Capture 2.4

Instruction Manual

Content

General Introduction

Capture is a set of powerful software that integrates the controlling the working of micro-imaging cameras, the calculating imaging, the images processing and the flowing work of measuring and counting, from it, users can obtain much better operating experiences.

Capture can drive and control cameras which are installed on the microscopes from different manufacturers, it helps to bring you the best performance in your micro-imaging jobs.

When you need to make the best uses of the potentials of your microscopes and their cameras, Capture can apply accurately almost all the parameters you select, and it optimizes to these settings of these parameters through its user-friendly designs.

Capture enables users to set up their customized desktops according to their actual applications. When user combine the customized desktops with his customized working flows, there will be a distinct layout of the software working appearance, the user is ensured the accuracy of his experiment results no matter the software is working with multi-tasks or under multi-users circumstances.

Capture achieves senior quality images due to its powerful real-time calculating engine. The function of real-time stitching helps you to obtain a super wide of FOV image which is the result of real-time auto-images-stitching, when you moving your mechanic stage of the microscope. Real time EDF functions can offer you a combined picture of extended-depth-focusing (EDF) rapidly with less than one second.

From the users' points of view, assuring the best operating procedures, the developers of Capture refined the all-new camera operating work flow as Efficient image acquisition->Image edition->measurement->report by modularizing designs. This work flow, acts in concert with the latest image processing algorithms, greatly saves the users' operation time and then improves their working efficiency.

1. Starting Interface

When installing and starting up the software for the first time, the biological or industrial application option box will pop out, select your application direction to enter the software. The software will automatically optimize parameter settings based on your choice. While using software, the application direction can also be switched through [Information] - [Options] - [Microscope] on the right upper part of menu bar.
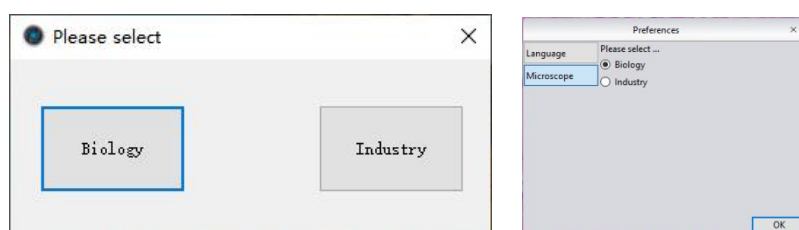
Click and select **[Biological]**. Entering the software, automatic white balance is defaulted with gamma value 2.10 and the mode of exposure to the right. Click and select **[Industrial]**. Entering software, the default color temperature value is 6500K, and the software default as area white balance, and adopts the gamma value of 1.80 and middle exposure mode.
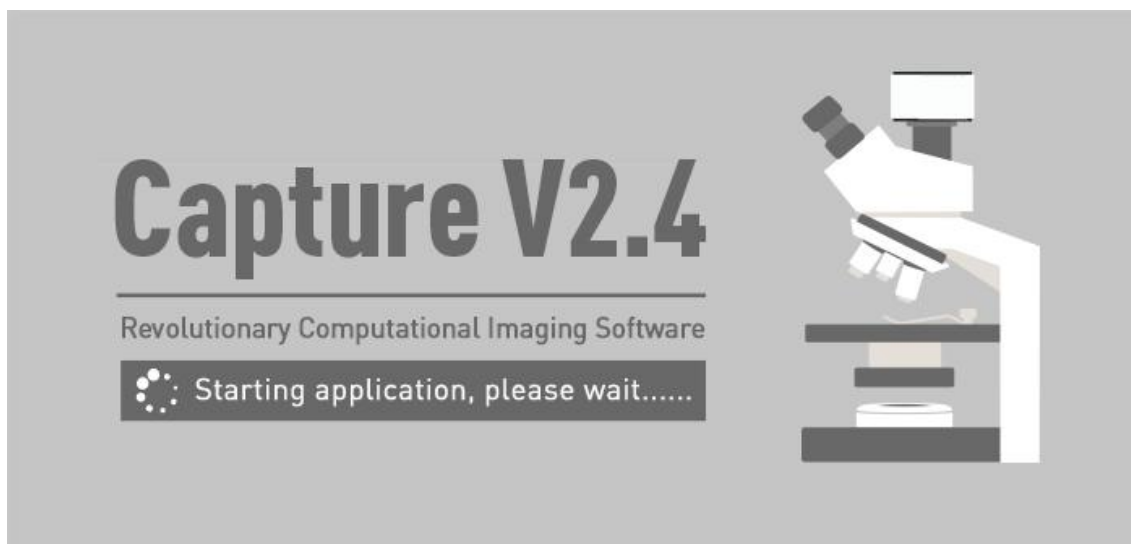
It normally takes around 10 seconds for software start-up. When there's no camera connected or it is connected with an unsupported camera, an error is prompted as shown below when the software is started. At this time, by clicking the button "**OK**" or closing the prompt, the software will be closed automatically.

It normally takes around 10 seconds for software start-up. Some cameras will open for a longer time, such as the FL-20BW will generally open for about 20 seconds.

If the camera is not connected or an unsupported camera is connected, the software

only supports image processing, measurement operations and report operations.
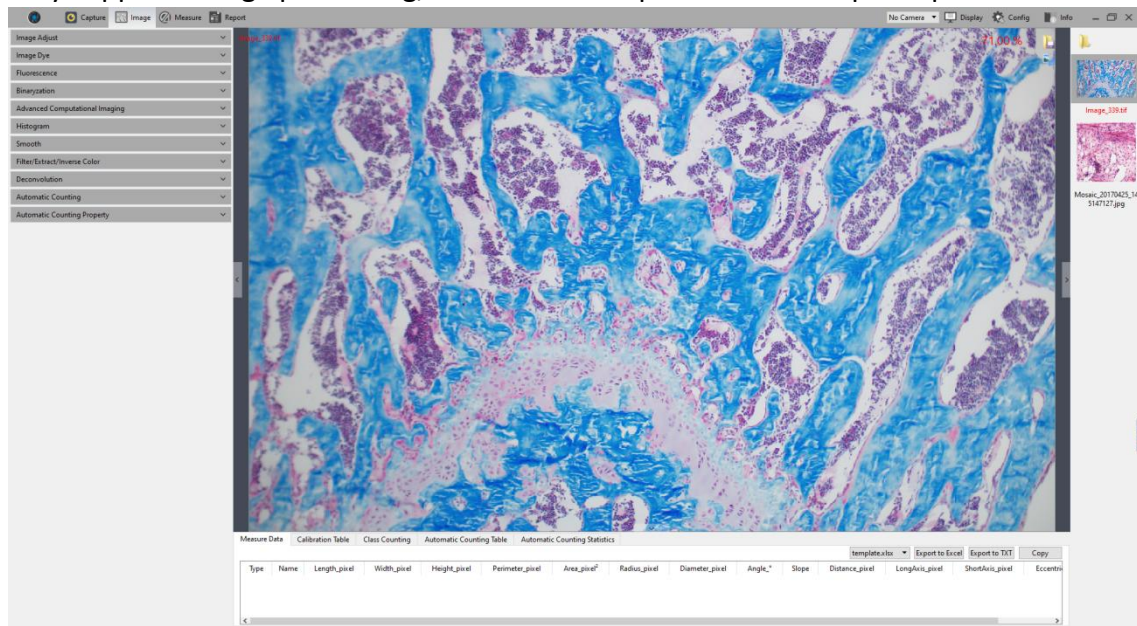
2. Windows

The home screen of software is mainly consisted of five parts - **status bar, control bar, preview window, data bar, picture bar:**
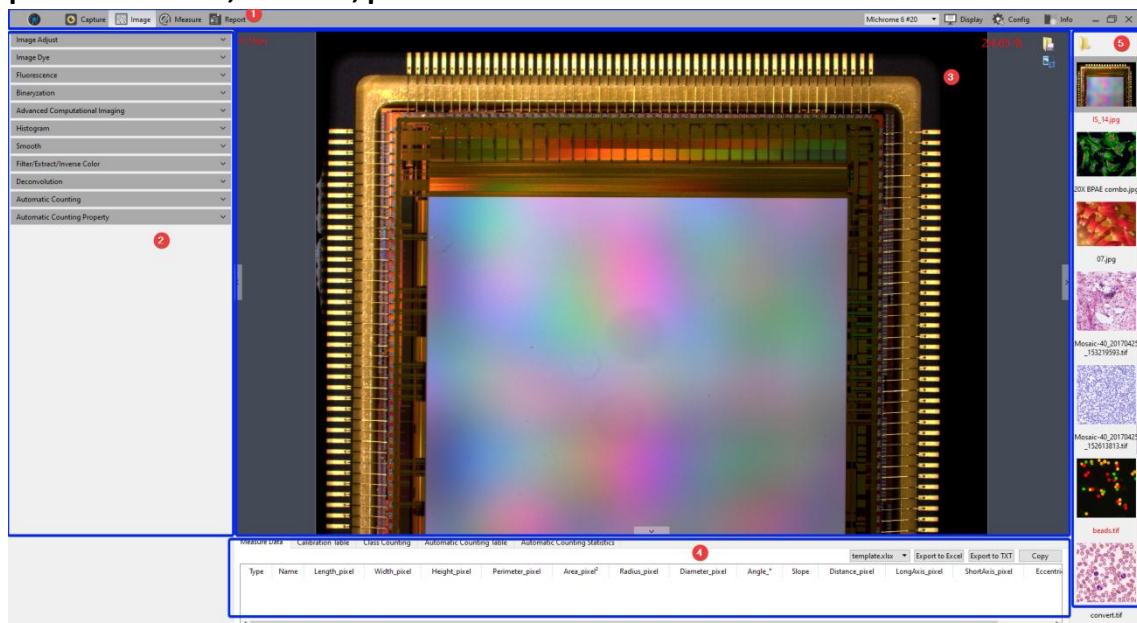
① Status Bar

There are seven main modules in the status bar, they are **Capture / Image / Measure / Report / Camera List / Display / Config / Info.** Click on the certain bar, the software will switch to related interface.

Multi-camera connection and hot-plug function, only supported by Windows system, not supported by Mac system, and please use computer's USB3.0 port for hot swap, and do not unplug or plug the camera when the camera list is refreshed.

In the camera list, the recognized camera model is displayed. Click the camera name to switch the camera.

When the current camera is removed, it will automatically switch to another camera, or display no camera.

Note: Hot swap is not supported in the MAC version;
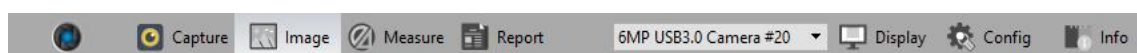
② **Control Bar**

All function modules supported by camera are displayed on the left side, click module status bar button to check detailed functions.

Click ⌄ button to unfold all the functions display.

Click ⌃ button to fold up all the functions display.

③**Preview Window**
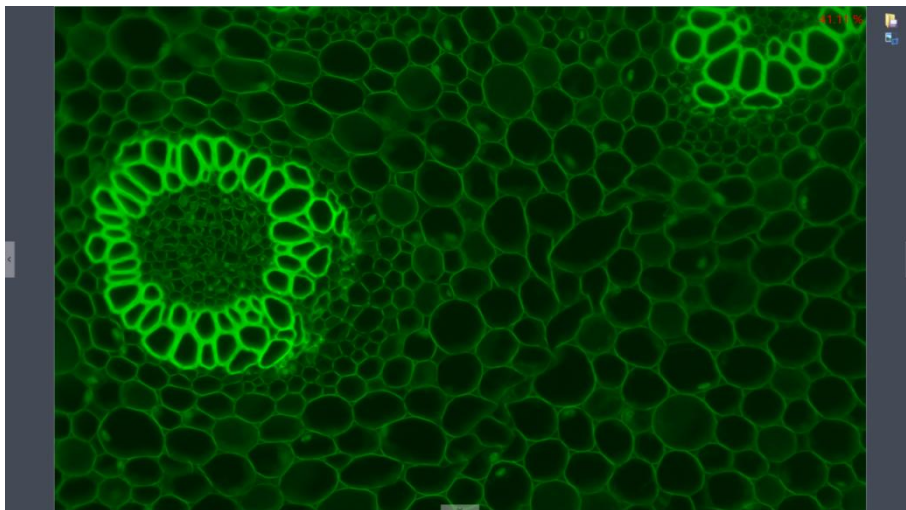
1) To display the real-time viewing and captured images.

2) Mouse roller can zoom out/zoom in pictures; the cursor always appears at the center of the picture.

3) Hold down the left button / right button / scroll wheel of mouse to drag the image display area.

4) Click the control button at the edge of the window: left, right, down can expand or contract the corresponding operating bar.

5) Click the button to save the currently selected picture as another document,

then the following window will pop up. The software supports four image formats for saving or saving as: [JPG] [TIF] [PNG] [DICOM].
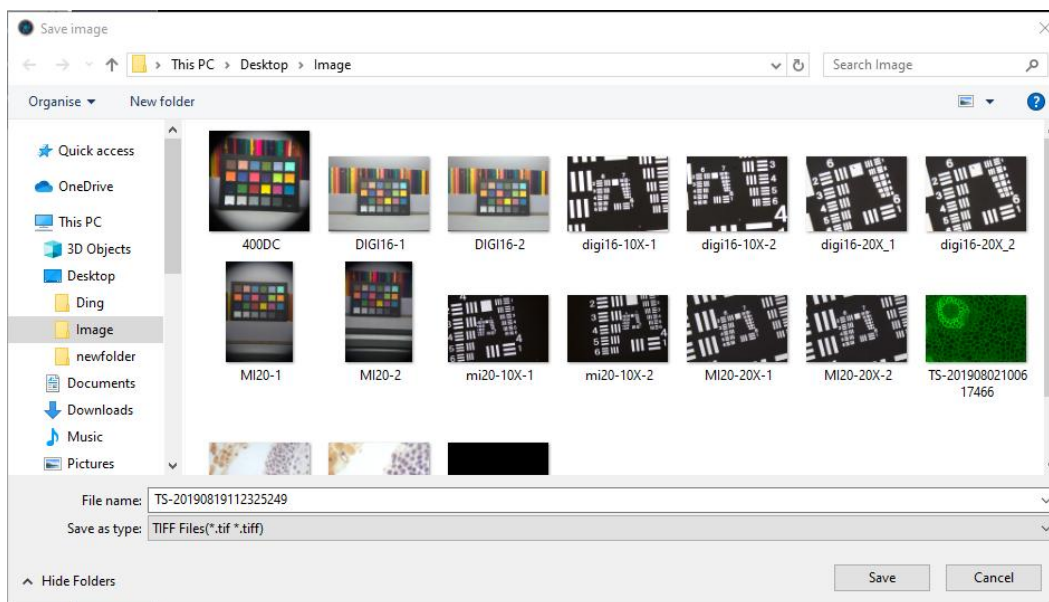
④ Data Bar

To show the measurement and statistics tables.

The measurement table supports the export of custom templates. For specific operations, please refer to the report chapter.

⑤ Image Bar

The captured pictures, videos and pictures, video thumbnails opened through other paths are displayed on the right side of the software. Picture shows emission reduction by time from top to bottom, to click any image can switch it to [Image] page in order to adjust the parameter settings. The specific operation is as follows:

1) Click the 📁 button to locate the saving path of the file, select the path in which the image need to import or open, the interface will switch to the following.

   To double click selected pictures can add them to the preview window on the right side.
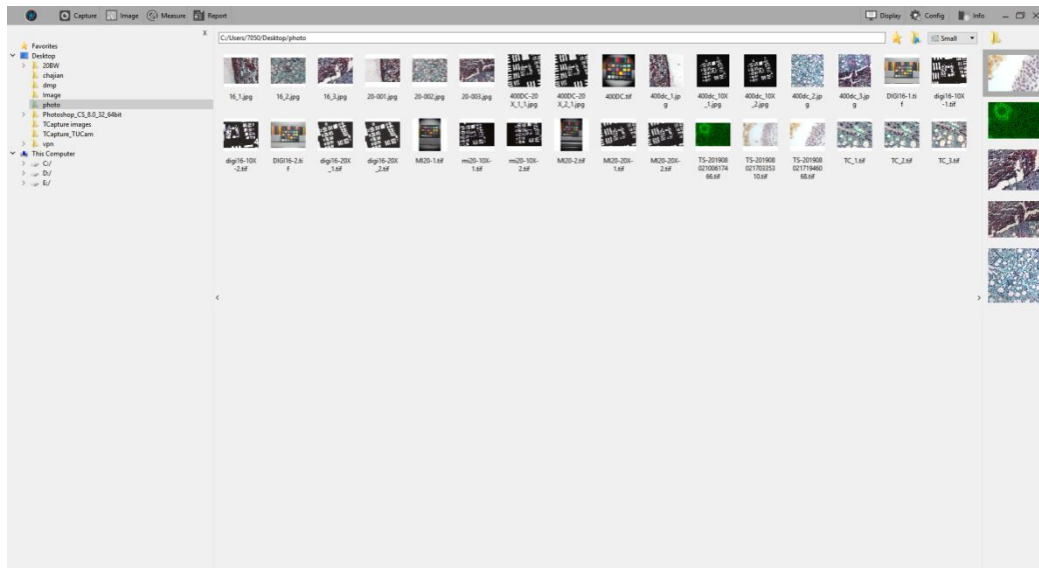
2) Right click on one of the image, the dialog box of operations will pop up as below.
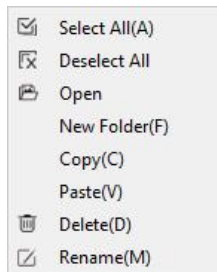
It supports [Select All (A)], [Cancel All], [Open], [New Folder (F)], [Copy (C)], [Paste (V)], [Delete (D)] and [Rename (M)]; you can use ctrl+c shortcut keys to copy images, use ctrl+v to paste it to the current folder; Select the files-saving path on the left side. Click the ᵡ button to close the window.

● The saving path and all the images under this path will display on the right side of the window.

● Click the ⭐ button to add the current saving path to the favorites folder for the next time of speedy opening.

● Click the 📁 button to return to the upper directory. Click following buttons to select picture view mode.

3) Right click on an image or on the blank area of the interface to pop up the operation menu, under which, [Rename], [Close], [Close All], [Delete All], [Delete] [Compare], [Save Compare] operations are able to performed.
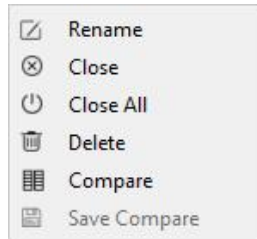
There are two contrast mode: dynamic contrast and static contrast.

● Dynamic contrast: The contrast between preview image and saved picture. In preview status, right click picture bar will eject operation menu, then select [Contrast]. Dynamic preview picture will appear on the left side of the page, any saved picture selected on picture bar will appear on the right side, and the pictures on the right side can be replaced at anytime. Click on the right upper corner to exit contrast.

● Static contrast: Contrast between two saved pictures. Selecting an image, and by right clicking picture bar, the operation menu is popped out; then selecting [Contrast], the selected picture will appear on the left side of the page. Clicking another picture on the right side of picture bar, it will appear on the right side. During static contrast, pictures on both sides can be replaced at any time: firstly, click the picture which needs to be replaced, and then click the picture to replace; the process will be completed.
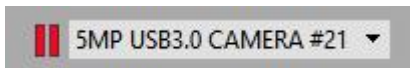
To save contrast can save the pictures being contrasted. The contrast effect is as follows.
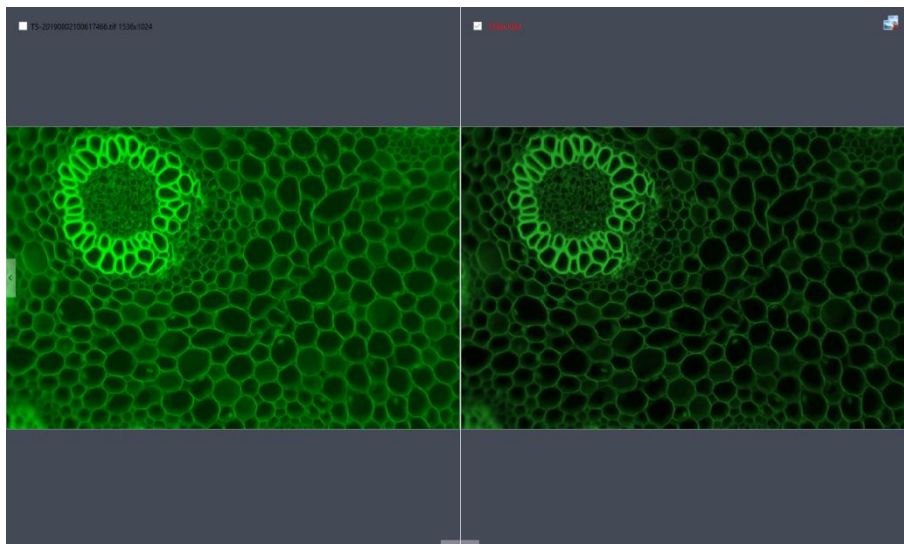
⑥ **Shortcut Key**

In order to make clients' operation more convenient, the software provides shortcut key functions. Specific functions are as follow:

Function	Key	Remarks

Capture	F10	Take pictures and automatically save the taken pictures.
Record videos	F11	Press once to record, press again to stop recording
Close all	F9	Not to display right thumbnails. A prompt box will appear: whether to close all pictures, click [Yes] to take effect.
Save image as	F8	Can change the picture format or picture saving position.
Pause	F7	Pause/ Resume the preview. When the preview is paused, a pause state prompt appears on the interface, as shown in below

3. Capture

3.1   Capture

Click the button to capture the image of the preview interface, support continuous click;

3.2   Resolution

Resolution: select the resolution of previewing.
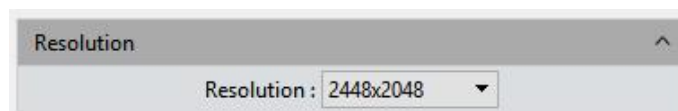
Note:

● The High Speed binning resolution of Monochrome Cooling camera can increase the frame rate;

● The compress resolution of the HDMI series will increase the frame rate, but the CPU usage is high;

3.3   Binning

Binning: Binning mode can improve the sensitivity of the image. The larger the value is, the higher the sensitivity is.

Note: This function performs sum binning on the basis of the original data, the amount of data does not change, so the frame rate does not change;

3.4   Exposure Control

Set the exposure time of camera and then the value of real-time frame per Second (FPS) will show up.
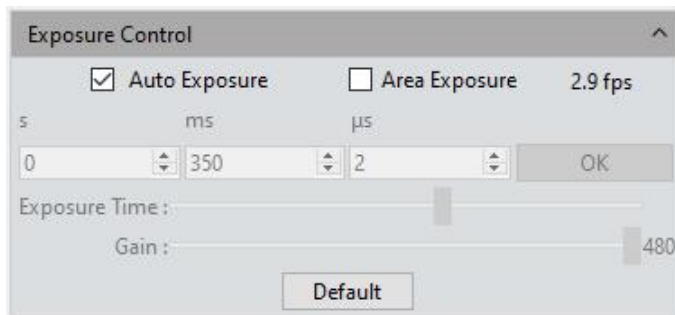
Target Value: The adjustment of target value can change the automatic exposure brightness of the image; the target value range for USB3.0 series are 10~245; USB2.0 series and HDMI series are 0-15.

Auto Exposure: check the blank in front of the [Auto Exposure], the software automatically adjusts the exposure time according to the brightness of the image to obtain an image with appropriate brightness.

Area Exposure: Check the [Area Exposure], the software automatically adjusts the exposure time according to the image brightness in the area.

Manual Exposure: Uncheck the [Auto Exposure], system switches to [Manual Exposure] mode, user can manually input the exposure time into the blank according to his actual demands for the image, then click [OK] button to apply, or manually adjust the exposure time linearly through the slider.

Gain: User can select the most suitable gear of gain according to his specific applications and needs on images previewing. Greater gain brings the improvement of the brightness, but with the increasing noise.

Default: Click the [default] button to restore this module's parameters to the factory default ones. The default setting of exposure is the [auto exposure].

3.5   White Balance

User can adjust the parameters of white balance according to the actual light source to obtain better image effects which closely meet the needs of his.
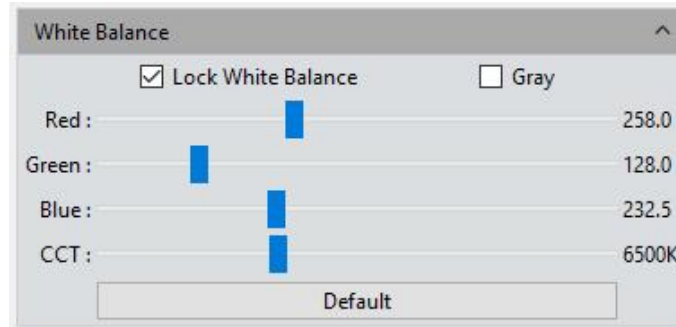
White Balance: By adjusting the ratio of the three individual components of red, green and blue, the camera is able to reflect the true image color under various illuminating conditions. The default setting of the white balance of the camera is Auto-white balance. User can uncheck **[Lock White Balance]** under the environment with stable illuminating conditions, while the user can check **[Lock White Balance]** to lock the current white balance setting under unstable illuminating conditions.

Area white balance: In the biology mode, when opening white balance options, and **[Area White Balance]** is selected, area white balance box will pop out on the preview pictures. In the industrial mode, when opening white balance options, area white balance box will pop out on the preview pictures. The size of area white balance box is adjustable. Under stable lighting environment, move the area white balance box to any white part of the pictures, then adjust size, and check [Lock White Balance] to lock present white balance, which will make white balance calibration more accurate.

Gray: Check to converts a color image to a monochrome image.

Red, Green, and Blue(Gain): Manually adjust the gain values of the red, green, and blue channels for suitable white balance effect, adjusting range is 0~683

Color temperature(CCT): The current close color temperature can be achieved by adjusting the three gains which are the above Red, Blue and Green. It can also be manually adjusted and matched to the close color temperature according to illuminating environment. By the way of calibrating the white balance will be more accurately to achieve the correct color temperature. Color temperature setting range is 2000K to 15000K.

Default: Click the **[Default]** button to restore this module's parameters to the factory default ones. The default setting of white balance is **[Auto-white balance]**.

3.6   Bit of Depth (only for Monochrome Cooling camera)

The preview image displayed by default is 8-bit data image. Capture allows the user to select the required 8/16-bit data for display preview according to the actual needs to meet the different needs of the user.
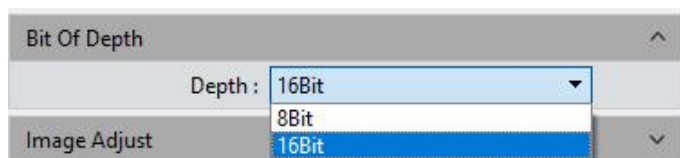
Note:

- The default bit depth of Monochrome Cooling camera is 16 bits;

- The default bit depth of USB3.0 color camera is 8 bits;

- The default bit depth of USB2.0 camera is 8 bits, and they can't support 16 bits;

3.7   Image Adjust

Conduct real-time dynamic adjustment of pictures by changing parameter to achieve ideal picture effect. Specific functions are as follow:
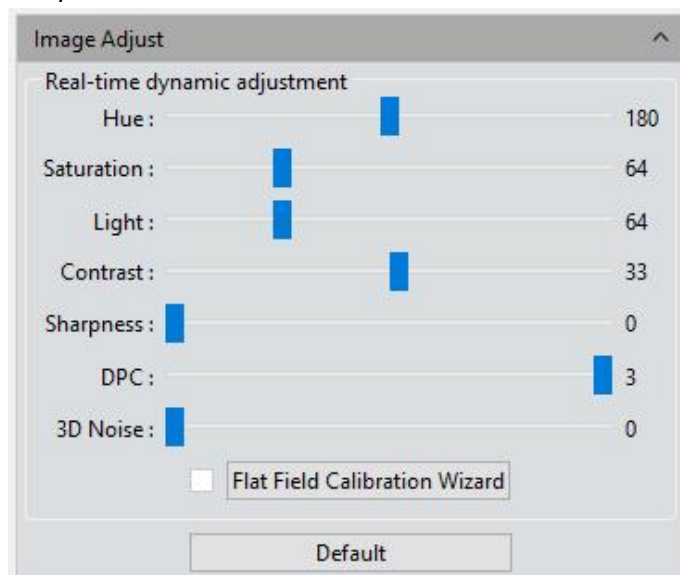
Hue: The shade of the color, adjusting ranges from 0 to 360.

Saturation: The purity of the color, the higher the purity, the more vivid performance,

the lower the purity, the bleaker of the effect, setting range is 0~255.

Light: The brightness and darkness of the image, setting range is 0~255.

Contrast: The higher the contrast is, the clearer the picture is, and the brighter the color is, setting range is 0~63.

Permeability: The enhancement of pictures, setting range is 0~48 for USB 3.0 camera and 0~63 for USB 2.0 camera.

Sharpness: To improve clarity of picture edges.

DPC: Reduce image bad points, range 0-3, 3 is default for FL-20.

Black level: Adjust gray value of dark field background, range 0-255, default 12, only for Monochrome Cooling camera.

3D noise reduction: take the average adjacent frames of pictures, automatically filter out the non-overlapping information, so as to obtain a purer and delicate picture. The number of frames can be customized. The setting range is 0~5 for Fl-20, and default is 3.

Flat Field Calibration: In actual microscope applications, the images captured by the camera may be uneven or carry color patches, due to the problems of microscopes' light sources, optical path systems, or the dirty spots on the microscope eyepieces and objectives. With flat field correction, those types of defects could be effectively reduced, the imaging effects will be more uniform, and the color reproduction of the images is smoother and more realistic.

Operations:

1) Click **[Flat Field Calibration Wizard]** to move the viewing field of camera to a blank background, as shown in the right figure (1);

2) Click [Next] to move the first background to another new blank background, click [OK] to apply the Flat Field Calibration function, as shown in the right figure(2);
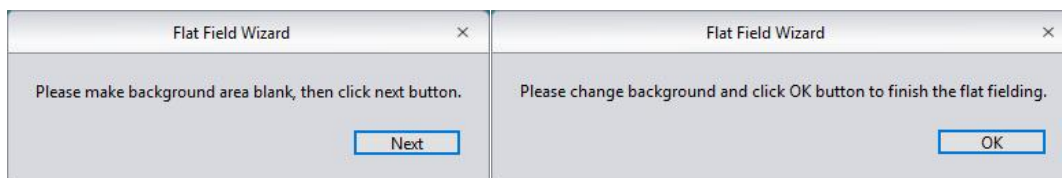
3) Select [☑ uncheck] to exit the flat field correction mode. If you need to apply it again, re-check it, no need for repeating the wizard procedures again.

Note:

1) The Flat Field Calibration requires the manually setting of the exposure time, so that the image brightness will not overflow up or down, and all the pixel values are

range from 64DN to 254DN.

2) The brightness of other areas of the two backgrounds which are used for references of correction should be almost the same except that there are some moving spots on the two backgrounds. These two background should not be those of "significantly inconsistent".

3) To standardize the background for the flat field correction, it is recommended to use plastic, ceramic or professional white balance paper as the standard samples.

4) Flat Field Correction requires that the background it use as reference to be a blank one and the light illumination on it is uniform. The correction should be conduct again if the camera or the microscope changed their lens or objective.

Default: The settings will restore to default value when you click [Default]. Color tune default is 180, contrast default is 33, saturation default value is 64, permeability default is 16, image enhancement save is defaulted to be unchecked, detail enhancement default is 1, and noise reduction default is 1.

3.8   Histogram

User can try the software function of color level Adjusting to obtain more realistic images for observation and analysis.
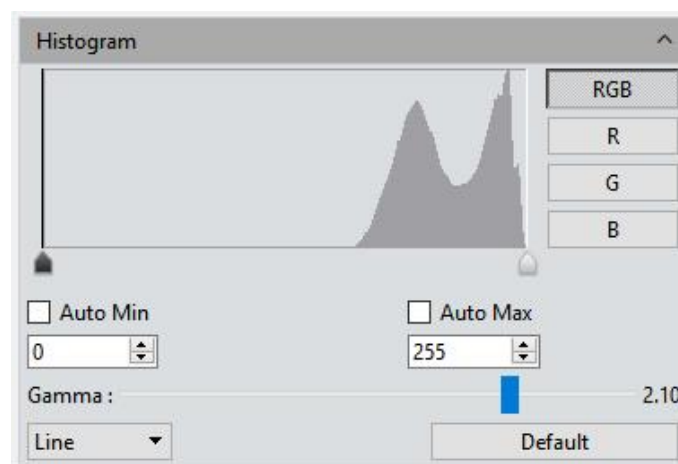
The color level adjusting means to redefine the R\G\B color levels in each channel and then re-allocate of the pixel values in among. Adjust the color level (gradation) to increase the range of the highlight area in the image, image becomes brighter, or using the contrary way to make the bright image darker. User can also adjust the components of the RGB three channels separately to change the image color of the corresponding channel.

Manual Color Level: User can manually adjust the image's dark tone (left gradation), the gamma and highlight brightness level (right color gradation) on the histogram to regulate the image's tones, such as the contrast, shading and image layers, then obtain the correct balance of the whole image.

Auto Color Level: Check [Auto Min] and [Auto Max] to automatically adjust the brightest and darkest pixels in each channel as white and black, and then re-allocate the pixel values in proportion.

Gamma: adjust the median of the color level, setting range is 0.64 to 2.55.

Histogram display: Histogram supports linear or Logarithm mode.

Default: Click [Default] button to restore the module's parameters to the factory default ones. The default of color level adjusting is manual, and the default gamma value is 2.10.

Note:

1) The composing and displaying of the histogram curve is the result of the software's running real-time data statistics, so some the sources of the software will be occupied. When this module applied, the camera frame rate may be slightly affected to drop. When the module stops working, the data statistics are turned off and the frame rate of the camera is able to reach to the maximum.

2) After canceling the automatic color level adjusting, the level value will be the default (0 and max).

3.9   Temperature Control (only for Cooling camera)

The software supports the temperature adjustment of cooling camera; noise reduction can be achieved by reducing working temperature of picture sensor.
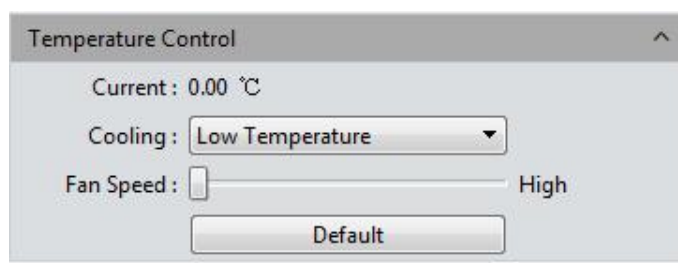
Current: to display the present temperature of camera.

Refrigeration: three options – normal temperature, 0°, low temperature – are set; selection can be made based on actual request.

Fan Speed: Control the fan speed. There are three options on Monochrome Cooling

camera: high, medium and low, and the default is High. There are 6 options on Color Cooling camera, and the default is 3. Low speeds can reduce noise, but the heat dissipation is slightly less effective.

Default: restore present parameter to factory default status. "Low temperature" refrigeration is default.

Note: when the external environment temperature is too high, the camera supports the high temperature warning function, the software will pop up the temperature warning prompt message in time, and the indicator light of the camera will turn red flashing, only for Monochrome Cooling camera.

3.10 File Save

Capture the currently needed data from the real-time video data stream and record it into image format for later development and analysis.
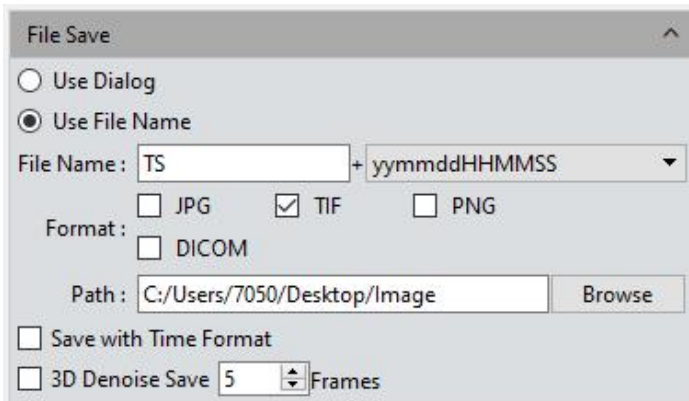
Click the button to capture a live previewing image.

Pop-up Windows Saving: the saving window will be popped up after the button Capture is clicked, it supports five formats for saving pictures: JPG\TIF\PNG\DICOM\MPTIF. MPTIFF is only supported on Dhyana 400DC. DICOM and MPTIF are not supported on Mac system.

File name: The name of the file to be saved is named as "TS" format by default, and it allows to name the file personally by user. The file name cannot contain special characters \/:*?"<>|, special characters cannot be entered, and an error message will pop up, as shown in below.

A file name can't contain any of the following characters:
\/:*?"<>|

The software supports the format of "custom + time-stamp" for naming. There are five formats of time-stamp naming.

```
yymmddHHMMSS
yyyymmddHHMMSS
yy-mm-dd-HH-MM-SS
yyyy-mm-dd-HH-MM-SS
nnnn
```
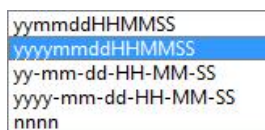
Format: The image formats could be saved as JPG\TIF\PNG\DICOM. The default format is TIF. These four image formats can be checked separately or simultaneously. The captured images in different formats will be displayed at together when their saving formats are selected to be simultaneously.

1) JPG: it is an information-losing and compressed image saving format, its image size is small, but the final quality of the image is degraded compared with the original captured image because of the image data- losing during being saved.

2) TIF: a Lossless image saving format, which can save all the data transmitted from the camera to your saving device without losing, this format is good for the saving and converting of images with high image quality requirements.

3) PNG: Portable network graphics is a lossless but compressed bit-image format that uses the way of lossless data compressing algorithm derived from LZ77 with a high compressing ratio and a small file size.

4) DICOM: Digital imaging and communication of Medical, an international standard format for medical images and related information. It defines a medical image format that can be used for data exchanging and meet the requiring of clinical practices and applications.

Path: To save the image files to the folder that is under the certain of defined path. User can click the [Browse] button to change the saving paths. The default saving path is C:/Users/Administrator/Desktop/Image. The path cannot contain special characters \/:*?"<>|, special characters cannot be entered, and an error message will pop up.

Saved with time format: The capture time will be displayed in the lower right corner of the picture.

3D Denoise Save: Obtain low-noise images by acquiring and comparing image data of several consecutive frames, and then filtering out non-overlapping information. The number of frames can be customized. The range is 1~99, the default is 10.

Note:

● To get 3D denoise image, so it will take longer time than taking a general image.

● 3D Denoise Save is only suitable for capturing static scenes;

● 3D noise reduction has no effect on video recording.

3.11 ROI

ROI (Region of interest) is an application that user runs the software to define a window area of interest within the effective and sensitive detecting area of the camera sensor and just allow the image information within this defined window to be read out and then show out a localized area of image. A smaller ROI area reduces the amount of information and tasks of image transferring and computer processing, which results in increased frame rate of the camera.
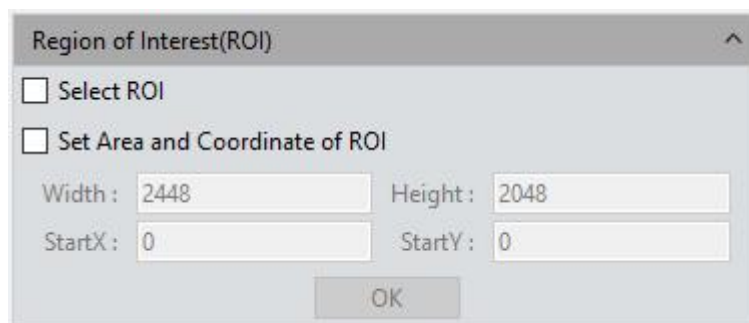
Select ROI: Using a computer mouse. Check on the **ROI** frame, then move the computer mouse to the previewing image to define the window area you would like it to be your ROI, this window area will display the coordinate value and resolution of the current running point. Click on the [v] below the cursor to apply the ROI settings into effect.

Set Area and Coordinate of ROI: Manually entering the starting point coordinate value and the resolution size to define the exact ROI area. Enter the actual point offset position of the rectangular area as well as the width and height, then click **[OK]** to apply the ROI settings into effect.

3.12 Mask
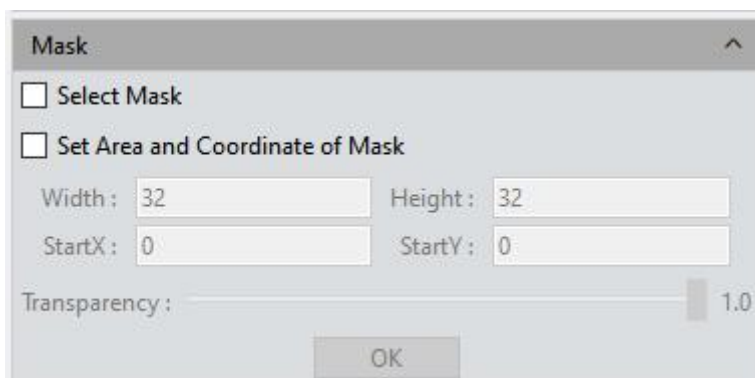
Selecting regions of cover: Using a computer mouse. move the computer mouse to the previewing image to define the window area you would like it to be cover, this window area will display the coordinate value and resolution of the current running point. Click on the [V] below the cursor to apply the cover settings into effect.

Setting the area and coordinates of the region of cover: Manually entering the starting point coordinate value and the resolution size to define the exact cover area. Enter the actual point offset position of the rectangular area as well as the width and height, then click [OK] to apply the cover settings into effect.

Transparency: Manually select the brightness of the unselected area

3.13 Imaging Stitching(Live)

The model of **real-time image stitching** supports to acquire several individual images with adjoining positions on the specimen or sample, and to have them combined into astitched image which present the whole form of the specimen.
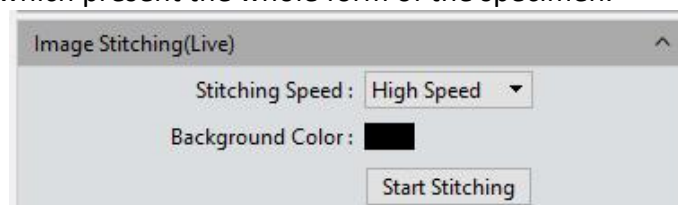
Stitching Speed: Two options: High Speed and High Quality. the default is High Speed.

Background Color: The default background color of the invalid area on the stitched-to-composed image is black, but you can change it. Click on ■ to select the desired color in the palette. And it will effective after stitching is completed.

Operating Procedures

1) Clicking **[Start Stitching]**, software will pop up below operating prompt;
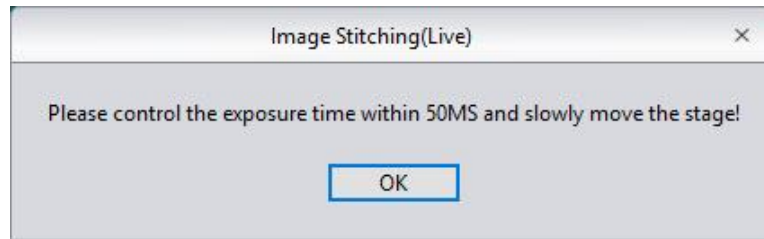
2) Move the sample to other areas through the stage, and move no more than 3/4. The navigation display frame in the stitching window is green, and the software will perform one stitching; each time the sample is moved, the software will perform one stitching;
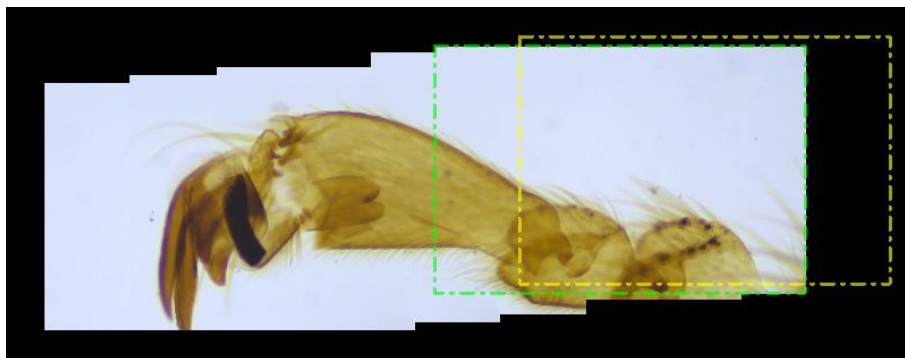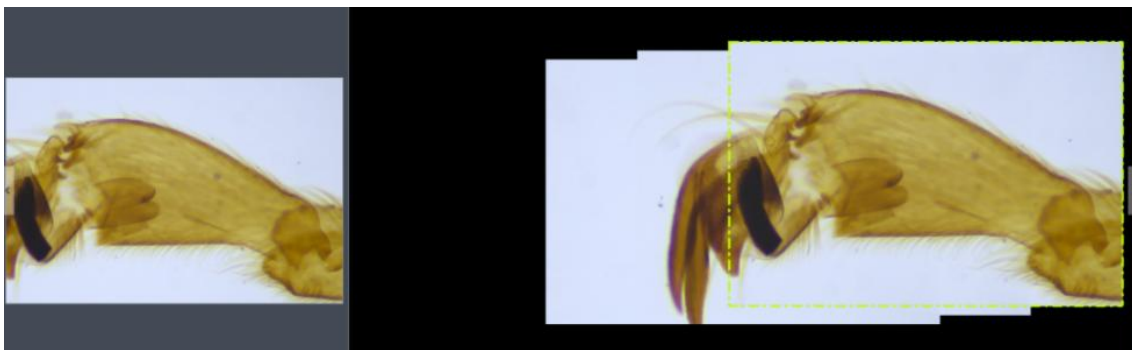
3) If the navigation display frame is red, it means that the stitching area is exceeded and stitching cannot be performed, and the sample needs to be moved back to the location near the last stitching area.

4) Click **[Stop Stitching]** to end the stitching, and a stitched and composited image will be generated in the image gallery.

Note:

1) It is recommended to conduct a white balance correction and flat field correction before starting the stitching to ensure to achieve the best quality images.

2) Since the stitched images are in huge sizes and will surly occupy massive memory of the computer, the stitching process will occupy computer memory, when the processing of stitching taking up 75% of the computer memory volume, the stitching module will stop working automatically. So it is recommended to conduct the stitching operations through a computer with sufficient memory volume.

3) 32-bit computer operating system does not support dynamic stitching images.

3.14 EDF(Live)

EDF makes it possible to stack and merge the images acquired by microscope with different focused panels or positions on a certain thick specimen or sample. The new stacked and merged image is able to present the clear full forms and information of the specimen or sample.
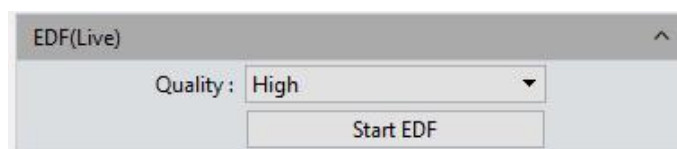

Quality: The higher quality level of the new image requires, the slower speed in its merging, but results in coming out of image with better quality.

Operating Procedures

1) Click the **[Start EDF]** to start the depth of field extension operation;

2) Continuously turn the fine knob of the microscope to focus on one plane to next other, the software is able to merge the obtained plane images instantly and show out a live and clearest image.

3) Click the **[Stop EDF]** to end the stacking and merging application, a new merged image including all the depth focusing information will be generated in the image gallery.

3.15 Realtime Dye

This mode is generally used when taking fluorograms with monochrome camera to color monochromatic fluorescent image, and take a photo to obtain a dyed image for later synthesizing a complete fluorescent image.
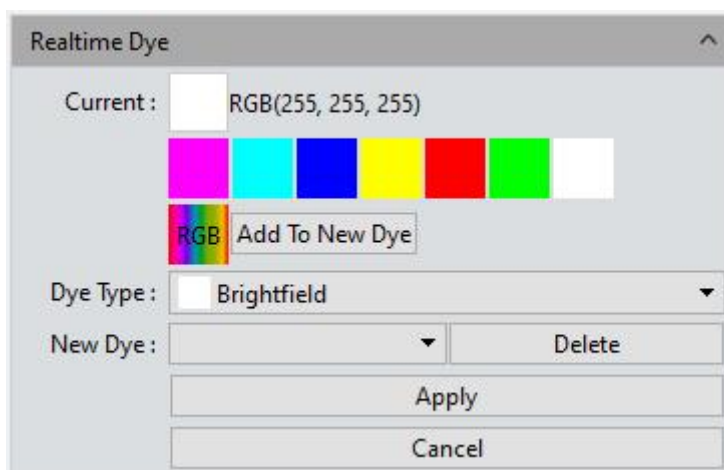
Current: This window displays the currently available colors.

Click ![RGB icon] to make the full color palette appear, from which, user has many more choices of color to pick.

Add to New Dyes: To add selected colors on the palette into the new dyes.

Dye Type: Display seven commonly colors.

New Dye: Displays user-defined dye colors.

Delete: Delete the selected user-defined dye color;

Apply: Apply the selected dye color to the image;

Cancel: To cancel a certain kind of dyes added through custom mode.

3.16 Video Record

Click on [Video Record], Save the image data into video formats for playing back to observe the process of the samples' live movements.

Encoder: The software provides two compressing formats: [Full frame (No compression)] and [MPEG-4], the video sizes generated by different compressing formats are inconsistent, and the user may choose either one format according to his actual needs.

Total Frame: Capture images according to how many frames was set to be captured, setting range is 1~9999 frames.

Total Time(s): The length of time of capturing images based on how long the time was set to, setting range is 1~9999 seconds.
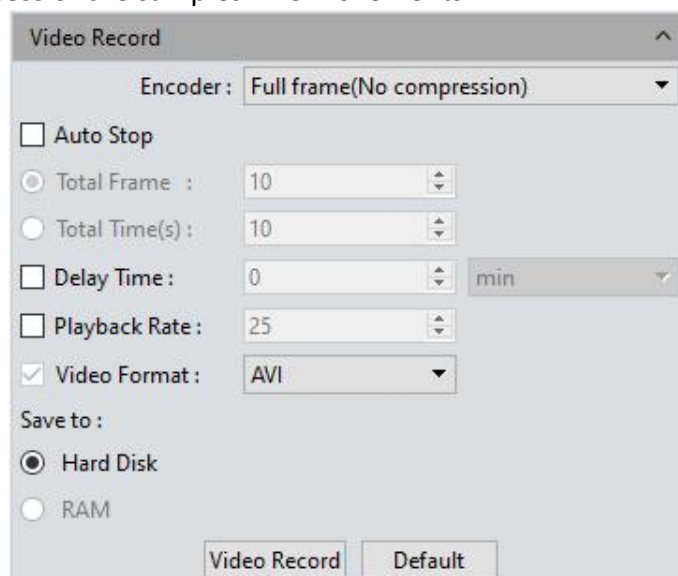
Delay time: There will be a delay in capturing images based on the setting period; Time units: minutes, seconds and milliseconds; the range is 1 millisecond to 120 minutes.

Save to Hard Disk: Instant loading and writing in. The image data is being loaded and written into the hard drive of the computer during the image capturing process. In this mode, the transmission speed from the camera to computer will reduce due to the computer's loading and writing in images data into its hard drive, so this mode is not suitable for capturing the images of quickly changing scenes or backgrounds, but it is suitable for long-time period of capturing.

Playback Rate: Record according to the set playback frame rate

Video Format: AVI\MP4\WMA are supported, the default is AVI format;

Save to RAM: The image data is saved in the RAM of the computer temporarily, after the image capturing, all the image data is transferred to the hard drive of the computer to save. Select Save to RAM and enable the RAM to save images. The maximum numbers of images that can be saved by RAM and display will be shown out. This saving mode allows the camera to maintain a high transmission speed of the images when capturing and avoid data losing due to a low transmission speed. This saving mode is limited by the volume of the computer's RAM, so it is not suitable for long-time period or huge volume of capturing.

Default: Click the [Default] button to restore the module's parameters to the factory default ones. The default saving mode is the compressed mode with full resolution frame, with the total number of frames to be 10 frames, and the total default capturing time is 10 seconds, image data default to be saved to the local hard drive.

3.17 Delay Capture
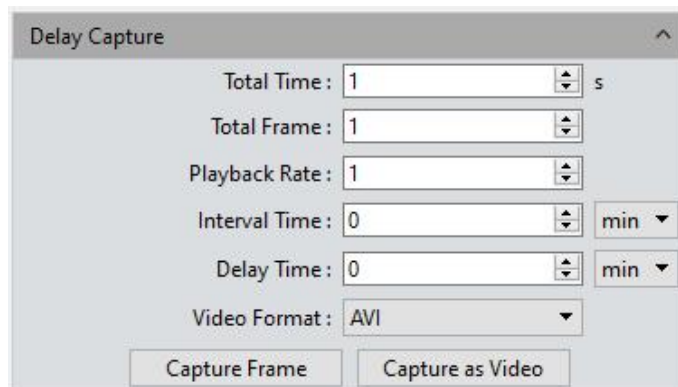
Total Time: Capture images according to set time, default is 1, the setting range is 1-9999s.

Total Frame: Capture images according to how many frames was set to, system default to be 10 frames, the setting range is 1~9999 frames.

Playback Rate: Record according to the set playback frame rate, default is 25, the setting range is 1-10000 frames.

Interval Time: Interval time for capturing every image, three time units options: minutes, seconds and milliseconds, the default is 0 minutes, and the range is 0ms-120min.

Delay time: There will be a delay in capturing images based on the setting period; three time units options: minutes, seconds and milliseconds, the default is 0 minutes, and the range is 0ms-120min.

Video Format: AVI\MP4\WAM are supported, the default format is AVI;

Capture Frame: Capture and save multiple frames of images continuously.

according to the preset parameters, click **[Stop]** to terminate the continuously capturing before the capturing task is finished.

Capture as Video: Capture multiple frames of images according to preset parameters and convert them into a movie directly. Click **[Stop]** to terminate the continuously capturing before the capturing task is finished.

MPTIF: When Dhyana 400DC is connected, it can support save images as MPTIF format. If both TIF and MPTIF formats are selected, only MPTIF format images will be generated.

Note:

There is a quantitative relationship between the total time, the total number of frames, and the playback frame rate. The value of total time = total number of frames/playback

frame rate is rounded down.

3.18 Trigger (only for Monochrome Cooling camera)

There are two output modes for image output: frame mode and stream mode.

Frame mode: that is, external trigger mode, which outputs images by triggering in frames: Hardware trigger mode and software trigger mode.

Flow mode: real-time preview mode. Data flow is the output mode. Embed image data in the stream. The image is output circularly like flowing water.

Off mode:

Indicates that the hardware trigger mode is off at this time, and the camera is always taking pictures.

When the on mode is selected, the camera will switch to the trigger waiting mode, and no picture taking will be carried out. Only when the trigger signal is received, the camera will take pictures.
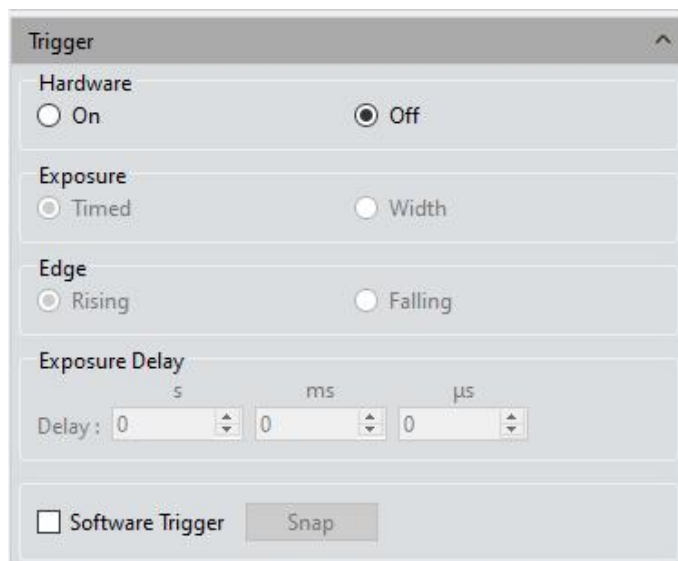
On mode: Turn on the hardware trigger and enter the standard trigger mode. There are several configuration modules:

1) exposure:

   Time: the exposure time is set by the software.

   Pulse width: indicates exposure time is set by input level width.

2) edge

   Rising edge: indicates that the trigger signal is valid for rising edge.

Falling edge: indicates that the trigger signal is valid for falling edge.

3) exposure delay: it indicates how long the delay time can be set for the camera to trigger exposure after receiving a trigger signal.

Software Trigger mode

In the software trigger mode, click capture, and the command of taking pictures will be sent to the camera, and only one picture will be output at a time.

Note:

1) When the external trigger mode and the real-time preview mode switch to each other, checking different modes will take effect directly.

2) It takes effect directly when trigger mode selection, exposure mode selection, boundary selection and delay setting are performed.

3) Turn off the software and save the parameters. The next time you turn on the software, it is still in external trigger mode.

4) External trigger support can control the start and end of taking pictures. The operation steps are as follows: First select the trigger mode, then configure the shooting parameters (such as shooting format, shooting pictures), then click frame shooting, and finally input the pulse signal.

5) This module can shield resolution, bit depth, ROI and video recording functions after external triggering.

6) Minimum trigger period: readout time + exposure time. For example, FL 20BW readout time = 1000/frame rate and exposure is 50ms, then trigger signal high level + low level $\geqslant$ readout time + exposure time = 125ms+50ms.

3.19 Image Process (only for Monochrome Cooling camera)
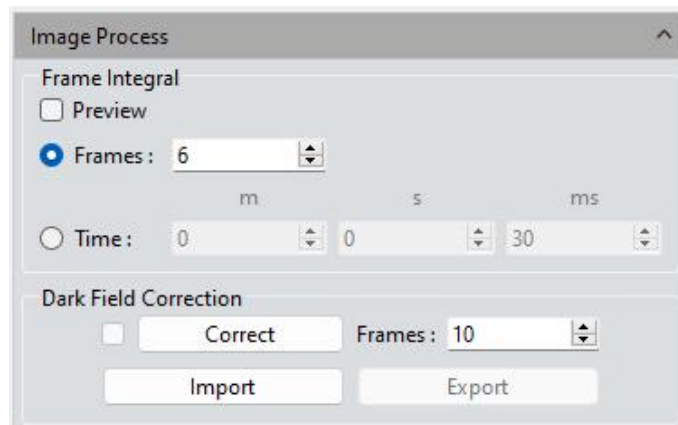
Frame Integration: capture continuous multi-frame images according to preset conditions, accumulate multi-frame data into one image, and preview integration effect in real time.

1) integral by frame number: take the continuous preset frame number and add it up to a picture.

2) integral by time: all frame data within the preset time are accumulated into one picture, and the number of frames is the integral time divided by the exposure time.

3) integral Preview: display the integral effect in real time in advance on the screen according to the preset parameters, adjust to the best effect, and then take the picture.

Integral photographing can improve the brightness of low brightness image and obtain better imaging effect:

Note:

1) The appropriate number of accumulated frames shall be set for integral photographing, otherwise the image brightness will be too high and distortion will occur.

2) "Integration frame number" and "integration time length" cannot be enabled at the same time. Only one method can be selected at a time.

Dark Field Correction: in order to solve the problem of chip edge light and background no uniformity, the dark field correction function is used.

1) The default correction enable is disabled and cannot be checked. It lights up only after the coefficients are imported and set. It is automatically checked, that is, to

enable the dark field correction. At this time, the check status can be selected to be removed, that is, to turn off the dark field correction.

2) Click the correction button and follow the pop-up prompt. Click next to calculate the correction coefficient automatically.

3) The default frame number is 10 frames (users can set different frames according to their needs, and the range supports 1-99).

4) Import and export are import and export correction factors respectively.

5) In different exposure time and scene, dark field correction should be done respectively.

6) Close the software and parameter group to save the frame number, close the software to clear the correction enable and coefficient, and restart the software for correction next time.

3.20 Save Settings

This software supplies the function of managing the groups of experiment parameters for the users' conveniences using the camera in different applications or platforms.

User can save and re-load the set parameters from different experiment statuses and then apply them to the new experiments projects, this function will surely save the users' time, develop the working efficiency and ensure the reproducibility of the experiment results. The parameter group saver allows the users to save all the software functions and modules mentioned above (exception is the flat field correction module).
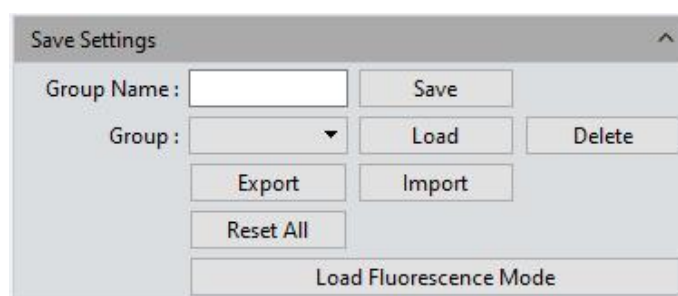
Copying and loading the files of parameter group to other computer platforms can realize the cross-platform applications of these parameters, so the user's experimental conditions are ensured to be as uniform as possible.

Group Name: To name the parameter group, input the name you desired and load it, the window's context menu will display those parameter groups which have been saved or loaded.

Save: To save the current parameters into a named parameter group file, up to 50 sets of parameters can be saved

Load: Load the parameter group to current working status.

Delete: To delete the currently selected files of parameter group.

Export: Save the files of the parameter groups to specified folder documents; Reset all: Restore to the factory default settings will delete all the files of parameter groups set and saved by the users before.

Import: To load the selected files of parameter group from the selected folder.

Reset All: Clear all parameters set by the user and restore to default settings of the software

Load Fluorescence Mode: After clicking this button, the exposure mode is switched to manual exposure, the exposure time is 100ms, and the automatic level is automatically checked.

3.21 Light Frequency

Users can select the corresponding light source frequency according to the actual applications or conditions. Suitable frequency of light source is good for the normality of the live images and excludes the phenomenon of stroboscopic on the live images. The default light source frequency is the frequency of direct current.
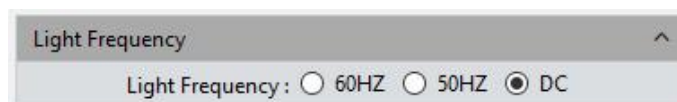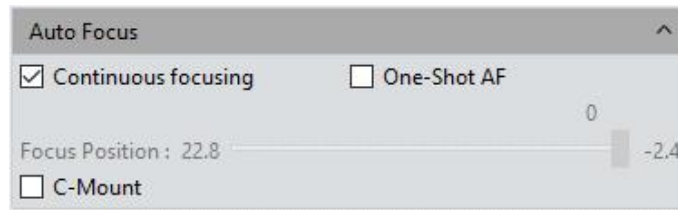

3.22 Other Settings
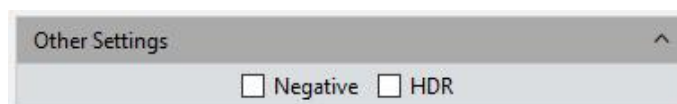
Negative: Change the color of the current image to its inverse color.

HDR: Click to achieve higher dynamic range and more image details for better image quality.

## 3.23 Auto Focus (only for Auto Focus camera)

Continuous Focusing: Select the area to be focused in the preview screen; then, the camera will conduct continuous focusing on selected area until it's completely clear. When the focal length is changed due to movement of sample or camera, camera will automatically fix the focal length to ensure the clear effect of pictures.

One-ShotAF: Select the area to be focused in the preview screen; camera will conduct one-time focusing on selected area. After focusing is completed, the focal length will stay unchanged when sample or camera moves, but it is required to select the area needs to be focused.

Focusing Location: Focusing location can be manually adjusted; the focal length of camera will change according to location change.

C-Mount: Automatically move to the C interface position

4. Image

Click ![icon] to save picture as any format of JPG\TIF\PNG\DICOM; saving window will be popped out as shown below.
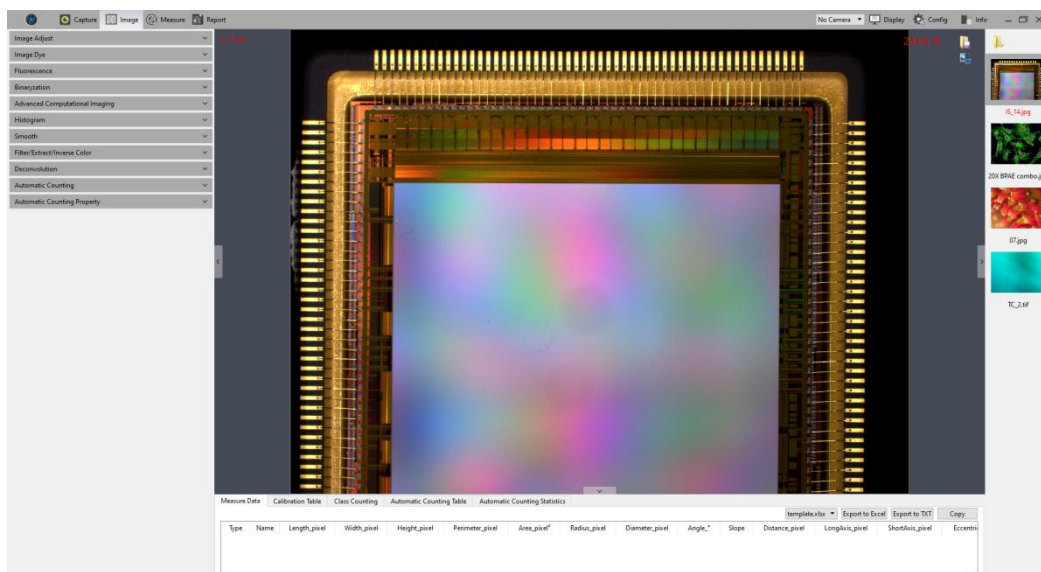
Click ![icon] screenshot button on the right upper corner of the preview window to crop picture, to select the interested area in preview image with mouse,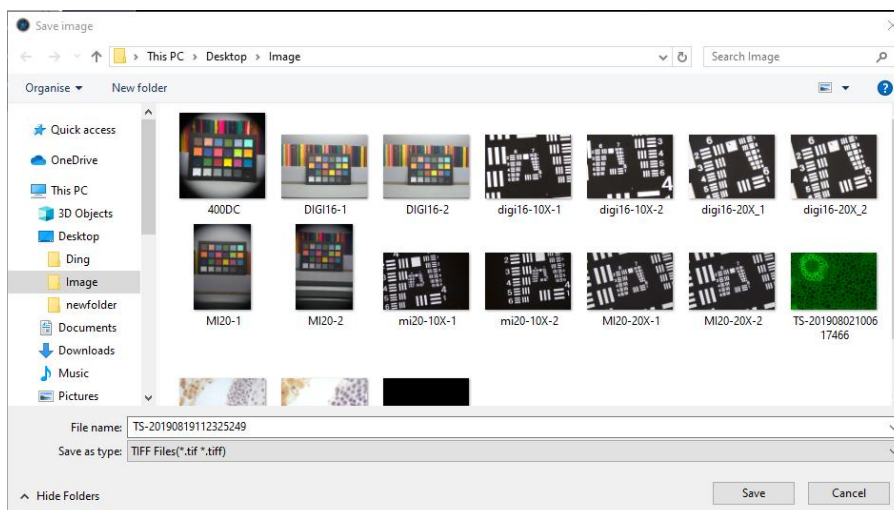 then double left click or double right click the mouse to complete screenshot. The screenshot will appear on right picture bar, click ![icon] to save current screenshot. If there is no need to save the screenshot, right lick to exit crop window.

4.1   Image Adjust

Adjust the image parameters to revise the effects of the captured images.
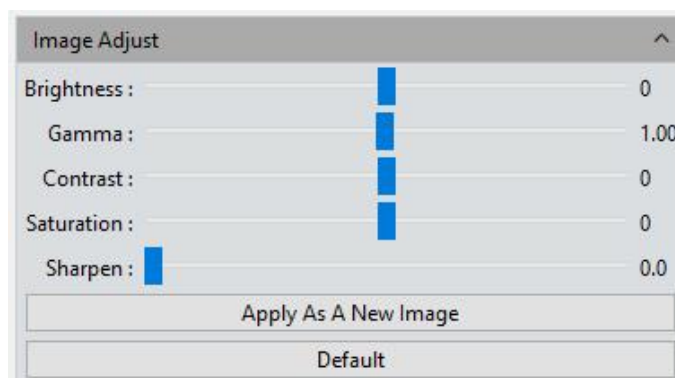
Brightness: The brightness of the image, the default value is 0, adjusting range is -255~255.

Gamma: Adjust the brightness of the image displayed on the monitor; the default value is 1.00, adjusting range is 0.01~2.00.

Contrast: The ratio between the darkest areas and brightest areas of the image, the default value is 0, adjusting range is -80~80.

Saturation: The purity of the color, the higher value of the saturation, the brighter the

color is, the default value is 0, adjusting range is -180~180.

Sharpen: Focus on blurred edges of the image to improve the sharpness or focal length of a certain part of the image, leads to a more vivid color in the specific area of the image. The default value is 0, and adjusting range is 0~3.

Finishing the adjustments of the parameters for the image, Click **[Apply As A New Image]**, the set parameters will be applied to the original image which then change to a new image with the adjusted characters. The new image also be saved by this command.

Default: Click the **[default]** button to restore the adjusted parameters to the factory default ones.

4.2   Image Dye

Need to color blank-and-white pictures firstly. Based on actual request, users can select color through color editor and also to select corresponding fluorescent dyes. After color selection, click **[Apply As A New Image]** to apply color on picture, to gain a realistic color picture almost coincident to that observed under a microscope. Click **[Cancel]** to cancel dyeing.
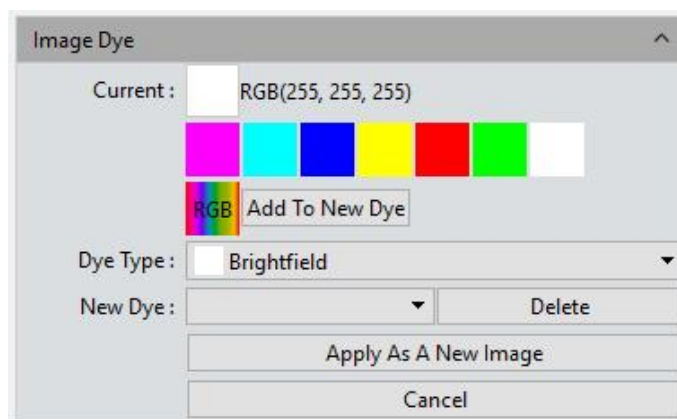
Current: to show present selected dye type. Software provides seven colors usually used, click to get the integrate palette to select more abundant colors as shown below.
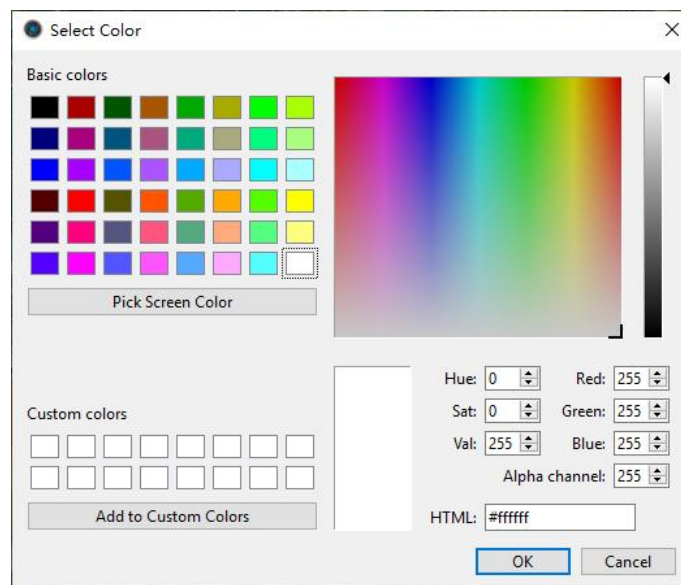
Dye Type: To provide abundant colors for use; set the preferable color through right color parameter setting, click and add it to customized color to facilitate future use.

Add to New Dye: selected color on palette can be added to new dye.

Cancel: Cancel a certain kind of customized added dyes.

4.3   Fluorescence

In the researching fields of biological related sciences, different fluorochromes are used to label different cell structures. On the applications of micro-fluorescent observations, a complete fluorescent cell image contains multiple of fluorescent areas which belong to different cell structure who has its own special affinity to certain of fluorochromes.

Due to the limitation to the wavelength of the emission fluorescence in the microscope turret, user can only observe one color of image each time. The specific operation is as follows:
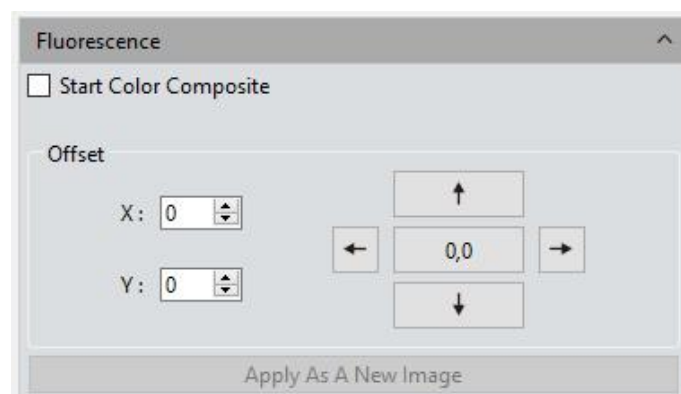
Operating Procedures:

1) Select the image which needs fluorescent channels combing from its path and open onto the window.

2) Click on **[Start Color Composite]** to select a group of images with the same observation field as the one opened before. The maximum pieces of images could be selected to combine together are 4 pieces. The operating directions window will pop-up, as shown below.
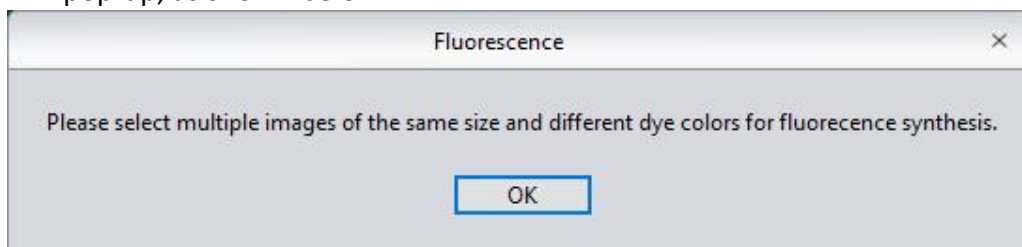
3) Select the original picture needs fluorescent synthesis on right picture bar; the synthesized picture will be displayed on preview windows, as shown below.
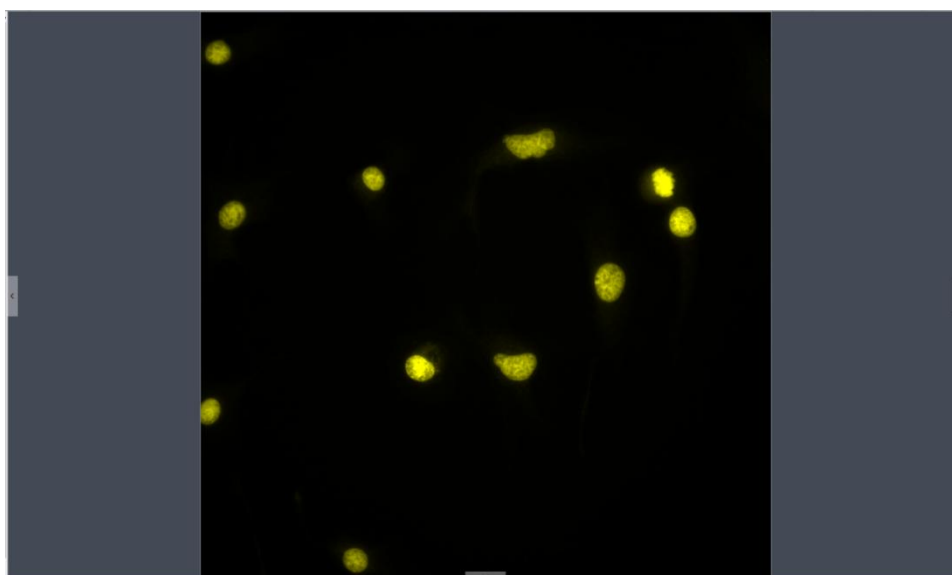
4) Click **[Apply as A New Image]** to add the combined image to the image gallery and let it display in the center of the working interface, the fluorescent combing processing finished.

Offset: The mechanical vibrations from the fluorescence filters' switching can lead to the pixel drifting of each captured single-channel image to others when they were captured individually, so it leads to the situation that these captured single-channel images are not exact under the same observation field and area, with slight drifts. Drift Correction module is able to let the user to correct these pixel drifting and finally ensure all the single-channel images to be under the exactly same observation field and area, thus results in the perfect results of multi-channels combing. One correction unit stands for one pixel, click on [0,0] to restore to the original point.

4.4　Advanced Computational Imaging

Capture software offers users with three kinds of Post-processing technologies for Image packages. They work on the merging of batch of captured images.

Extend Depth of Field (EDF): Pick up those images which were captured from the same observation field but not on the same focused planes, use those clear focused areas of each captured image together to merge a new image which carries all clear focused areas in whole image.

Image Stitching: Stitch several images which have overlapping parts to one and other into a large, seamless, high-resolution image.

High-Dynamic Range(HDR): Take a batch of images with different exposure times, merge the three images which are the insufficient exposure one, the moderate exposure one and the excessive exposure one into new image with high dynamic range.

Operating Procedures:

1) User may select the image processing method he needs. Pick up multiple of images with the wizard of operation. Let us take the EDF processing as an example.

2) Then click on the **[Combination]** at the bottom of the interface.

3) The combining process requires for a while, the window will display the on-progress, for example: EDF 4/39.

4) When the combing is completed, a thumbnail of the combined image will be generated and present in the left menu bar as below.

5) Click on [Apply as A New Image] button, The new combined image will be add to the image gallery and shown up in the center of the working interface and the combing process comes to ending.

4.5   Binaryzation

Capture software provides user with image binaryzation, which is to set the grayscale value of the pixels on the image from 0 to 255, it is the process of presenting the whole image with a distinct black and white effect (A binary image, which is a digital image that has only two possible values for each pixel).
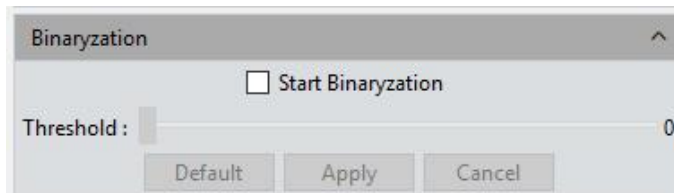
4.6   Histogram

When handling with pictures, more realistic colorful pictures are usually needed to use for observation and analysis. Color scale adjustment can help users to obtain better picture effect, as shown in the following picture.
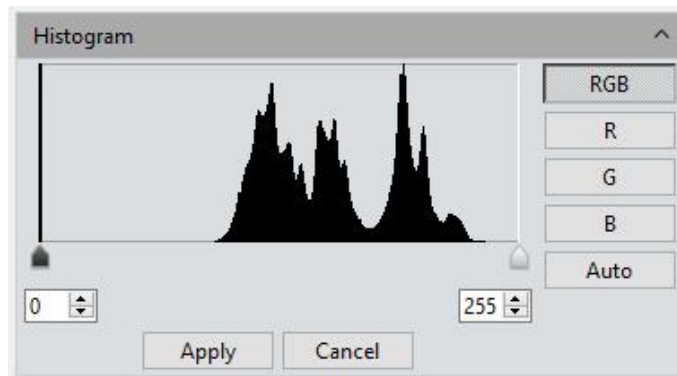
Color Scale Adjustment: redefine R/G/B in each path, and then proportionally redistribute the pixel value among them. The adjustment of picture's color scale can enlarge highlight area of the picture and brighten picture, as well as to darken the brighter picture; RGB three paths can be adjusted separately to change the color of picture in corresponding path.

Manual Color Scale: Users, with histogram, can manually adjust the dark shade (left color scale), gamma and highlight brightness level (right color scale) to calibrate picture shade tone, including contrast, shade and image hierarchy, and to balance the color of the picture.

Automatic Color Scale: Check Automatic, customize the brightest and darkest pixel in each path as white and black, and then proportionally redistribute the pixel values between them.

Apply: apply current parameter setting in picture and generate a new picture. The new picture can be saved as separately.

Cancel: click **[cancel]** button to cancel parameter of the module.

4.7   Smooth

Capture software provides users with three image smoothing techniques for blurring images to reduce the noise and the level of detail: ①Gaussian Blur ②Box Filter ③ Median Blur, setting range is 0~30.
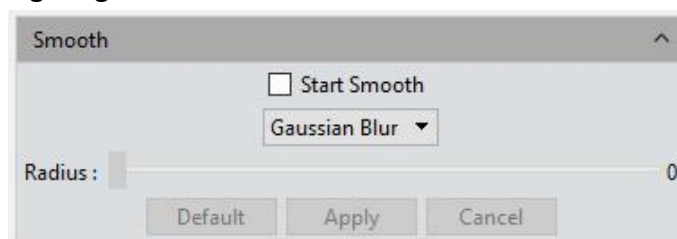
Default: Click the **[default]** button to restore the module's parameters to the factory

default ones.

Radius: the bigger the radius is, the stronger the image processing ability is and the smoother the image is.

Apply: When the parameter adjustments are completed, click **[Apply]** to make the parameter settings work into effects on the original image and generate a new image, the new image can be save as to other path or documents.

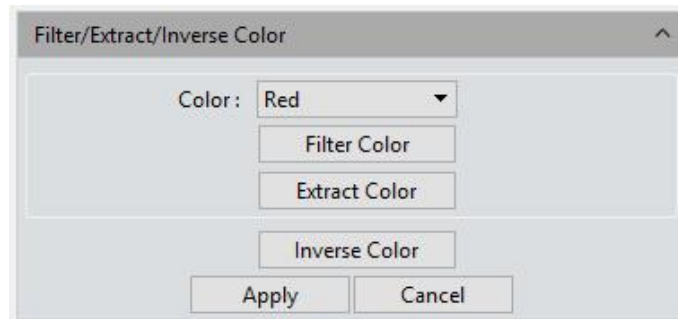**Cancel:** Click the **[Cancel]** button to cancel the parameters set into the module before.

4.8　Filter/Extract/Inverse Color

Color: Select Red/Green/Blue.

Filter Color: check the color level information in each channel and combine the complementary colors of the mixed colors with the base color. The combined color is always the brightest color.

Extract Color: Extract the certain of color from the RGB color group.

Inverse Color: Invert the colors in the RGB group to their complementary colors.

Apply: When the parameter adjustments are completed, click **[Apply]** to make the parameter settings work into effects on the original image and generate a new image, the new image can be save as to other path or documents.

Cancel: Click the **[Cancel]** button to cancel the parameters set into the module before.

4.9　Deconvolution
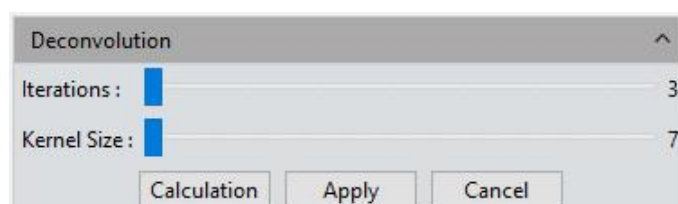
Iterations: Number of iterations;

Kernel Size: Deconvolution kernel window size;

Note: This function is not supported on Mac system.

4.10 Automatic Counting

Automatic Counting setting interface as below show.
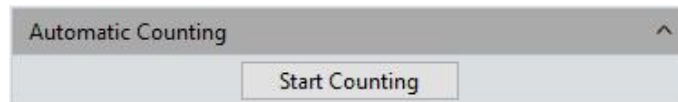
Start Counting: Click it to enter the counting process;
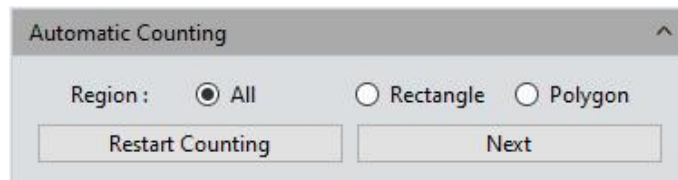
All: The counting area is the full image;

Rectangle: Left-click to select two endpoints to draw a rectangular image, and the counting area is the selected rectangular;

Polygon: Left-click multiple times to draw a polygon, double-click to end the drawing, and the count area is the selected polygon;

Restart Counting: Back to the start counting interface;

Next: Go to next step;

Auto Bright: Use algorithms to automatically segment bright objects from the dark background;

Auto Dark: Use algorithms to automatically segment dark objects from bright backgrounds;

Manual: Manual segmentation is based on the histogram distribution of the image, which can be adjusted by the two vertical lines on the left and right in the histogram, or can be adjusted directly by inputting values in the upper and lower limit edit boxes of the histogram;

Dilate: Change the size of the cells in the image to expand the borders of bright cells and shrink the borders of dark cells;

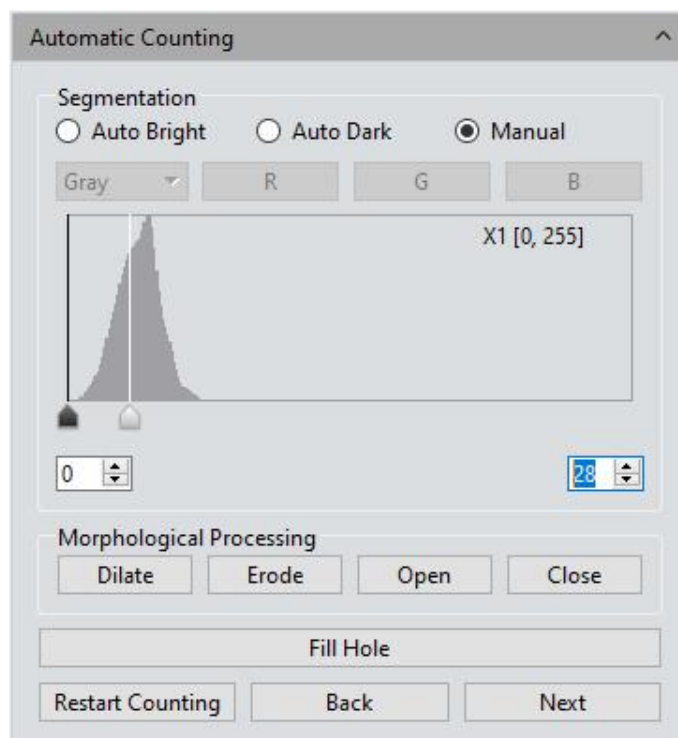**Erode:** Change the size of the cells in the image to expand the borders of dark cells and shrink the borders of bright cells;

Open: Change the shape of image cells. Assuming that the image is a bright cell on a dark background, clicking this item will smooth the cell boundary, separate connected cells, and remove small black holes in the cell;

Close: Change the shape of image cells. Assuming that the image is a bright cell on a dark background, clicking this item will fill in the gap of the cell, and at the same time stretch and highlight the cell that is close to it;

Fill holes: Fill holes in image cells

Restart Counting: Back to the start counting interface;

Back: Back to the previous operation process;

Next: Go to next step;
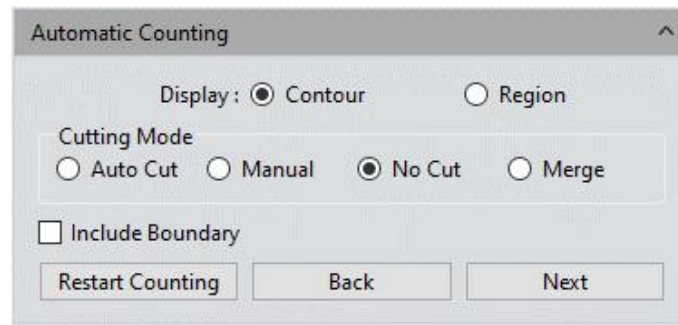
Contour: Use contour lines to represent the divided cells;

Area: Use padding to represent divided cells;

Auto Cut: draw the boundary directly according to the actual contour of the divided cell;

Manual: Manually select multiple points on the interface, and divide cells according to the selected points;

No Cut: Do not divide the cell;

Merge: Merge separate cells into one cell;

Bound Process: When calculating the number of cells, cells with incomplete boundaries in the image will not be counted;

Restart Counting: Back to the start counting interface;

Back: Back to the previous operation process;

Next: Go to next step;
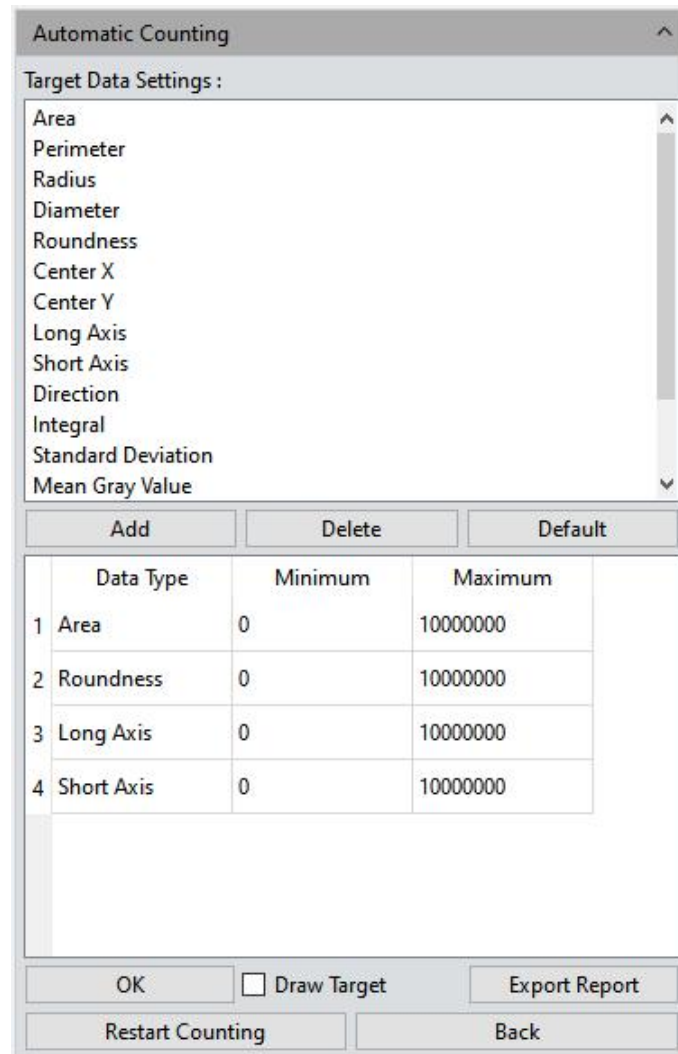
Add: Add the type of calculation to the statistical result;

Delete: Delete type of calculation;

Minimum: Set the minimum value for dividing cells, that is, cells smaller than the minimum value will not be counted;

Maximum: Set the maximum value for dividing cells, that is, cells greater than the maximum value will not be counted;

OK: Start counting cell data;

Draw Target: Check this option after the automatic counting is completed, and you can manually draw the missed cells on the interface;

Export Report: Export statistical cell data to Excel file;

Restart Counting: Back to the start counting interface;

Back: Back to the previous operation process;

4.11 Automatic Counting Property

Font: Set font and size, default is Arial, 9, click ⬚ to bring up the font board to select the desired font;
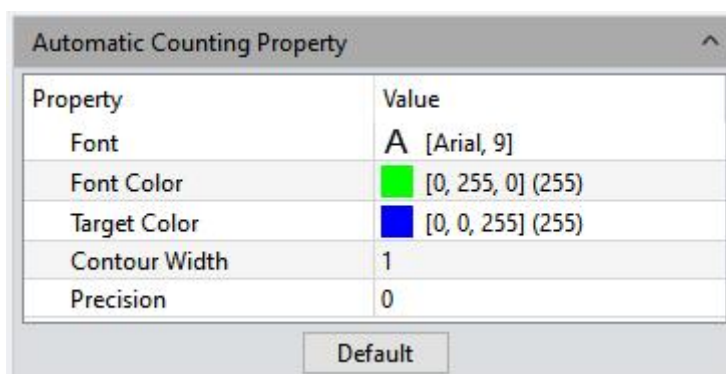
Font Color: Set font color, default is green, click ⬚ to bring up the color palette to select the desired color;

Target Color: Set cell display target color, the default is blue, select it and click ⬚ to bring up the color palette to select the desired color;

Contour Width: Adjust the cell display outline width, default is 1, range 1~5;

Precision: Set the number of decimal places for the maximum and minimum values. By default, 3 decimal places are reserved. The range is 0~6.

5. Measure

Capture provides tools for images measuring. For example, if you want to know the distance between two points in the image, using the measurement tools, you can simply draw a line between the two points and get real-time measurement data.

Capture provides users with a rich set of measurements in image analyzing. The principle of the measuring function in Capture is based on image pixels as the basic execution unit. For example, the length of the line feature is determined by the number of pixels along the line. Pixel-level measurements can be converted to more practical units, such as millimeters(mm) or inches, using measurement calibration module in the software and calibration ruler.

5.1   Measure Tool
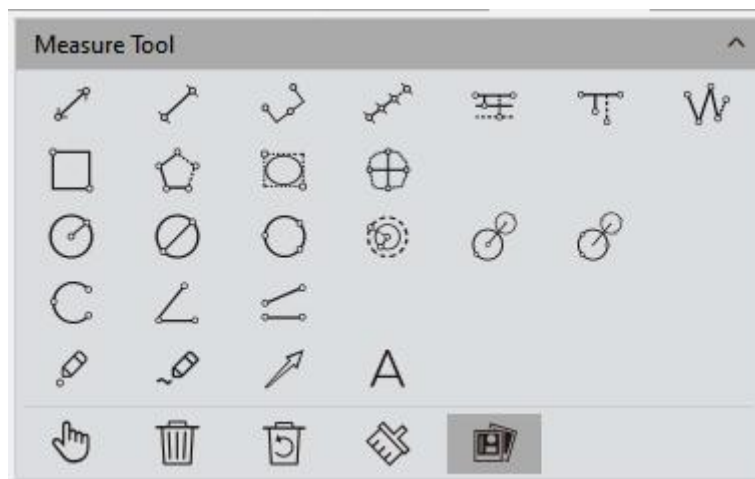
Straight Line: Draw a line segment graphic and then finish drawing with one more click, arrows at endpoints. Press [ctrl] to draw horizontal or vertical lines.

H Shape Straight Line: Draw a line segment graphic and then finish drawing with one more click, vertical lines at endpoints.

Three Dots Line Segment: draw graphic with three dots line segment, finish drawing when click for the third time.

Multiple Dots Line Segment: draw graphic with multiple dots at the same direction, single click to draw and double click to end drawing.

Parallel Line: Draw a line segment, then left click again to draw its parallel lines, double- left-click to finish drawing.

Vertical Line: Draw a line segment, then left click again, draw its vertical line, double-

left-click to finish drawing.

Polyline: Left click, add a new line segment to the existing polyline, double- left-click to finish drawing.

Rectangle: Left click to select two endpoints to draw a rectangular, the length, width, perimeter and area of the rectangular can be measured.

Polygon: Left click to draw the polygon multiple times, double click to finish drawing.

Ellipse: Left-click to select two endpoints to draw an elliptical graph the perimeter, area, major axis, short axis, and eccentricity of the ellipse can be measured.

Roundness: Select the first and second segment passing through the center of the circle on the contour of the measured circle. After drawing, the value of the degree to which the cross section is close to the theoretical circle is obtained. The value is equal to two. The difference of the secondary line segment is divided by two;

Radius Circle: Left-click to select the center of the circle, and click again to define the radius length, then click to finish drawing.

Diameter Circle: Click two times to define the two diameter endpoints separately to draw the circle, then click again to finish drawing.

3Point Circle: Click three times separately on the selected circle, and then click again to finish drawing.

Concentric Circles: Draw a circle with its radius, Click the position to be the center of the circle, then double click finish drawing.

4Point Double Circle: First click to position the center of the first circle, second click to define the radius length of the first circle. The third click to position the center of the second circle, the fourth click to define the radius length of the second circle.

6Point Double Circle: Click three times to select three points on the first circle, and click another three times to select the three points of the second circle, then end the drawing.

Arc: Draw a curved line by taking three points on the circle, finish the drawing with the third click.

3Point Angle: the angle between two connected lines. Click to draw the endpoint and intersection point of the two lines, take the third click to finish drawing.

4Point Angle: the angle between two unconnected lines. Click to draw the endpoints of the two lines, position the intersection point and take the fourth click to finish drawing.

Dot: Dot marking or dot counting, manually count the quantity of targets or mark them. And record the XY coordinate value of the point.

Paintbrush: Draw any curve on the preview screen.

Arrow: The arrow mark is made by two times of clicks.

Text: Add a text note to the image.

Select: The measured graphics or text notes on the image are able to be selected. When the mouse moved to the vicinity of the graphics or texts, the mouse symbol changes ⸱ to ⸱ , you can drag or use the [Delete] button on the keyboard to delete the selected graphics and text.

Delete: To delete the drawn or measured graphs.

Back Undelete: Undo the last delete operation.

Clear All: Delete all the drawn and measured graphics or texts on the current layers.

Combined: When saving the image, the drawn or measured graphics or texts will be attached onto the image. The default status of the software to this module is active.

Data Property: Each graphic has corresponding data type, such as **length, angle, slope, diameter, perimeter, area and etc**. Draw graphics after checking and the information will appear on pictures at the same time.

Within the status of graphics drawing, right click the mouse to quit drawing state and switch to selecting status. Click the right mouse button again to restore the drawing state.

When the mouse is in the ⸱ state, scroll the wheel to zoom in on the picture,

and hold down the mouse to drag the picture.

When the mouse is in the ⸱ state, scroll the wheel to zoom in on the image, hold down the mouse on the graph to drag the graph, and hold down the mouse on the endpoint of the graph to ⸱ change the graph.

All drawing and measuring graphic data information will be saved in the measurement table. Click **[Export to Excel]** or **[Export to TXT]** to transfer the data information to EXCEL form format or TXT document format. Click **[Copy]** to copy the entire table to other places for paste.

	Type	Name	Length_pixel	Width_pixel	Height_pixel	Perimeter_pixel	Area_pixel²	Radius_pixel	Diameter_pixel	Angle_°	Slope	Distance_pixel	LongAxis_pixel	ShortAxis_pixel	Eccen
1	⊘	Radius...				5455	2368271	868	1736						
2	⊘	Radius...				2372	447551	377	755						
3	⌣	3Point...	648							173	-0				

Tabs above table: Measure Data | Calibration Table | Class Counting | Automatic Counting Table | Automatic Counting Statistics | Export to Excel | Export to TXT | Copy

5.2　Calibration

The calibration ruler converts the number of pixels into meaningful measurement units,

and supports conversion units of nm, um, mm, inch, 1/10inch, 1/100inch, and 1/1000inch.
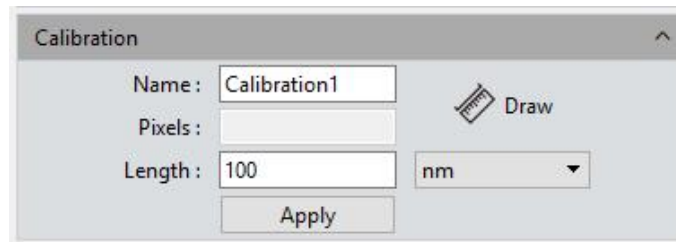
Operating Procedures:

1) Click [Draw], and draw a straight line on the image, press [ctrl] to draw horizontal or vertical lines;

2) Enter the length and unit represented by the number of pixels of the straight line;

3) Enter a name for the calibration scale;

4) Click [Apply] to save and use the calibration ruler;

View/Edit Calibration Table: Users can create multiple groups of calibration scales at the same time for the switching uses of multiple measuring application scenes. The calibration scales can be viewed or edited on the calibration table.
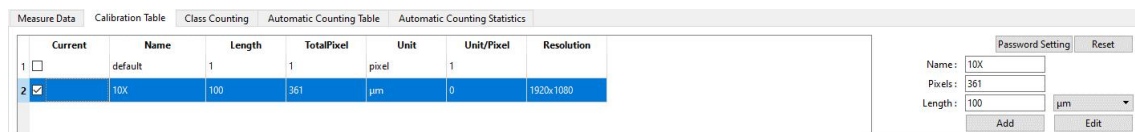

Open the calibration table, check the box under "Current" bar and select calibration ruler. The software defaulted calibration ruler should be applied to all measure projects. Selecting calibration ruler, calibration ruler can be edited and added on the right side, and mouse right key can eject menu bar as well: **[Cancel]** can cancel selected calibration ruler, but the calibration ruler being applied cannot be canceled; **[Load]** can guide in previously saved calibration table; **[Save As]** can derive the whole calibration table and save it.

Resolution is the preview resolution of the new calibration ruler. Switching the resolution, calibration ruler and measurement data will be automatically converted with resolution.

Note: Calibration processing can be performed more accurately with a micrometer. Using an incorrect calibration table will lead the measurement results to be completely wrong. Special cautions must be used to select the correct calibration table before working on images measuring.

5.3 Measure Layer
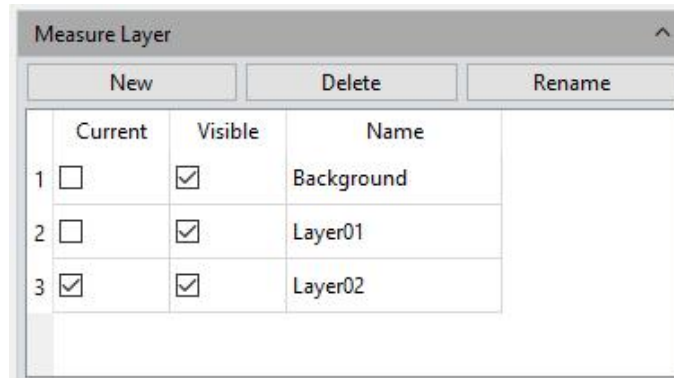
Measure Layer: Creating multiple layers on the image, user can make different measurements on different layers of the image.

This layer creating module meet the needs of a large number of image measuring and image further processing applications.
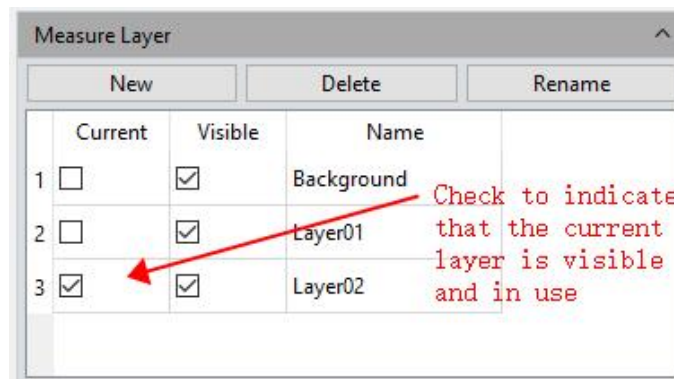
If some targets on the current image have already been measured, the layer creating function will automatically create a [Background] and named it as [Layer 01], the current measurement results will be automatically displayed in [Layer 01].

You can choose to display the measurement data from different layers or choose to view the different layers.

Check the box which the related layer belongs to under the defined window of **[Current]** to display the layer you want to preview. Check on different box to switch to different layer you want to display.

Check on the box under the defined window of **[Visible]** to display the measurement results of the corresponding layer.

Click **[New]** to create a new layer, you can customize the new layer name. The default layer naming principle is by [Layer 01], [Layer 02], [Layer 03], it means that the layer name with increased number, which related from early to later by the time the layer was created.

Click **[Delete]** to delete the selected layer.

Click **[Rename]** to rename the selected layer.

5.4 Metrics Flow

Capture provides powerful metrics flow function for convenient and semi-automatic measurements in the passing-rate detection of batches of industrial devices or parts.
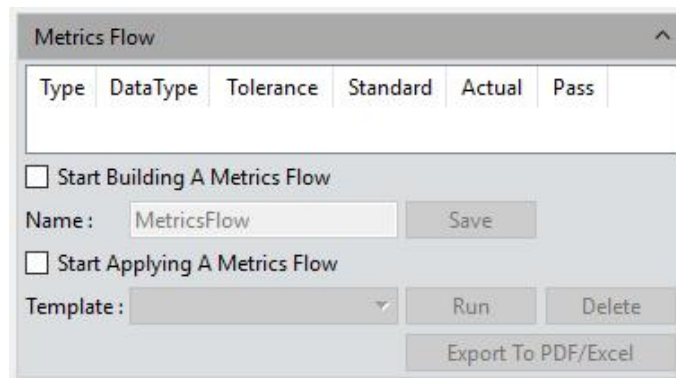
1) Open a group of the devices or parts images saved in the image gallery.

2) Select the image of the standardized sample (or we call this image as the reference image) to calibrate and set the tolerances for later measurements and detections.

3) Click **[Start Building A Metrics Flow]** to create a new metrics template.

4) Use the different measurement tools to measure or draw any of the desired shapes on the reference image opened before. The running template will record the whole measuring or drawing process and save the measuring results or drawing graphics as the reference specifications.
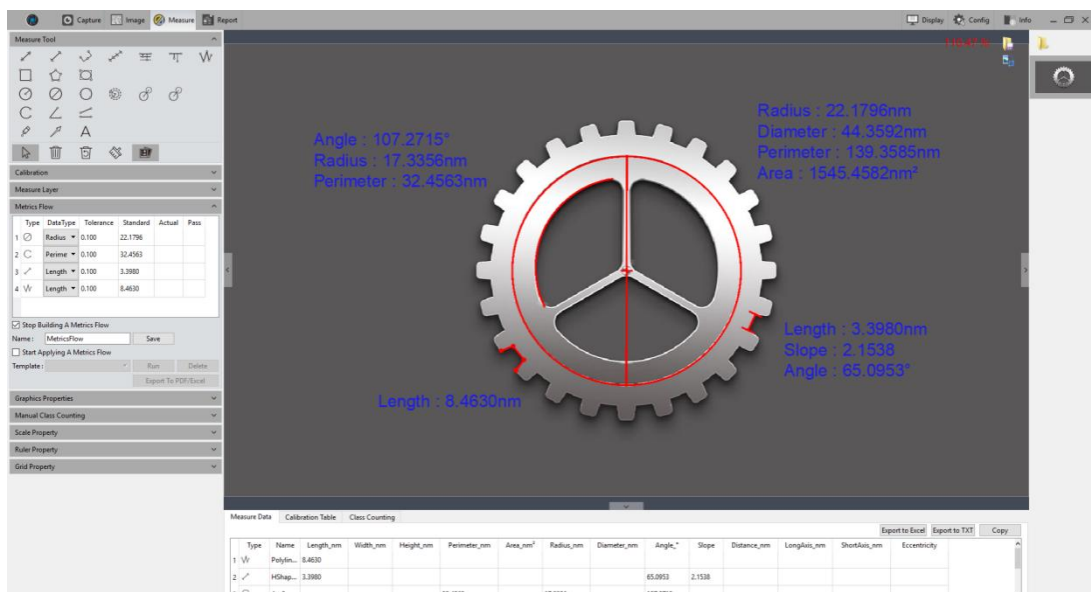
5) After setting the referencing information on the template, user can name the template personally, click **[Save]** to complete the setting and saving of the measurement flow template.

6) Click **[Start Applying A Metrics Flow]**, select the created template, click **[Run]** button to apply the template, click **[Delete]** to delete the template created and saved before.

7) Select the image to be detected and operate as the procedure as that on creating template.
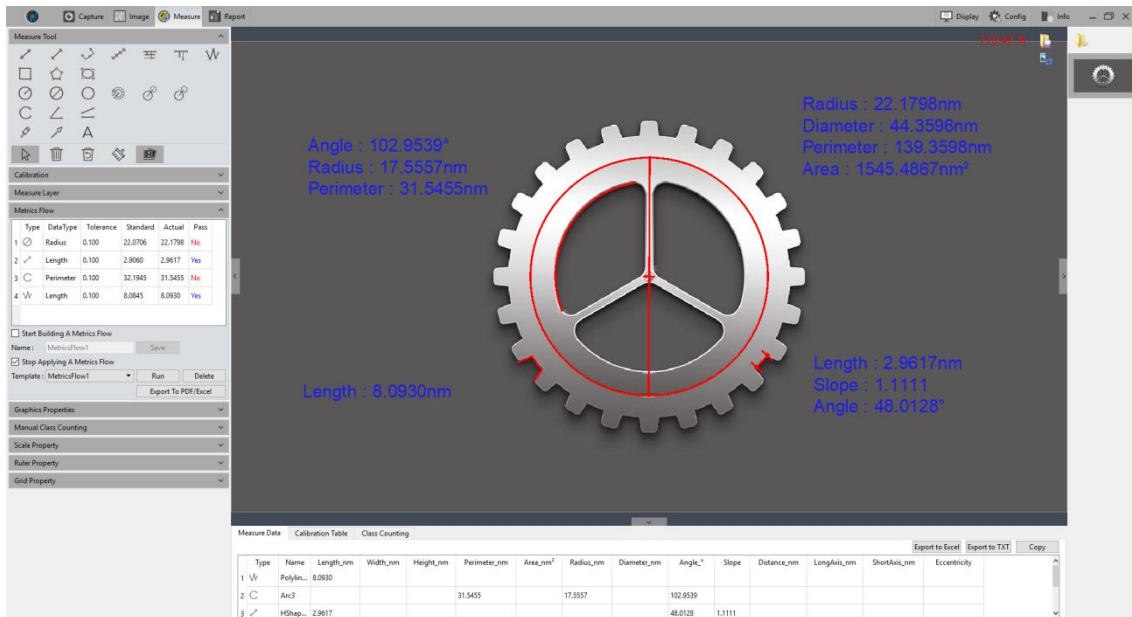
8) After the operating of the software on the image to be detected, [Run] button will be released and a window showing the detecting results will pop up automatically.
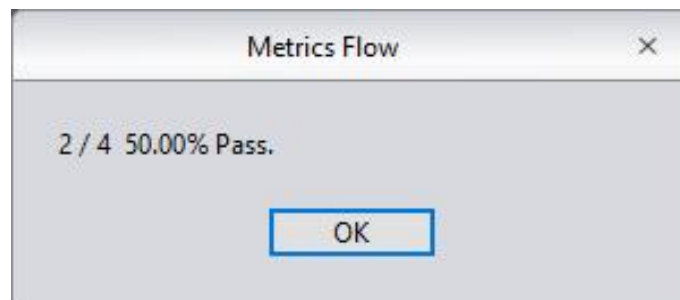
9) Click **[Export to PDF / Excel]**, to save as PDF format or export to in Excel format with the detecting results.

10) Continue to click **[Run]** to select the next image need to be detected, repeat the procedures of steps 7, 8, and 9 directed above.

11) After finishing all the images need to be detected, click [Stop Applying a Metrics Flow] to stop the working of the software function of measurement flow.

5.5   Graphics Properties

Define the property of all measure tools. Specific information are as follows:
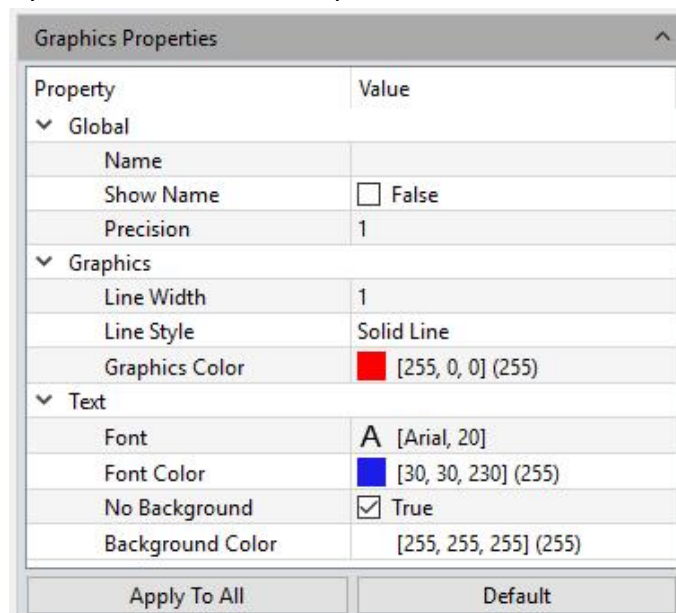
Global: Create or change a name on the blank right next to the [Name] column.

Show Name: Check if you do not need to display of the name.

Precision: choose the display precision after the decimal point, the default value is 3, the range is 0~6.

Line Width: To display line width of the measurement tool currently applied on the image. The default is value 1, the range is 1~5.

Line Style: Select the styles of measurement tools currently applied on the image. The default style is the solid line, software supporting solid lines, dashed lines, dotted lines, dotted lines, and two dotted lines.

Graphics Color: choose the colors for the measurement tools applied on the image, the default color is red, colors could be chosen from […].

Font: Choose the font format for the currently applied measurement data, the default

format is [Arial 20], click on […] to choose the desired format.

Font color: Choose the color for the currently applied measurement data, the default color is blue, click on […] to select the desired color.

No Background: check or uncheck the blank of True to set the background as transparent background, or with background, transparent background is the default setting.

Background Color: Select the background color for the current measurement data on the image. Click out […] to choose the desired background color, the default background color is white.

Apply to All: Apply all the set parameters above to the measured graphs.

Default: Resort and apply the default parameters settings to the measured graphs.

5.6   Manual Class Counting

User can classify and count different categories of cells with the manual counter from the Capture software, there are 7 different categories available.
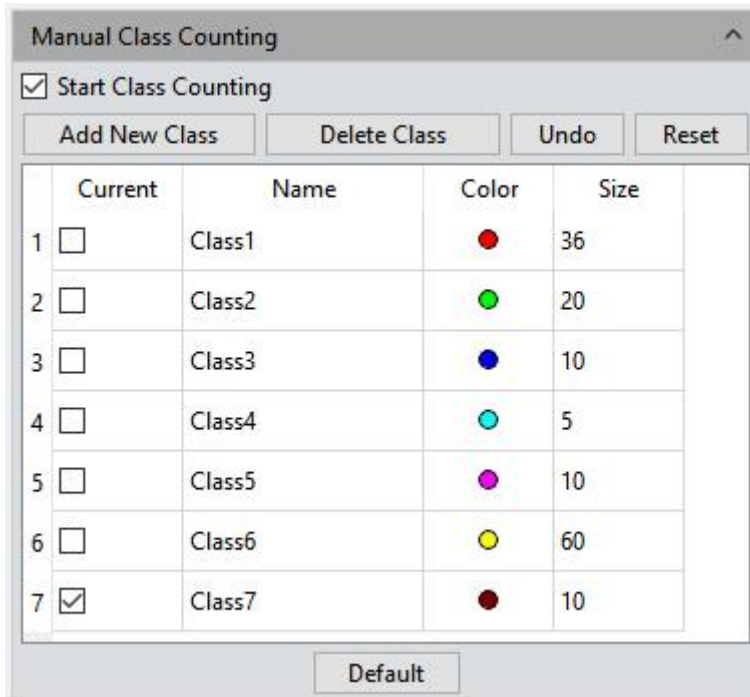
Class Name: Double-click the category button to name the category personally.

Color: Double-click [icon] to display the palette to choose the desired color.

Size: Double-click the number to set the size of points, the default is 10, the range is 5-100.

Add New Class: Click **[Add New Class]** to create a new category.

Delete Class: Click **[Delete Class]** to delete the selected category.

Undo: Click **[undo]** to undo the last action.

Reset: Click **[Reset]** to clear all classes and clear the counter table.

Default: Click [Default] to reset all classes' parameters, but not clear classes.

Start Class Counting: Click **[Start Class Counting]** to select a certain category, click the left mouse button on the targets on image to count. The counted results will be automatically display on the counting table.

After the counting with one or different categories, all the counting results data will be displayed on the counting table, select **[Export to Excel]**, and export the data to the Excel forms.

5.7   Scale Property

Captures software allows the user to set the scale properties for the user's actual needs.

Show Scale: check on the blank to select to display the scale on the measured image or not; the default setting is not showing the scale, if check to show the scale, the scale will automatically be shown on the left top of the image, use can use the mouse to drag the scale to the position he desires.

Type: select the display type of the current scale, support manual and automatic, the default is automatic;

Align: Set the alignment between the current scale and the value. It supports left, center, and right alignment, and the default is center;

Orientation: Set the display direction of the current scale, support horizontal and vertical, the default is horizontal;

Name: Create name for the scale applied to the current, the default setting is blank.

Length: The default value is 100 pixels, that is, the scale is displayed in total length of 100-unit pixels, and this value can be modified by entering new value.
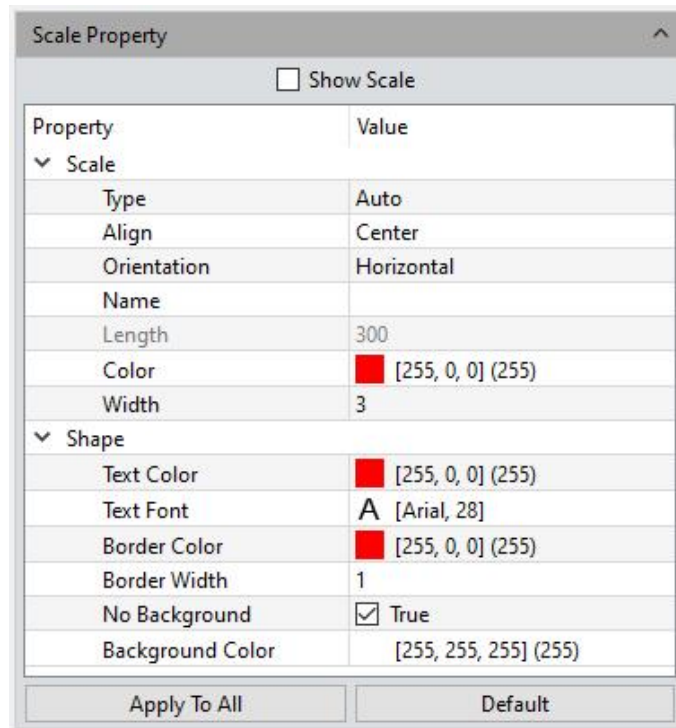
Color: Choose the color for the current applied scale on the image, the default color is red, click on […] to choose the desired scale color.

Width: enter the value of width for the scale on applied the image, the default value is 5, range 1~5.

Text Color: Choose the color for text of the scale currently applied on the image, the default color is red, click on […] to select the desired color.

Text Font: Choose the font format for scale currently applied on the image, the default format is [Arial 28], click on […] to choose the desired format.

Border Color: Choose the color for border of the scale currently applied on the image, the default color is red, click on […] to select the desired color.

Border Width: enter the value of width of the scale currently applied on the image, the default value is 5, range 1~5.

No Background: check or uncheck the blank of True to set the background as transparent background, or with background for the scale currently applied on the image, transparent background on the scale is the default setting.

Background Color: Select the background color for scale currently applied on the image. Click on […] to choose the desired background color, the default background color is white.

Apply to All: Apply settings to all scales.

Default: Resort and apply the default parameters settings to the scale on the image.

5.8 Ruler Property

Capture software allows the user to set the crosshair properties of the image according to his actual needs.
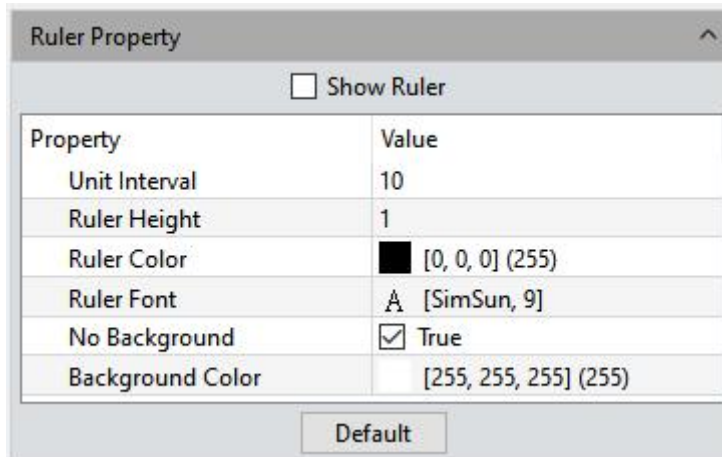
Show Ruler: check on the blank to select to display the crosshair on the image or not; the default setting is not showing the crosshair.

Unit interval: Set current applied cross ruler interval distance on the image;

Ruler height: Set height of the currently applied cross ruler on the image;

Ruler Color: Choose the color for the current applied crosshair on the image, the default color is black, click on [...] to choose the desired crosshair color.

Ruler Font: Sets the font size on crosshair;

No Background: check or uncheck the blank of True to set the background as transparent background, or with background for the crosshair currently applied on the image, transparent background on the crosshair is the default setting.

Background Color: Select the background color for crosshair currently applied on the image. Click on [...] to choose the desired background color, the default background color is white.

Default: Resort and apply the default parameters settings to the crosshair on the image.

5.9 Grid Property

Captures software allows the user to set the grid properties of the image according to his actual needs.
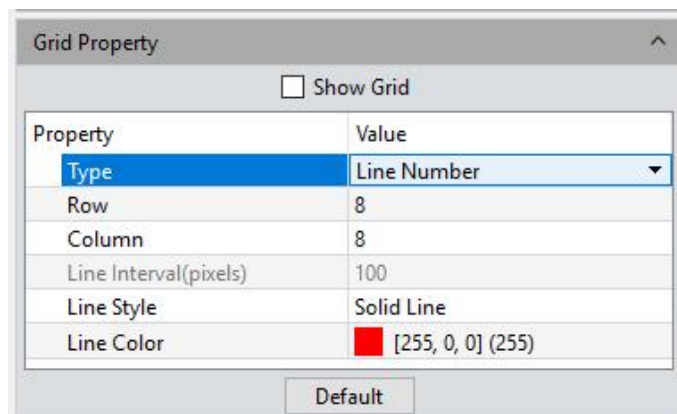
Show Grid: check on the blank to select to display the grid on the image or not; the default setting is not showing the grid.

Type: Select the way to set the grid to apply to the current image.

Row/Column: If you choose to define the line number, you can enter the numbers of the line on rows and columns applied on the image. The default numbers of row grid and column grid are both 8.

Line Interval: If you choose to define the grid by the line interval, you can enter the number of grids you need into the blank of Line Interval, the default number of line interval is 100.

Line style: Choose the line style for the grid to apply on the image there are 5 styles of grid could be chosen from, the solid lines, dashed lines, dotted lines, dotted lines, and two dotted lines.

Line Color: Choose the color for the grid to apply on the image, the default color is red, click on […] to choose the desired grid color.

Default: Resort and apply the default parameters settings to the grid on the image.

5.10 Save Settings

Copy the parameter file and load it on other computer, which can realize the transfer of parameters across platforms and keep the user's experimental conditions as consistent as possible.
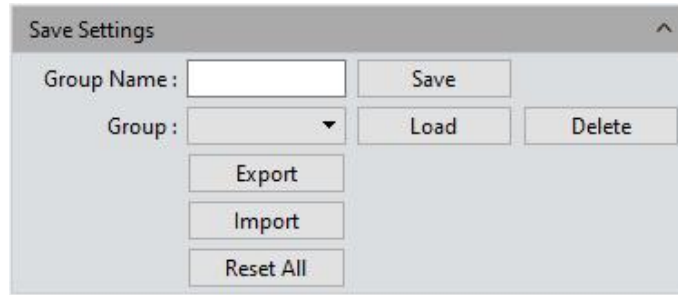
Group Name: Set the parameter name, it can also be viewed and loaded through the drop-down menu.

Save: Save settings;

Load: Load selected settings;

Delete: Delete selected settings;

Export: Export selected settings;

Import: Import settings file into drop-down menu;

Reset All: Clear all user settings and restore to the software factory settings;

5.11 Fluorescence Intensity

Mosaic allows users to measure the gray value of the image according to actual needs, and supports both linear and rectangular methods;
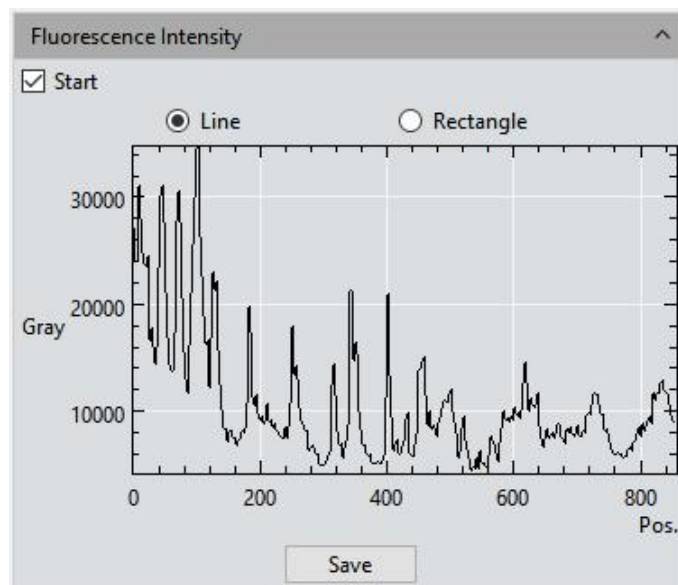
Operating Procedures

1) Switch from the preview module to the measurement module, or open an image,

and check [Start] to enable the function. At this time, the measurement tool is not allowed;

2) Draw a line segment or a rectangle to measure the fluorescence intensity of the drawn area;

3) Click [Save] to save the current measurement data in excel format to the local disk;

Note:

● Draw a line segment graph and complete the drawing at the second click to measure the fluorescence intensity data on the straight line

● To draw a rectangle, left-click to select two endpoints to draw a rectangle graph, which can measure the average fluorescence intensity data of each column of pixels within the rectangle.

5.12 Cursor Property

The user can adjust the properties of the measurement cursor according to actual needs. The setting interface is shown in below.
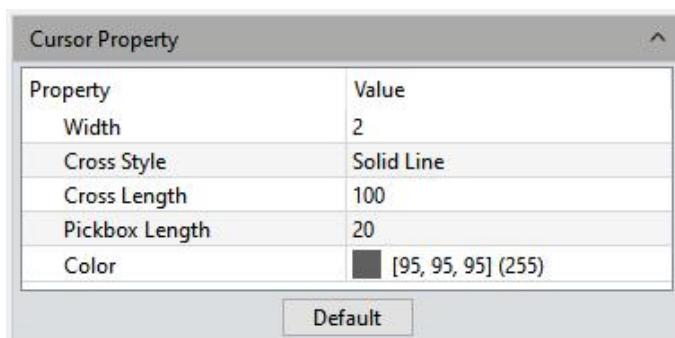
Width: Used to set the thickness of the cross cursor line segment, the setting range is 1~5, and the default value is 2.

Cross style: Set the line style of the cross cursor, the default is solid line, and dotted line can be selected;

Cross length: Select the length of the cross cursor currently displayed on the image, the default is 100;

Pickbox length: Select the width and length of the cross cursor that is currently displayed on the image, the default is 20;

Color: Select the currently applied cross cursor on the image to adjust the line color, select it and click the color palette to select the desired color;

6. Report

Captures software provides report formats to export the measurement data to your working report documents, you can also export the report in real time when you in preview window, In addition to the default template, a custom template is also available, and users can modify the report according to actual needs. Custom template, only supports excel format.

6.1   Template Report

The software provides functions to export custom measurement templates, measurement data modules and batch export reports.
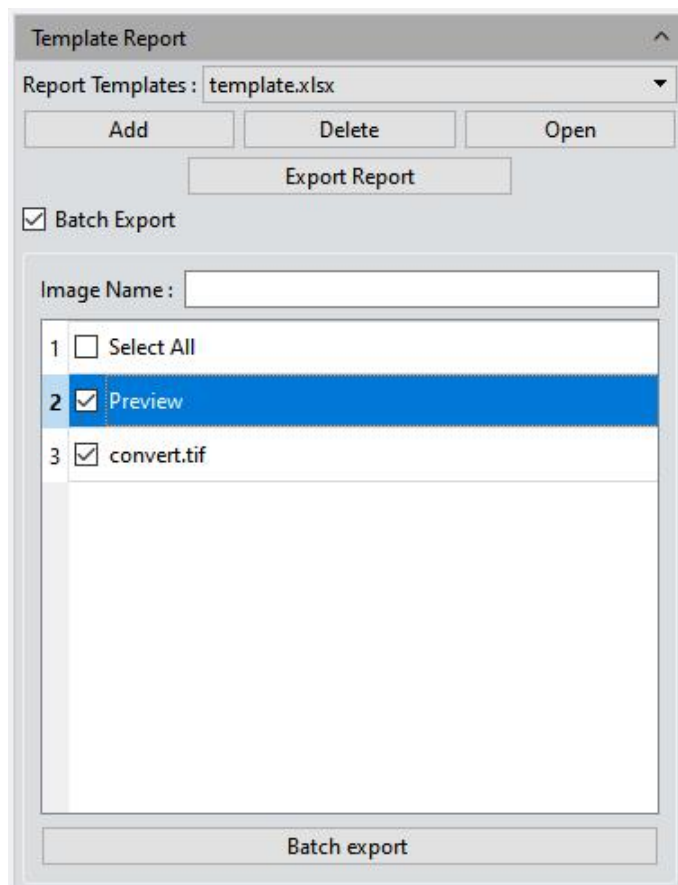
Report Templates: Users can click on the name to select a template, and the default is the software template.

Add: Add a custom template, the custom template must be modified on the software default template, the template format is Excel. The default template is in the [templates] file under the software installation path. Use the **#** identifier to indicate the content that needs to be displayed. When the **##** identifier appears, it means that the

header of the data table is hidden.

Delete: Delete the selected template;

Open: Preview the selected template;

Export Report: Export the current report, the format is excel;

Batch Export: Check [Batch Export], the user can check the names of the pictures to be exported, and click [Batch Export] to export the report. The image name supports query.

6.2   Report

Report Templates: Choose your desired format of report template.

Project Name: Enter your personal name for the project you are working on, this name will show up on your working report.

Sample Name: Enter the name of your sample in this project, this name will show up on your working report.

User Name: Enter the name of the user, or conductor, or worker, or reporter.

Notes: Enter the notes, supplement information or any or the comments you need to record down from reference for this job in this working report.

Image Name: Enter the name of the image you captured before, then the image can automatically be loaded on the report.

Image information: Check on the blank to show the information of the image you just pulled out, uncheck to vanish the information, the default setting is showing out the information of the image on the report.

Measure Data: In the report, display/do not display the current image measure data, default checked.
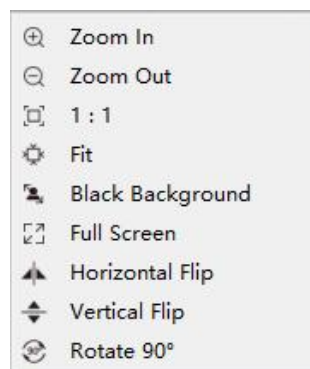
Count Table: In the report, display/do not display the current image count table, default checked.

Export Report: Export current report into a document of with PDF format.

Print: Print the current report.

Cancel: Cancels this operation, it means clearing out all the report information just entered or loaded in.

7. Display

Zoom In: Magnify the current image and let it display larger than its original size.

Zoom Out: Reduces the current image and let it display smaller than its original size.

1:1: The current displaying image is in its 1:1 original size.

Fit: Adjust the showing size of the image to fit the software operating window.

Black Background: The image is in full screen and the background of the image is

default to be black. Type the [Esc] button of the computer keyboard or click on the Back-Arrow symbol on the right down corner of the screen to exit the black background mode.

Full Screen: Enable the image to be full screen. Type the [Esc] button of the computer keyboard or click on the Back-Arrow symbol on the right down corner of the screen to exit the full screen mode.

Horizontal Flip: Horizontally mirrors the current image.

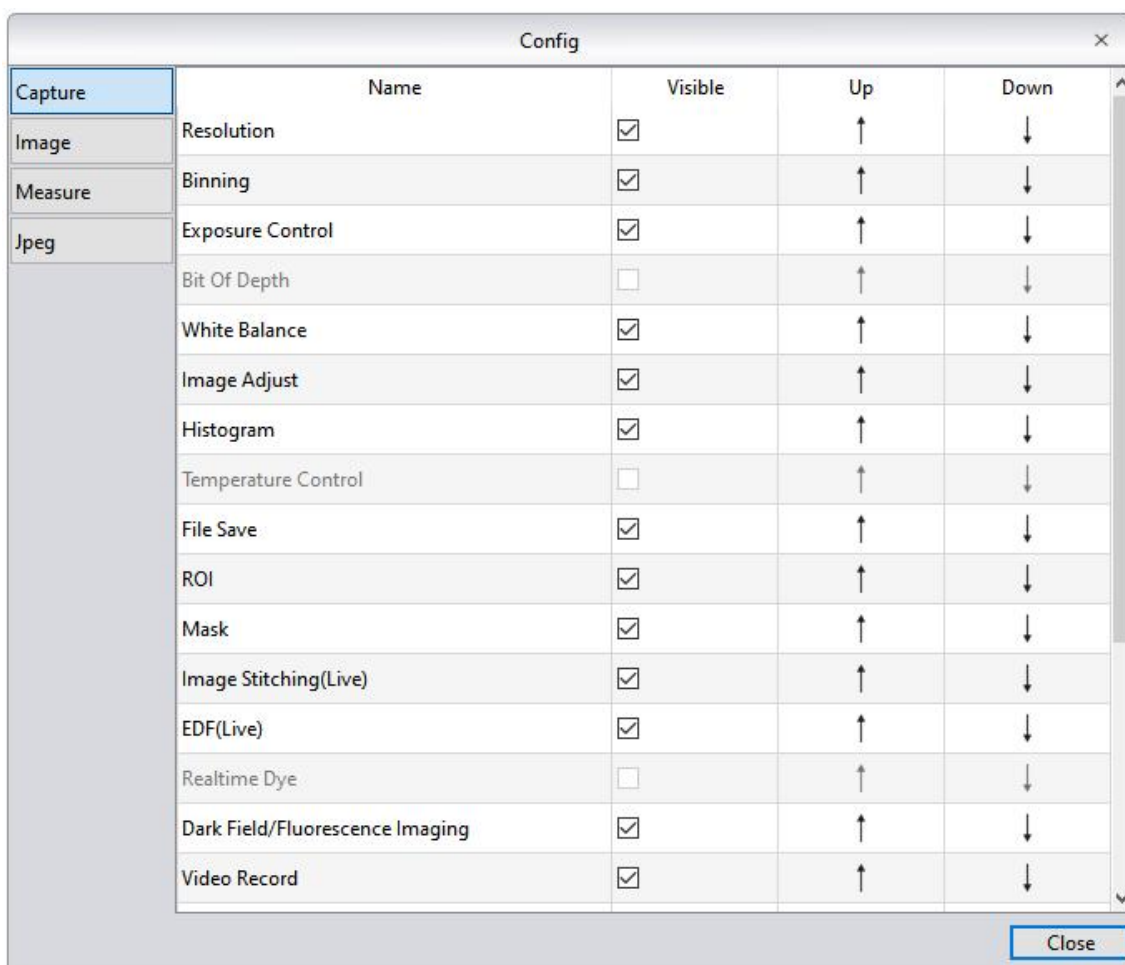**Vertical Flip:** Vertically mirrors of the current image.

Rotate 90°: Rotate the current image clockwise, 90 degrees each click.

8. Config

8.1   Capture\Image\Measure

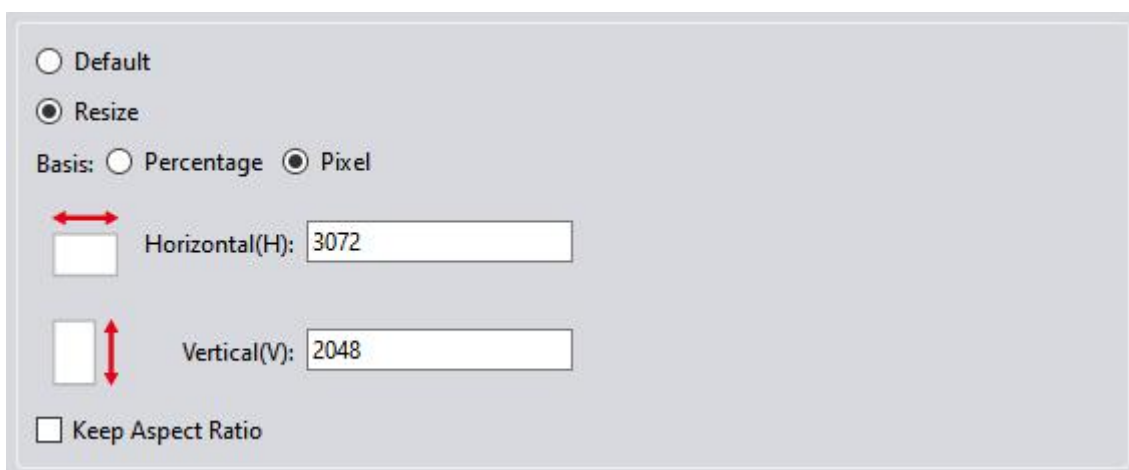Software function modules and orders can be customized as shown below.

Shown: Check module to display on the software interface. Unchecking of the blank next to the module means that the module will not be displayed on the interface. All modules are checked by default. This setting can be saved after the software restarts;

Up: The shown module can be moved up, and the interface layout changes accordingly to the moving.

Down: The shown module can be moved down, and the interface layout changes accordingly to the moving.

8.2   Jpeg

Capture provides Jpeg format size settings. It can be operated in the settings. When Jpeg is selected in the file saving module, the image size will be generated according to the set format when taking pictures.

Default: When the default is selected, the generated image keeps the current camera image resolution;

Resize: Check the resize to adjust the image size;

Percentage/pixel: Adjust pictures according to percentage/pixel. When a percentage is selected, the adjustment range is 1-200%. When pixel is selected, the adjustment range is 4-maximum resolution;

Horizontal: Set the size of the image in the horizontal direction;

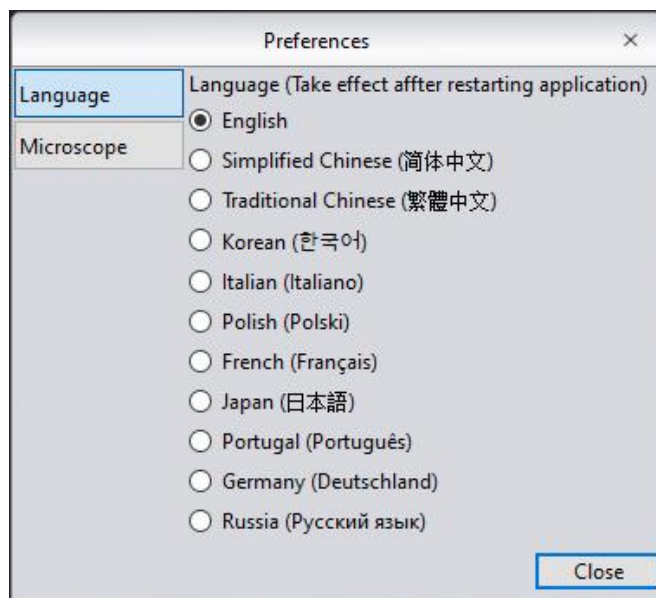**Vertical:** Set the size of the image in the vertical direction;

Keep Aspect Ratio: check it to keep the image aspect ratio to prevent image distortion;
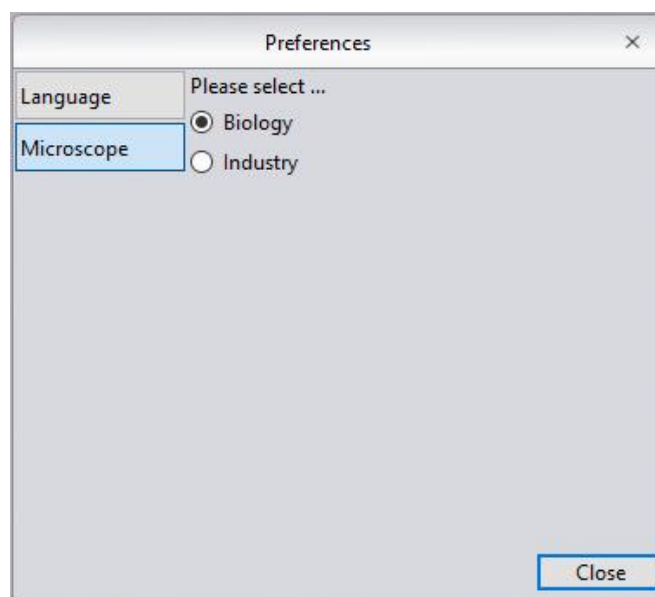
9. Info

9.1 Preferences

language: The software language can be selected. The software needs to be restarted to take the language setting into effect.

Microscope Option: To select applicable directions, software will take effect after restart.
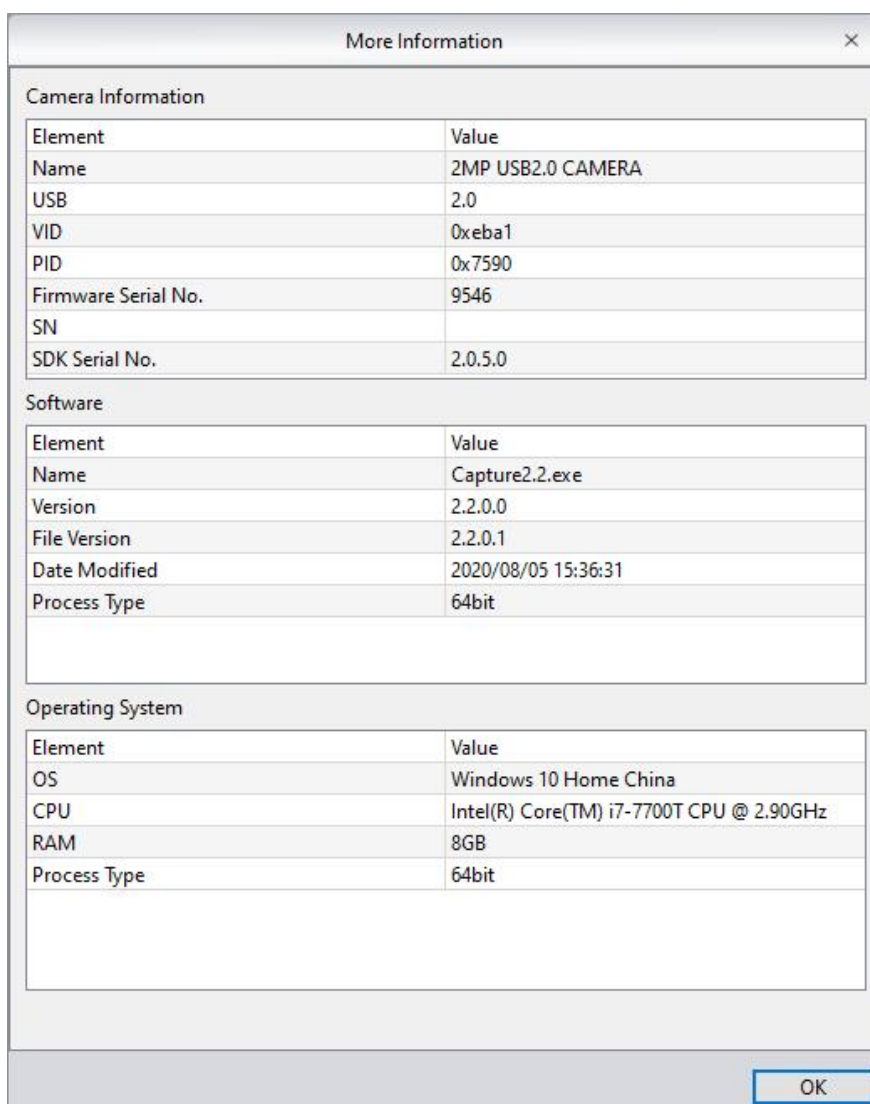
9.2   Help

The software operation instructions can be called out for the user to learn and refer.

9.3   About

Open about menu, click More information, you can get the current information of the camera, the versions of the software and the information of the operating system.

More Information	
Camera Information	

Element	Value
Name	2MP USB2.0 CAMERA
USB	2.0
VID	0xeba1
PID	0x7590
Firmware Serial No.	9546
SN	
SDK Serial No.	2.0.5.0

Software

Element	Value
Name	Capture2.2.exe
Version	2.2.0.0
File Version	2.2.0.1
Date Modified	2020/08/05 15:36:31
Process Type	64bit

Operating System

Element	Value
OS	Windows 10 Home China
CPU	Intel(R) Core(TM) i7-7700T CPU @ 2.90GHz
RAM	8GB
Process Type	64bit

OK

10. Customer Services

Warranty

1) When the product is under warranty, we fulfill the repairing to any damages corresponding with the warranty policies for free of charges.

2) The warranty policies are limited to the defects in manufacturing and materials of the commodity. Anthropic damage such as self-disassembling, water ingress, dropping, and damages of natural disasters are not covered by the warranty.

To save your time, please prepare the following information in advanced:

1) Camera model and S/N (product serial number).

2) Software version number and computer system configuration information.

3) As details as possible of description of the problems and any images help to indicate and show to the problems.