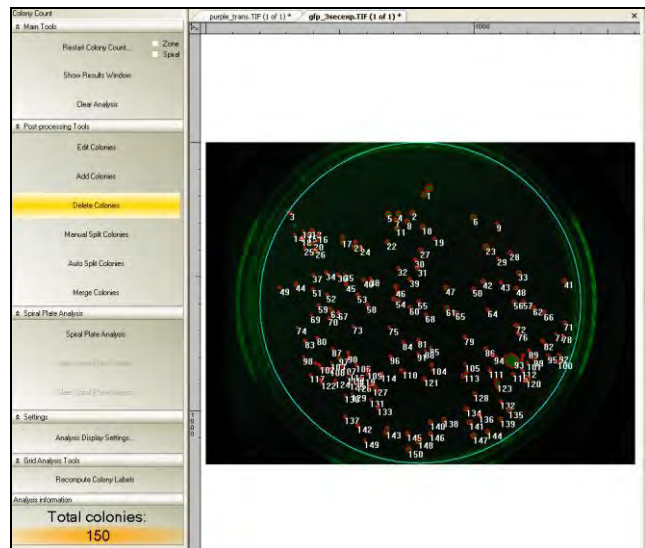
Select **Preview** to position the plate inside the red circle guides and then select **Capture** when the image is positioned properly.





Finally, choose to count the colonies automatically, manually, or with a template.

Refer to the *Automatic Count*, *Manual Count*, or *Template Count* instructions in this manual for additional information.



## Zone Analysis

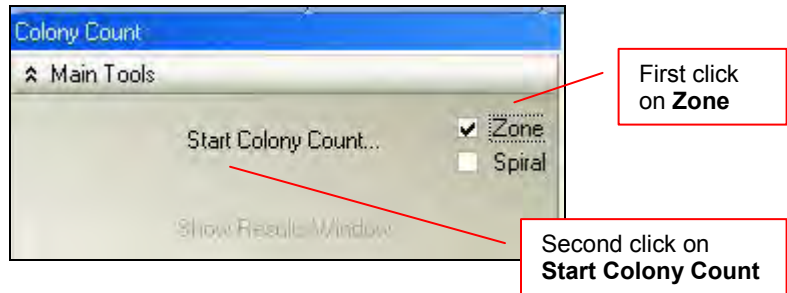
Zone analysis provides users with zone sizing information useful for applications such as inhibition zone analysis.

Before proceeding through the zone analysis process, ensure that an image of the Petri dish has been captured and is ready for analysis. See instructions on *Quick Capture* in this manual for more information on how to capture an image.

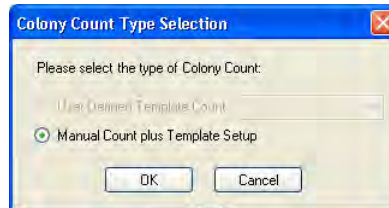
To obtain zone analysis information for a plate, click on the checkbox for **Zone** then select **Start Colony Count**.

Choose to count with the Manual or User Defined method.

Click **OK**.



If using the software for the first time, no templates are created and the **User Defined Template Count** option appears grey. To create a template, first proceed through the **Manual Count** functions to store settings.



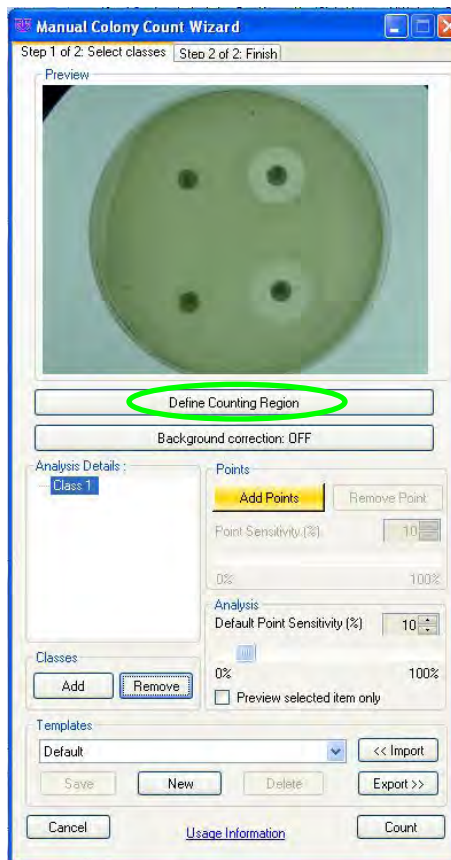


## Step 1: Select classes

The window that appears after choosing **Manual Count** is the **Manual Count Colony Wizard**. It contains two tabs.

The first tab is Step 1 of 2: Select classes, the second tab is Step 2 of 2: Finish.

The first tab allows the user to define the region of interest inside the Petri dish to be analyzed. The **region of interest is identified by a green circle** that should include all the zones of interest in the Petri dish. The software automatically defines the region of interest but by clicking the **Define Counting Region** button the user can increase or decrease the circle size as needed.



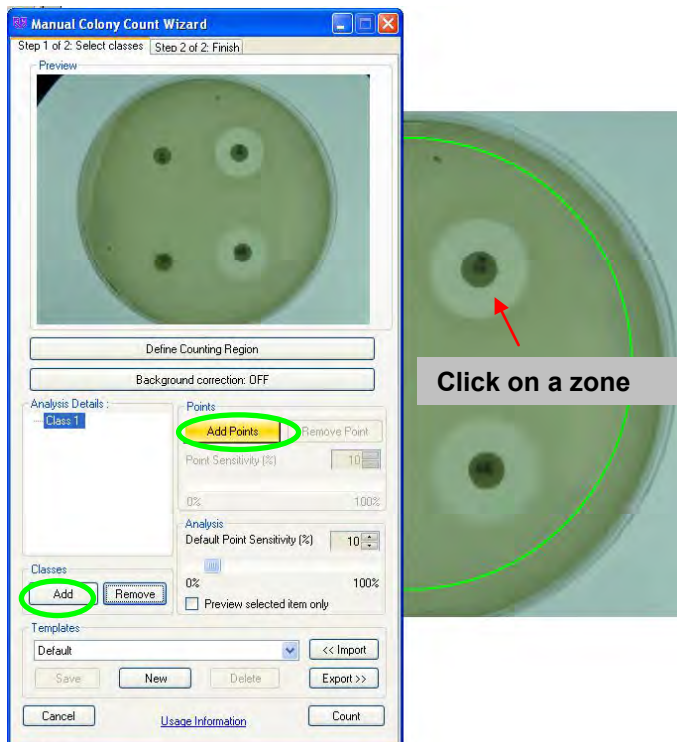
If a smaller or larger region of interest is desired, click onto the **Define Counting Region** button and hold and drag the pointer over one of the corners of the circle to change the size.



The Select Classes tab allows users to select the number of classes and zones in the Petri dish sample.

To analyze the desired zones, ensure that the **Add Points** button is highlighted in yellow and **click on a zone** to be counted in the **original image** of the Petri dish. (A smaller duplicate image of the original is present in the **Step 1 of 2: Select classes** tab, but a zone cannot be selected from this image)

Classes are defined as different types of bacteria, yeast, or mold present on the sample. The software can detect various types of classes in one dish. To add a class, click onto the **Add** button in the **Classes** section of the window.



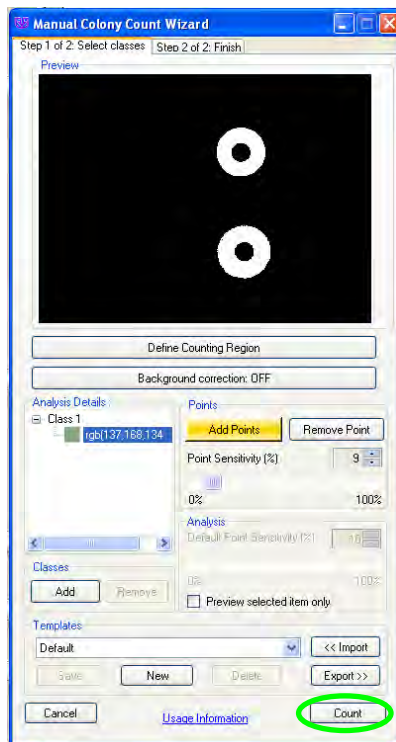
Once the first zone is selected, the new image in the **Step 1 of 2: Select classes** window will show a black background along with all of the zones that contain the same color as the point identified in the **Analysis Details** window.

Continue clicking on zones to add points as necessary until the black and white image shows all the zones of interest identified in white.

To remove points or classes from the **Analysis Details** window, highlight the point and select **Remove Point** or highlight the class and select **Remove**.

The **Step 1 of 2: Select classes** tab allows the settings created in this window to be saved in a user defined template. If there are no templates created, the drop down menu will list Default as the only template option. Go to the *Templates* section of this manual for instructions on creating templates.

Click the **Count** button to proceed to the next step.



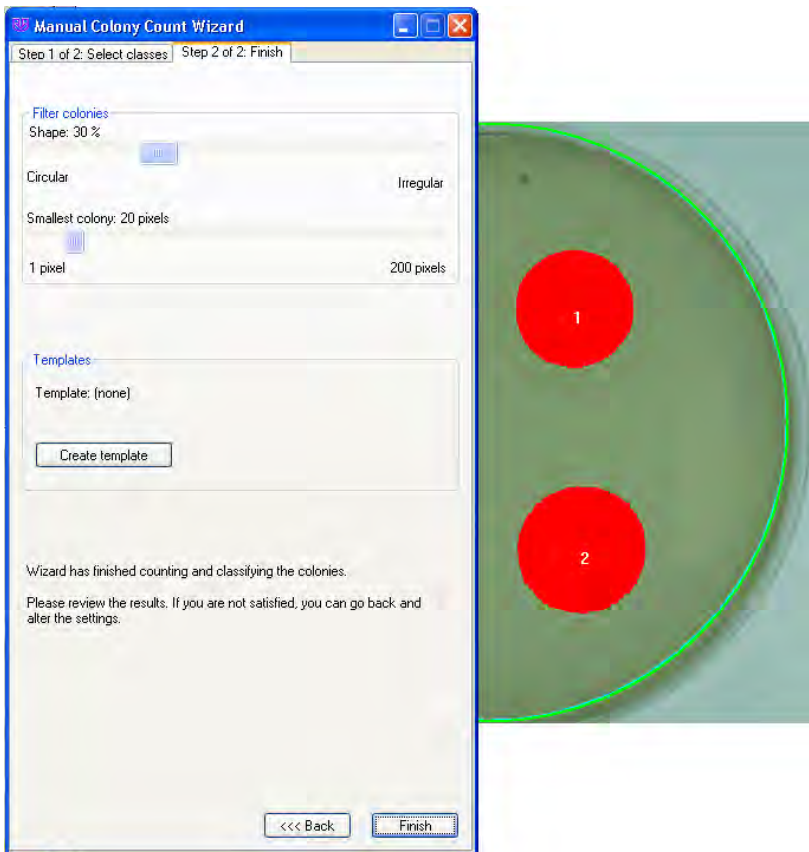
### Step 2: Finish

The software will automatically move to the second tab **Step 2 of 2: Finish** after **Count** is selected in **Step 1 of 2: Select classes**.

To add or subtract zones, change the slider buttons for **shape** (circular to irregular) and **size** (1 pixel to 200 pixels) until all the zones of interest are highlighted.

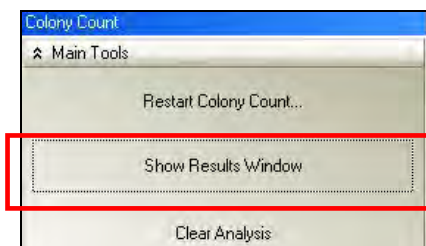
This window is a second means to save settings into templates. Go to the *Templates* section of this manual for instructions on creating templates.

Click **Finish** to exit the manual count mode and view the results table.



The software will redirect to the initial screen and display the total number of zones identified.

To view the analysis data for the zones click onto **Show Results Window** from the Main Tools section of the Colony Count module. A window appears that provides information relating to the classes, zones (listed as colonies), statistics, and distribution of the zones. In the report, users may view the area and perimeter of the zone.



Colony Number	Class	Area(px)	Perimeter(px)	Avg Diameter(px)	Circularity
1	1	6895	511.25	93.93	1.12
2	1	8012	346.87	101.24	1.2

To learn more about reporting capabilities, go to the *Reporting Functions* section of this manual.

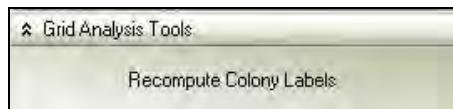
## Renumbering Colony/Zone Values

To enable easier statistical reporting of each colony or zone, the values assigned to each colony or zone may be renumbered.

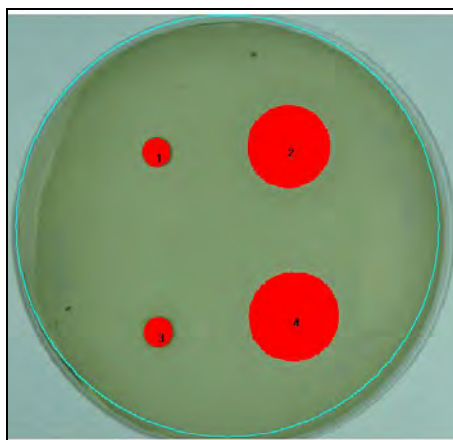
To renumber the values assigned to each colony or zone click **Recompute Colony Labels** under the Grid Analysis Tools.

**NOTE:** The plate must have already been counted.

The **Recompute Colony Labels** function will read the plate from left to right and from top to bottom. So the colony (or zone) labeled 1 will be seated at the left and towards the top of the plate.



Before applying "Recompute Colony Labels" function



After applying "Recompute Colony Labels" function

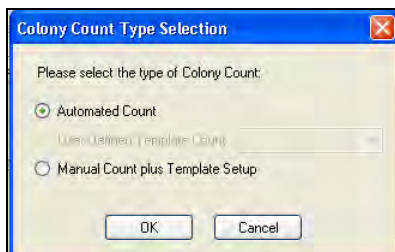
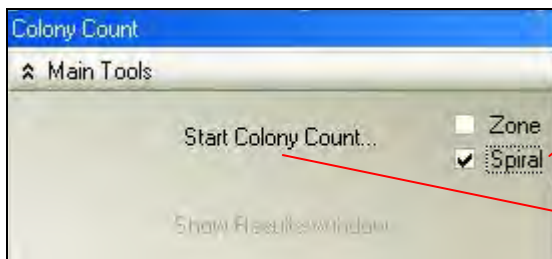
## Spiral Plate Counting

To perform a spiral plate count click onto the **Spiral** checkbox and then select **Start Colony Count**.

Next, select from the **Automated Count**, **Manual Count** or **User Defined Template Count**.

**NOTE:** If using the software for the first time, no templates are created and the **User Defined Template Count** option appears grey. To create a template, first proceed through the **Manual Count** functions to store settings.

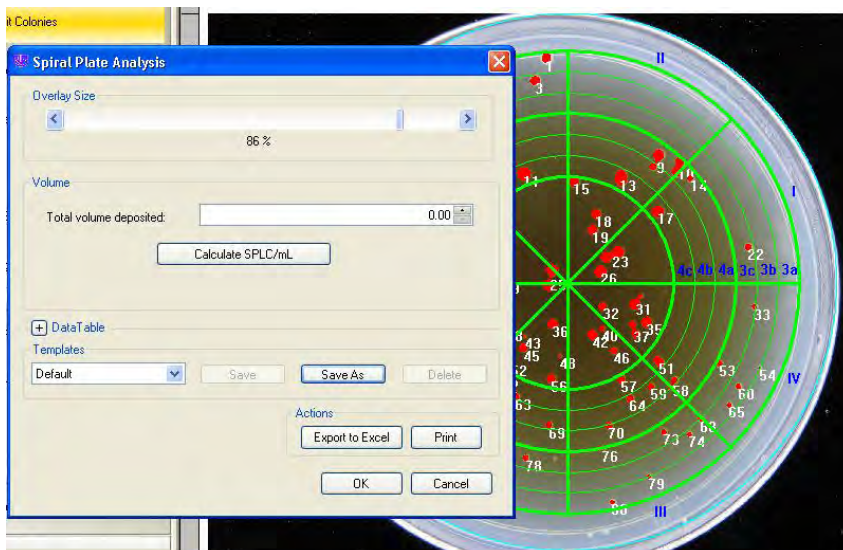
Additional instruction on performing an *Automated Count*, *Manual Count*, or *Template Count* is listed in detail in this manual.



After performing a count, a **Spiral Plate Analysis** window will appear along with a green grid over the counted image.

To change the overlay grid size, move the **Overlay Size** slider bar to the left (to decrease the grid size) or to the right (to increase the grid size).

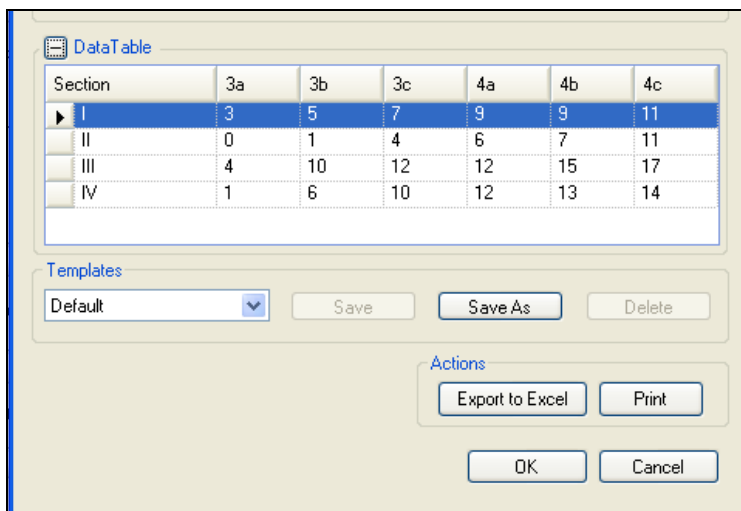
To calculate the SPLC/mL, type in or use the up or down arrows in the **Total volume deposited** box provided. The calculated amount will appear immediately below the **Calculate SPLC/mL** button.



To view the resulting **Data Table** analysis for the spiral plate count, click onto the + sign (expanded report shown here after clicking the + sign). The values listed will provide the number of colonies found in each quadrant and section of the counted plate.

To save the spiral plate settings in a template, click onto **Save As** and provide a name for the template.

To print or export the data into Excel, click onto the **Print** or **Export to Excel** button.



Section	3a	3b	3c	4a	4b	4c
I	3	5	7	9	9	11
II	0	1	4	6	7	11
III	4	10	12	12	15	17
IV	1	6	10	12	13	14

Templates: Default [Save] [Save As] [Delete]

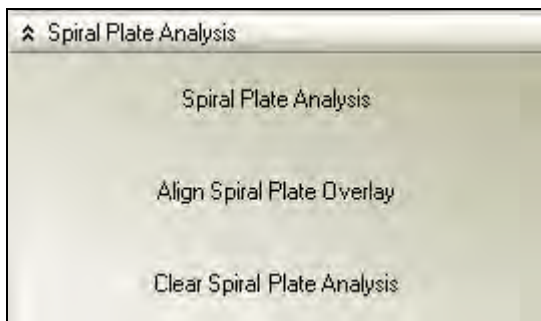
Actions: [Export to Excel] [Print] [OK] [Cancel]

While in the **Spiral Plate Analysis** window, the user may choose to move the green overlay grid by using the **Align Spiral Plate Overlay**.

To move the grid, click onto **Align Spiral Plate Overlay**, click and drag the green grid until the center of the grid is aligned with the center of the captured image.

To clear the spiral plate analysis, click onto the **Clear Spiral Plate Analysis**. This action will remove the data entered for this plate and remove the spiral plate grid.

Spiral plate analysis may be performed on any counted plate. To perform the spiral plate analysis any previously counted plate, select the **Spiral Plate Analysis** option directly above the **Align Spiral Plate Overlay** option.



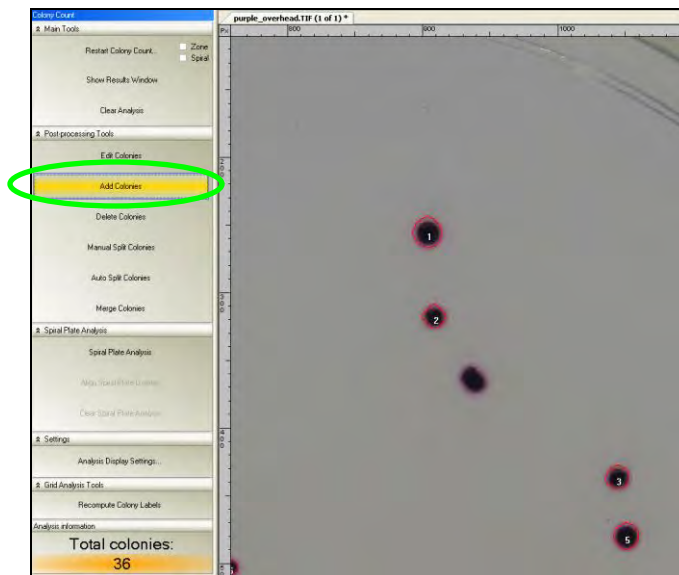
## Editing Colonies

### Add Colonies

Users may add colonies by performing the initial count (**Automated Count**, **Manual Count**, or **User Defined Template Count**), and adding colonies manually.

To add colonies, ensure that the **Add Colonies** tab in the **Colony Count** module is highlighted in yellow.

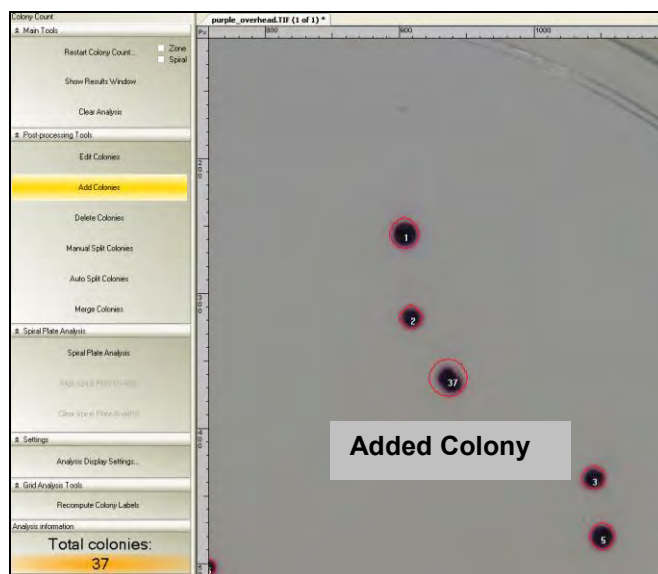
If the colony is hard to see, zoom in on the colony. In the **Zoom/Pan** module, move the slider button towards the + sign on the right to zoom in. A rectangular object will appear in the **Zoom/Pan** module. Move it over the area of interest. The central Petri dish image will appear larger in the area identified by the rectangular object.



Click on a colony to add.

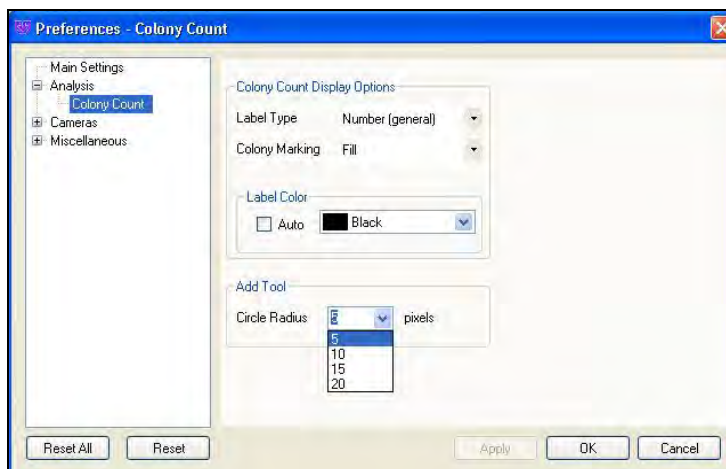
The colony selected will now have a circle (filled in or outlined) around the point selected.

The **Total colonies** count will change to include the colonies added.



To use a larger circle to highlight the colony, go to the **Analysis Display Settings**. A new window will open. Browse to **Main Settings > Analysis > Colony Count**.

In the **Add Tool** section of the window, use the drop down menu to select between a **Circle Radius** of 5, 10, 15, or 20.



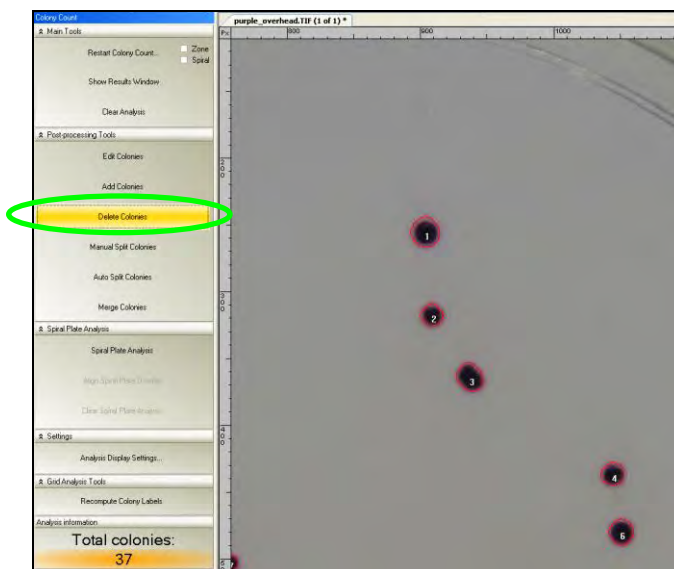
## Delete Colonies

Users may delete colonies after performing the initial count (**Automated Count**, **Manual Count**, or **User Defined Template Count**), and deleting colonies manually.

To delete colonies from the **Total Colonies** count, ensure that the **Delete Colonies** tab is highlighted in yellow.

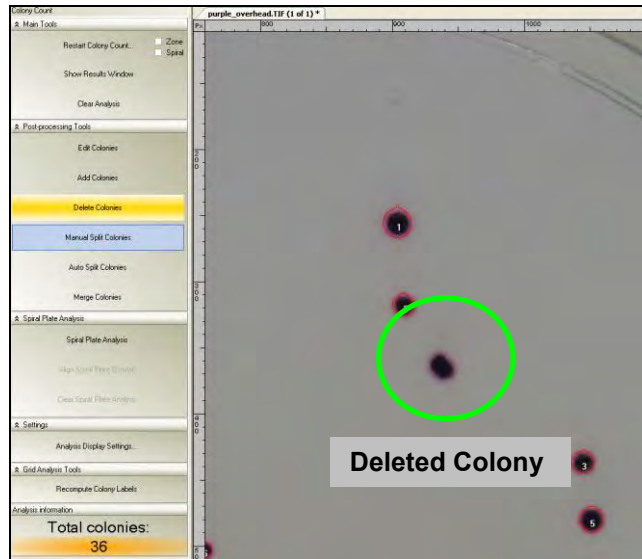
If the colony is hard to see, zoom in on the colony. In the **Zoom/Pan** module, move the slider button towards the + sign on the right to zoom in. A rectangular object will appear in the **Zoom/Pan** module. Move it over the area of interest. The central Petri dish image will appear larger in the area identified by the rectangular object.

Click on a colony to delete.





The colony circle (filled in or outlined) will now disappear. The **Total colonies** count will change to remove the colonies deleted.



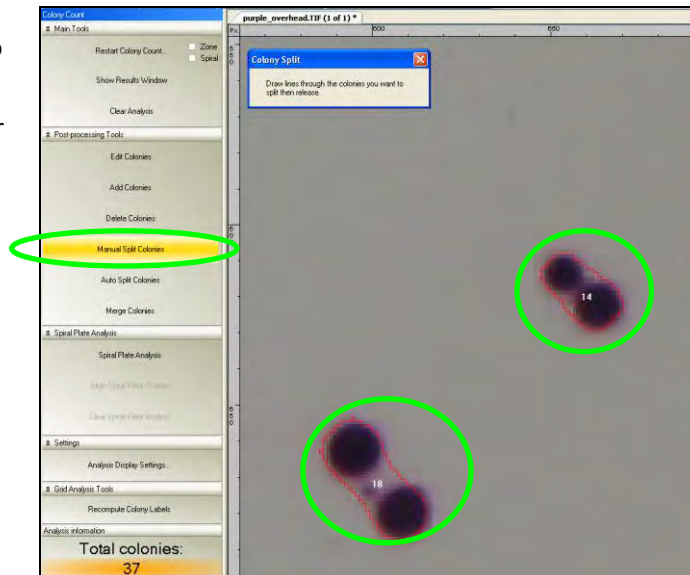
## Manual Split Colonies

Users may split colonies by performing the initial count (**Automated Count**, **Manual Count**, or **User Defined Template Count**), and splitting colonies manually. Colonies should be split when two or more colonies are very close together and are counted as one colony by the software.

To split colonies, ensure that the **Manual Split Colonies** tab is highlighted in yellow.

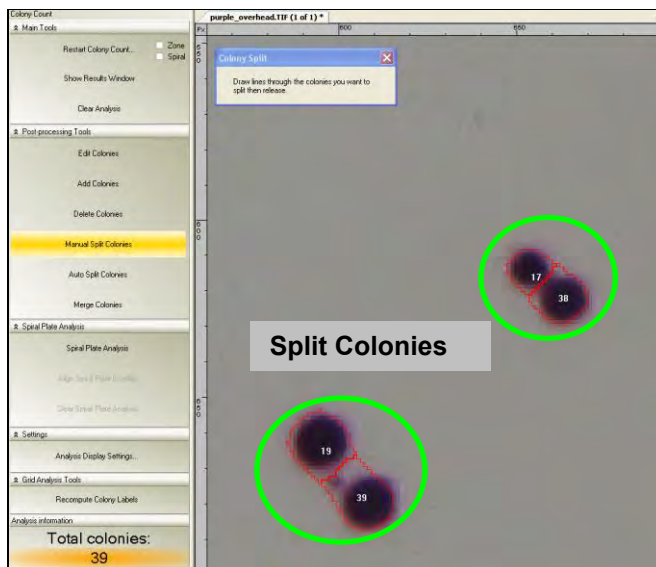
A new window will ask the user to “Draw lines through the colonies you want to split then release.”

If the colony is hard to see, zoom in on the colony. In the **Zoom/Pan** module, move the slider button towards the + sign on the right to zoom in. A rectangular object will appear in the **Zoom/Pan** module. Move it over the area of interest. The central Petri dish image will appear larger in the area identified by the rectangular object.



Draw lines through two or more colonies that are close together and treated as one. Use the pointer and, while holding the left mouse button down, move from one edge of the colony to the other.

The **Total colonies** count will change to add new colonies identified by the split.



## Auto Split Colonies

Users may split colonies by performing the initial count (**Automated Count**, **Manual Count**, or **User Defined Template Count**), and splitting colonies by clicking on the colony to split. Colonies should be split when two or more colonies are very close together and are counted as one colony by the software.

To split colonies, ensure that the **Auto Split Colonies** tab is highlighted in yellow.

If the colony is hard to see, zoom in on the colony. In the **Zoom/Pan** module, move the slider button towards the + sign on the right to zoom in. A rectangular object will appear in the **Zoom/Pan** module. Move it over the area of interest. The central Petri dish image will appear larger in the area identified by the rectangular object.

Click onto the colony to split.

If the colonies are hard to see, zoom in on the colonies. Refer to the **Zoom/Pan** section of this manual.

The **Total colonies count** will change to add new colonies identified by the split.

## Merging Colonies

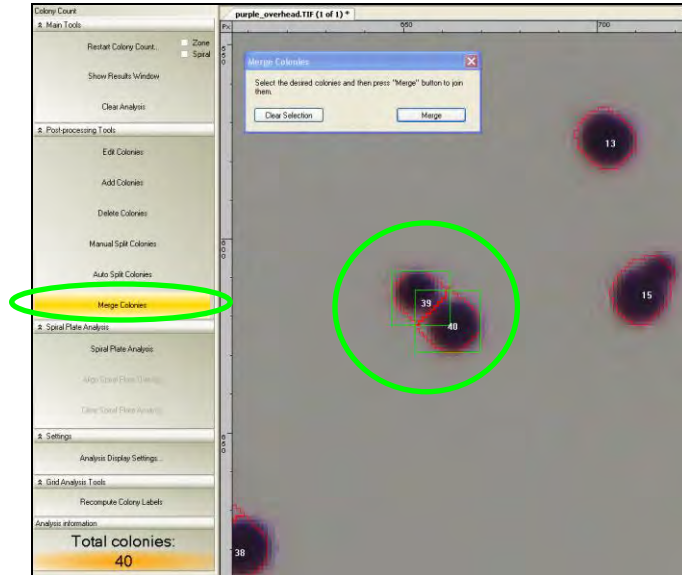
Users may merge colonies by performing the initial count (**Automated Count**, **Manual Count**, or **User Defined Template Count**), and merging colonies manually. Colonies should be merged when one colony is treated as two separate colonies by the software. Colonies will only be merged if they are less than 4 pixels apart.

To merge colonies, ensure that the **Merge Colonies** tab is highlighted in yellow.

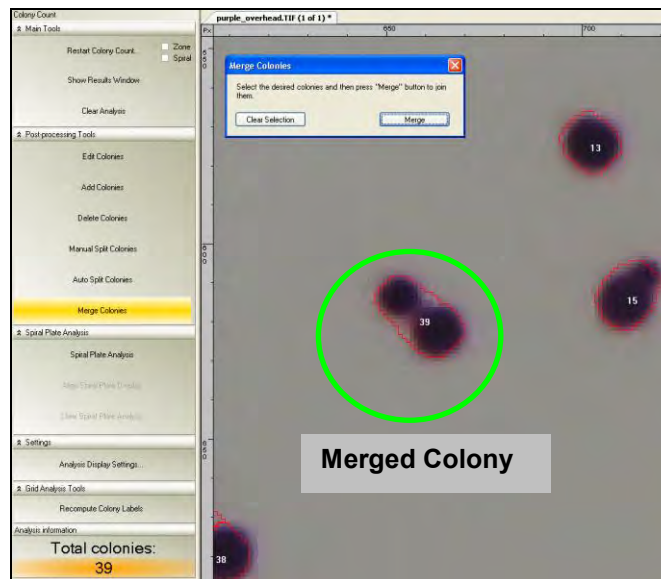
A new window will ask the user to “Select the desired colonies and then press Merge button to join them.”

If the colony is hard to see, zoom in on the colony. In the **Zoom/Pan** module, move the slider button towards the + sign on the right to zoom in. A rectangular object will appear in the **Zoom/Pan** module. Move it over the area of interest. The central Petri dish image will appear larger in the area identified by the rectangular object.

Click onto the colonies to be merged.



The **Total colonies** count will now reflect changes due to merging the colonies.

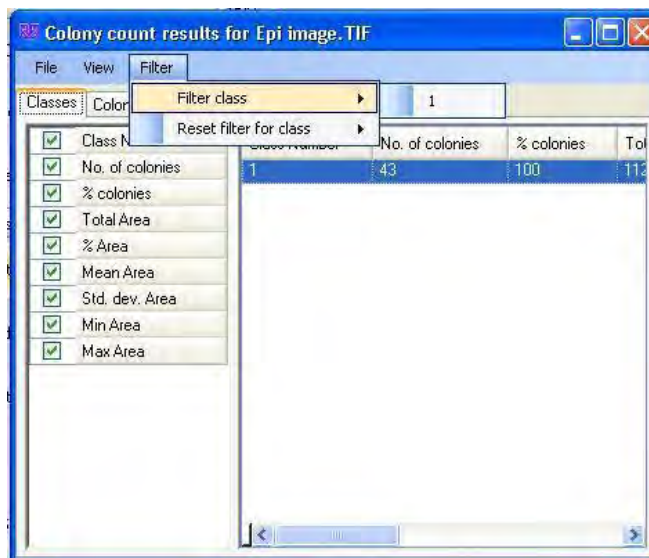


## Using the Software

### Changing Filter Settings

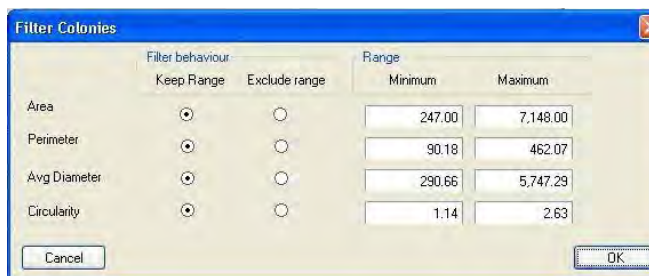
To reduce user initial set-up time, filters were created to count “true” colonies and remove inherent defects from the sample plate that would (without the filters) be included in the total colony count. The filters may prevent a colony from being counted based on some critical parameters.

To set new filter parameters, click onto the **Show Results Window > Filter > Filter class** and drag the pointer to the filter class to change.



A new **Filter Colonies** window will appear with the following parameters: **Area, Perimeter, Avg Diameter, and Circularity**.

The predefined ranges are defined. Each parameter can be changed to accommodate a wide variety of sample types.



The new range can either be inclusive or exclusive. Click onto the **Keep Range** or **Exclude range** depending on sample requirements.

Enter the values to keep or exclude. Click **OK**.

The software will recount the colonies based on the new filter values.

## Preferences

Open the Preferences window from **File > Preferences**. This window allows users to set new defaults for the display options, label color, annotation, camera template settings and miscellaneous functions such as annotation.

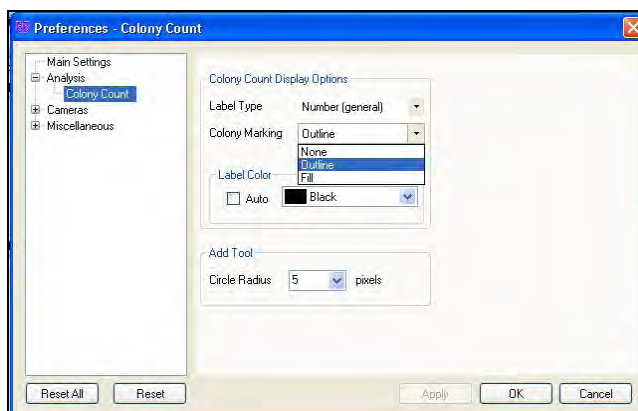
To change the **Label Type**, from the **Analysis > Colony Count** preferences window, click the drop down arrow and select from:

- None
- Class
- Number (general)
- Number (in class)

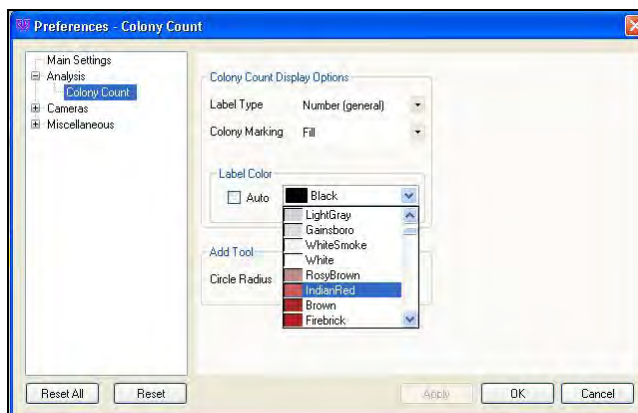


To change the **Colony Marking**, click the drop down arrow to select from:

- None
- Outline
- Fill



To change the **Label Color**, click **Auto** or click the drop down arrow and select from the colors listed.

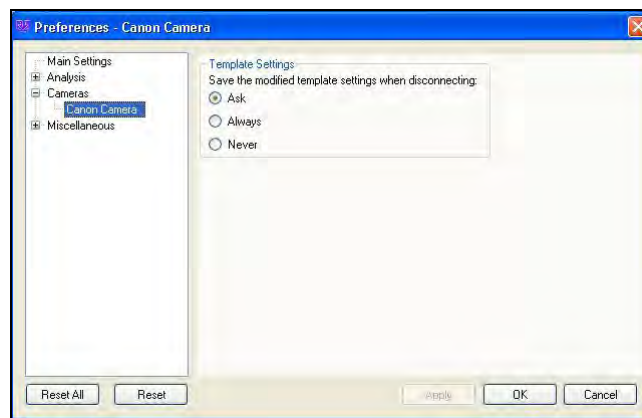


To change the **Circle Radius**, click the drop down arrow and select from the numbers to change circle pixel radius.



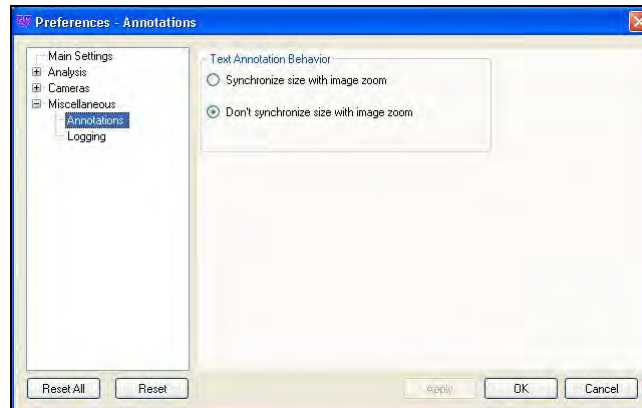
The **Cameras > Canon Camera** preferences window allows users to save modified template settings after disconnecting. Choose from:

- Ask
- Always
- Never



To change the **Text Annotation Behavior**, select from:

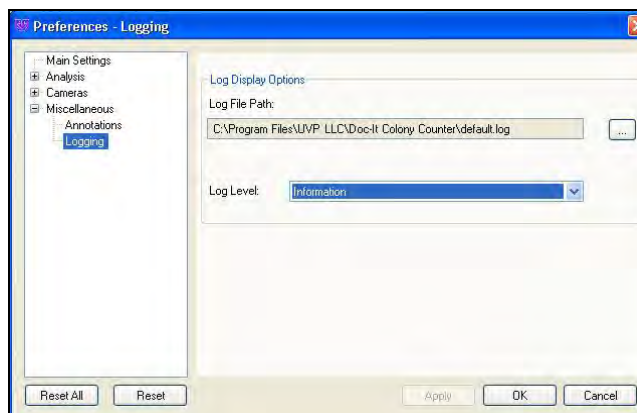
- **Synchronize size with image zoom** which reduces/increases the size of the annotations when the size of image is reduced/increased
- **Don't synchronize with image zoom** which maintains the size of the annotations if the image is reduced or increased



The **Logging** preferences window allows the user to define the log file path and the log level.

To change the **Log File Path**, click ... and locate a new directory.

To change the **Log Level**, click the drop down arrow and select from the list.



## Toolbars

The toolbars allows users to select most commands with a single button click. The toolbars are customizable to allow users the flexibility of including the commands used most and remove commands rarely used.



The initial default buttons include:

- **Open:** Opens an image file previously stored
- **Save:** Saves the current image
- **Save As:** Saves the current image to a different name
- **Close:** Closes the software program
- **Print:** Prints the current image
- **Copy:** Copies selected text, selected portions of the current image or the entire image to the clipboard
- **Paste:** Pastes the current clipboard item onto the screen
- **Paste Special:** Pastes an overlay of the current item in the clipboard
- **Cut:** Cut a specific area
- **Edit Annotation:** Select an annotation to edit
- **Text Annotation:** Creates text annotation
- **Line Annotation:** Creates line annotation
- **Rectangle Annotation:** Creates rectangle annotation
- **Ellipse Annotation:** Creates ellipse annotation
- **Highlighter Annotation:** Creates highlight annotation
- **Define Image Scale:** Calibrates the image to ruler dimensions instead of pixels

- **Measure Length:** Allows users to draw a line and measure the distance between any two points on the image, units depend on spatial calibration
- **Measure Angle:** Allows users to draw an angle and measure the degree value contained in that angle
- **Measure Area:** Allows users to draw an area and measure the area contained within that area
- **New ROI:** Removes the active Region of Interest and prepares for a new one of the current type
- **Rectangular ROI:** Changes the current mouse tool to select the Rectangular Region of Interest and brings up one if already present on the current image
- **Elliptical ROI:** Changes the current mouse tool to select the Elliptical Region of Interest and brings up one if already present on the current image
- **Polygonal ROI:** Changes the current mouse tool to select the Polygonal Region of Interest and brings up one if already present on the current image
- **Freeform ROI:** Changes the current mouse tool to select the Freeform Region of Interest and brings up one if already present on the current image
- **Magic Wand ROI:** Lets users select a consistently colored area (for example, a red flower) without having to trace its outline

## Reporting Functions

The results of the colony count can be displayed in the results window. To show the results:

- Click the **Show Results Window** to bring up the colony count results.
- The colony count results for the Petri dish are displayed with tabs on the upper left hand side of the screen.
- The tabs are Classes, Colonies, Statistics, and Distribution.

## Classes

In the **Classes** tab, information is displayed regarding critical parameters of each class recognized in the Petri dish. The Classes reported category and associated values are listed below.

**NOTE:** All dimensional information is reported in pixels unless the plate has been calibrated.

Class Number	No. of colonies	% colonies	Total Area	% Area	Mean Area	Std. dev. Area	Min Area
1	71	100	62867	100	899.1	707.56	20

- Number of classes in the sample
- Number of colonies in that class
- Percent of colonies of that colony classification in the sample

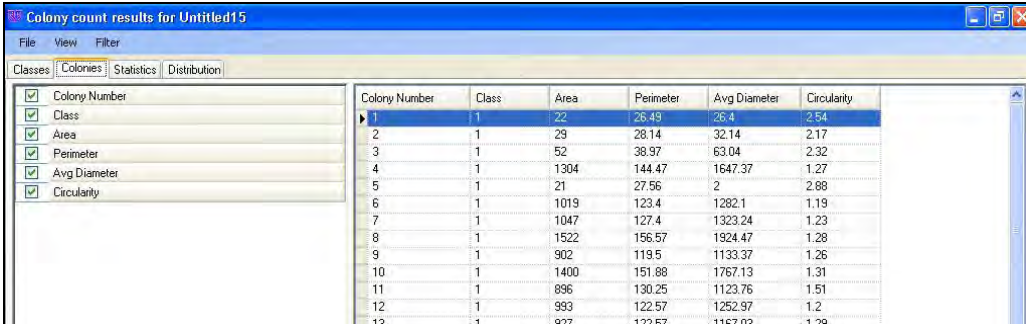


- Total area of the class on the sample (in pixels)
- Percentage of area of the class on the sample
- Mean area of the class (in pixels)
- Standard deviation of the area
- Minimum area (in pixels)
- Maximum area (in pixels)

## Colonies

In the **Colonies** tab, information is displayed regarding critical parameters of each colony counted in the Petri dish. The Colonies reported category and associated values are listed below.

**NOTE:** All dimensional information is reported in pixels unless the plate has been calibrated.



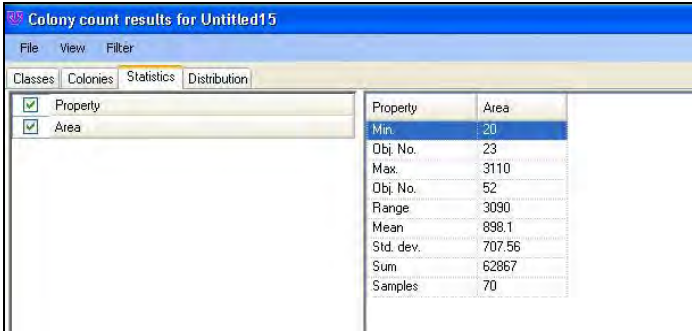
Colony Number	Class	Area	Perimeter	Avg Diameter	Circularity
1	1	22	26.49	26.4	2.54
2	1	29	28.14	32.14	2.17
3	1	52	38.97	63.04	2.32
4	1	1304	144.47	1647.37	1.27
5	1	21	27.56	2	2.88
6	1	1019	123.4	1282.1	1.19
7	1	1047	127.4	1323.24	1.23
8	1	1522	156.57	1924.47	1.28
9	1	902	119.5	1133.37	1.26
10	1	1400	151.88	1767.13	1.31
11	1	896	130.25	1123.76	1.51
12	1	993	122.57	1252.97	1.2
13	1	927	122.57	1167.03	1.29

- Class number
- Total area of that colony (pixels)
- Perimeter of the colony (pixels)
- Average diameter of the colony (pixels)
- Circularity of the colony (numerically depicts roundness of the colony)

## Statistics

In the **Statistics** tab information is displayed which shows the Statistical property and the area (in pixels) associated with that property.

**NOTE:** All dimensional information is reported in pixels unless the plate has been calibrated.



Property	Area
Min.	20
Obj No.	23
Max.	3110
Obj No.	52
Range	3090
Mean	898.1
Std dev.	707.56
Sum	62867
Samples	70



The second tab shows **Colonies**.

1	Colony Number	Class	Area	Perimeter	Avg Diameter	Circularity
2	1	1	132	61.21	154.59	2.26
3	2	1	3780	285.16	4756.18	1.71
4	3	1	2266	186.27	2867.96	1.22
5	4	1	2719	221.92	3440.77	1.44
6	5	1	2330	186.61	2844.64	1.21
7	6	1	3710	275.99	4695.67	1.63
8	7	1	1912	165.54	2417.96	1.14
9	8	1	2038	172.62	2577.38	1.16
10	9	1	4340	304.84	5423.8	1.7
11	10	1	1950	172.76	2461.69	1.22
12	11	1	1714	158.71	2168.41	1.17
13	12	1	5117	389.46	5811.36	2.36
14	13	1	3138	227.24	3870.13	1.31
15	14	1	2091	175.2	2649.54	1.17
16	15	1	2776	200.51	3516.54	1.15
17	16	1	2266	180.61	2863.21	1.15
18	17	1	1442	145.88	1819.06	1.17
19	18	1	2029	172.37	2565.38	1.17
20	19	1	1911	165.54	2413.26	1.14
21	20	1	3292	253.62	4157.11	1.55
22	21	1	2040	175.54	2579.74	1.2
23	22	1	1535	151.54	1943.14	1.19
24	23	1	2145	176.85	2712.8	1.16
25	24	1	2381	186.27	3017.14	1.16
26	25	1	5419	378.19	5330.79	2.1
27	26	1	3286	251.72	4092.11	1.53
28	27	1	1634	154.71	2061.18	1.17
29	28	1	3144	214.65	3972.79	1.17
30	29	1	2279	184.99	2873.73	1.2
31	30	1	1946	169.78	2462.88	1.18
32	31	1	2291	181.68	2894.16	1.15
33	32	1	1692	156.12	2136.76	1.15
34	33	1	2487	189.44	3148.72	1.15
35	34	1	2506	193.1	3169.51	1.18
36	35	1	2532	193.66	3204.36	1.18
37	36	1	1823	163.78	2364.29	1.17
38	37	1	2280	181.68	2883.51	1.15
39	38	1	3141	213.82	3968.53	1.16
40	39	1	3105	225.75	3923.89	1.31
41	40	1	2108	175.2	2667.96	1.16
42	41	1	7189	458.89	5199.7	2.33

The third tab shows **Statistics**.

1	Property	Area
2	Min.	114
3	Obj. No.	44
4	Max.	7189
5	Obj. No.	41
6	Range	7075
7	Mean	2643.36
8	Std. dev.	1277.89
9	Sum	118961
10	Samples	45
11		
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## Supporting 21 CFR Part-11 Compliance

### Purpose

US - Food and Drug Administration (US-FDA) created and released Part 11 of Title 21 of Code of Federal Regulations (CFR) in August 1997.

The rules delineate the conditions under which the US-FDA considers electronic records and electronic signatures equivalent to paper records and paper signatures. The instructions for compliance really span the entire organization and its practices. LS software by UVP is one piece that rightly fits into the bigger picture and *supports* compliance.

Note: *While software from UVP, LLC is an essential tool for assisting an organization to maintain CFR compliance, UVP cannot claim that this is the only tool needed to achieve overall CFR compliance. The organization must establish policies and procedures that work in conjunction with such efficient tools, to ensure total compliance with 21 CFR Part 11 regulations.*

### Features

UVP provides software support for the following two sections of CFR regulations:

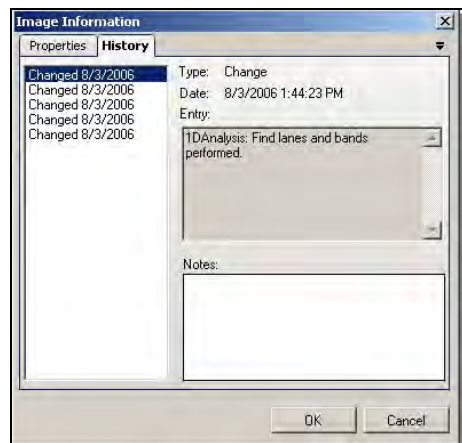
- Section 11.10 (e) – For electronic records, this section requires the use of computer- generated, time-stamped audit-trails to track changes.
- The software keeps track of all changes that affect image-data. Any action in the software that modifies the original data of an image open in the LS workspace, is logged. The log of such changes is individually maintained for each image and is referred to as „History’ in the software.
- Section 11.3 (b) (4) – This section mandates that the system be controlled by users responsible overall for contents of electronic records required to track.

The software provides an elaborate system of maintaining secure user accounts. Assign unique usernames and passwords to all the users who will be using the software. Each account can also be configured to provide read or modify access to other users’ data. Events generated in the audit trail (above) are logged with the username.

### Usage

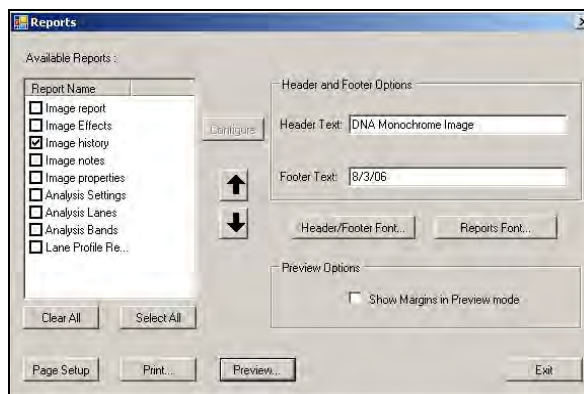
#### View an Audit Trail (History)

- Open the image in question.
- Right click on the image and select Image Information. Open the **History** tab.
- Events are listed in the left column. Click on each event to view the entry details on the right.
- Add notes to each event if required.



## Print an Audit Trail (Image History)

- Open the image for which an Audit Trail print copy is needed.
- Go to **Tools > Reports**. (This option is disabled, if no printer is available.) A window opens with various types of reports available.
- To select to print an Audit Trail, click the **Image History** item. If other reports are required, click in the checkbox of the other reports needed. For example, if both an audit trail and the image report need to be printed, click on **Image Report** and **Image History**.
- Adjust the header and footer settings or printer settings if necessary, and print the trail.



## Servicing the ColonyDoc-It

### Cleaning and Care

Use 70% Isopropanol Alcohol to clean the ColonyDoc-It external surfaces, base, and doors.

Clean the ColonyDoc-It twice a day, before and after every use.

### Cleaning the Diopter

Weekly clean the diopter with a soft photographic lens cleaning cloth dampened with lens cleaning solution.  
**CAUTION: Do not pour the solution directly onto the diopter.**

The diopter is located in the filter box. To access the diopter:

Remove the four brass thumbnuts on the filter box and remove the filter box from the housing.

Clean both sides of the diopter. Remove the filter if necessary to access the diopter (refer to *Installing the Filter* for instructions on removing the filter.)



## Replacing Switches

Follow these steps to replace the light switches on the cabinet. Refer to replacement parts for ordering information.

**NOTE:** This only applies to the light switches on the front of the system. Removal of other switches voids the manufacturer's warranty.

- Unplug the cabinet from the power source prior to removing the power switch.
- To remove the switch from the unit, use a thin flathead screwdriver to pry the switch out from the housing. Be careful not to scratch the paint of the unit in the process.
- Once the switch is removed, a number of connector wires will be observed plugged onto the back of the unit. Normally there are two black and two white wires, with some exceptions. Pull one wire out of the old switch and put it into the same connector location on the new switch. Continue this process for each wire until all are connect to the new switch.
- Push the new switch into position.

## Replacing Fuses

Fuses are located in the back of the unit.

- Remove the fuse by using a flathead screwdriver to turn the fuse counter clockwise.
- Pull the fuse out.
- Insert the new fuse.
- Use a screwdriver to turn the fuse clockwise to lock.

## Ordering Replacement Parts and Accessories

Contact UVP or authorized distributor for replacement parts. For replacement parts or components not shown here, please call UVP Customer Service or place of purchase.

Replacement Parts	Part Number	Qty Required
Switch, light	53-0135-01	1
Fuse, 3.15AMP/250V 5x20m, SLO BLO	56-0022-04	2
Thumbnut	62-0117-01	Order as required
GFP Filter	38-0340-01	1

## Troubleshooting

### **Camera not active**

Once the software loads, the Camera control window should become active. (The user should be able to select plate diameter sizes, colony sizes, and use all the functions within the Camera control window.)

If the Camera control is not active, turn the power switch off and then back on in the back of the unit. If a window appears such as the one to the right, select Cancel.



If the window is still inactive, remove the USB cable from the USB port on the computer and then plug the USB cable back into the USB port on the computer.

If the window is still inactive, contact Technical Support.

### **Count not accurate**

The user may add, delete, merge, and split colonies for a more accurate count.

The user may increase or decrease the count area by using the ROI tool to change the area of interest using the Automated or Manual Count.

The user may perform a manual count. Refer to the Manual Colony Counting procedures in this manual.

The user may change the pre-defined filter settings. These settings are area of the colony, perimeter of the colony, average diameter of the colony, and circularity of the colony. Refer to the manual section *Changing Filter Settings*.

### **Preview out of focus**

If the preview image is out of focus, select **Focus Preview** from the **Camera control** module. If the camera is still out of focus select **Calibrate & Lock Focus** from the **Camera control** module.

### **No power to the cabinet**

Recheck main power cord connections to the system and the wall power (surge protector).

Check the power switch on the back of the unit. Make sure it is in the I position.

Check the fuse located on the main power port. Replace if necessary. If the system continues to blow fuses, call UVP Technical Support Department.

## **Return Service Procedure**

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

- All returns must be authorized by UVP whether for credit, warranty replacement or repair.
- Items returned for credit may be subject to a restocking charge.
- Please contact our Customer Service Department for a Returned Goods Authorization (RGA).
- No credit will be issued or allowed until UVP has had sufficient time to inspect the product and determine corrective action.
- Returns must be made within 30 days of issuance of the RGA number and product must be in original packaging with all manuals and instructions.
- RGA number is non-transferable and good for one use only.
- Products returned for credit or replacement must be in like-new condition. All products must be free from Bio-Hazardous contamination with a contamination-free certificate attached. Contaminated products will be returned collect.
- Products returned for repair will be evaluated by Quality Control. Estimated cost for repair will be submitted to customer for approval. If accepted, all evaluation costs will be credited towards entire repair. Non-repaired products can be returned at customer's cost.
- Freight must be prepaid on goods returned to UVP by the customer.

For complete terms and conditions, contact UVP.

## Technical Support

UVP offers expert technical support on all of our products. If there are any questions about the product's use, operation or repair, please contact our offices at the locations below.

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

## Warranty

UVP, LLC warrants all of its products (except tubes, grids and filters which is 90 days) to be free from defects in material and workmanship for a period of one (1) year from the date of purchase. All transilluminators carry a two (2) year warranty. The foregoing warranty of UVP shall be of no force and effect if the buyer has modified or damaged the product.

All warranties or merchantability and fitness for any purpose, and all other warranties, express or implied, except those expressly set forth herein, are deemed waived and excluded.

UVP's duty under the warranty is limited to replacement and/or repair of the defective part at the option of UVP, FOB, Upland, California. UVP shall not be liable for any expenses or damages incurred by purchaser except as expressly set forth herein, and in no event shall UVP be liable for any special, incidental or consequential damages of any kind.