AmScope™

Software Application Manual

MU Series – USB 2.0 Color CMOS C-Mount Digital Microscope Cameras

MD Series – USB 2.0 Color CMOS Digital Eyepiece Microscope Cameras

Contents

ToupView help

ToupView is designed for **UCMOS**, **UHCCD** or other USB cameras. With ToupView, one can browse images, preview videos, capture images, and process captured images.

ToupView has 4 main user GUIs, they are:

Start Frame: ToupView's initial frame.

Browser Frame: Browser to browse images.

Live Capture Frame: Preview video and capture images.

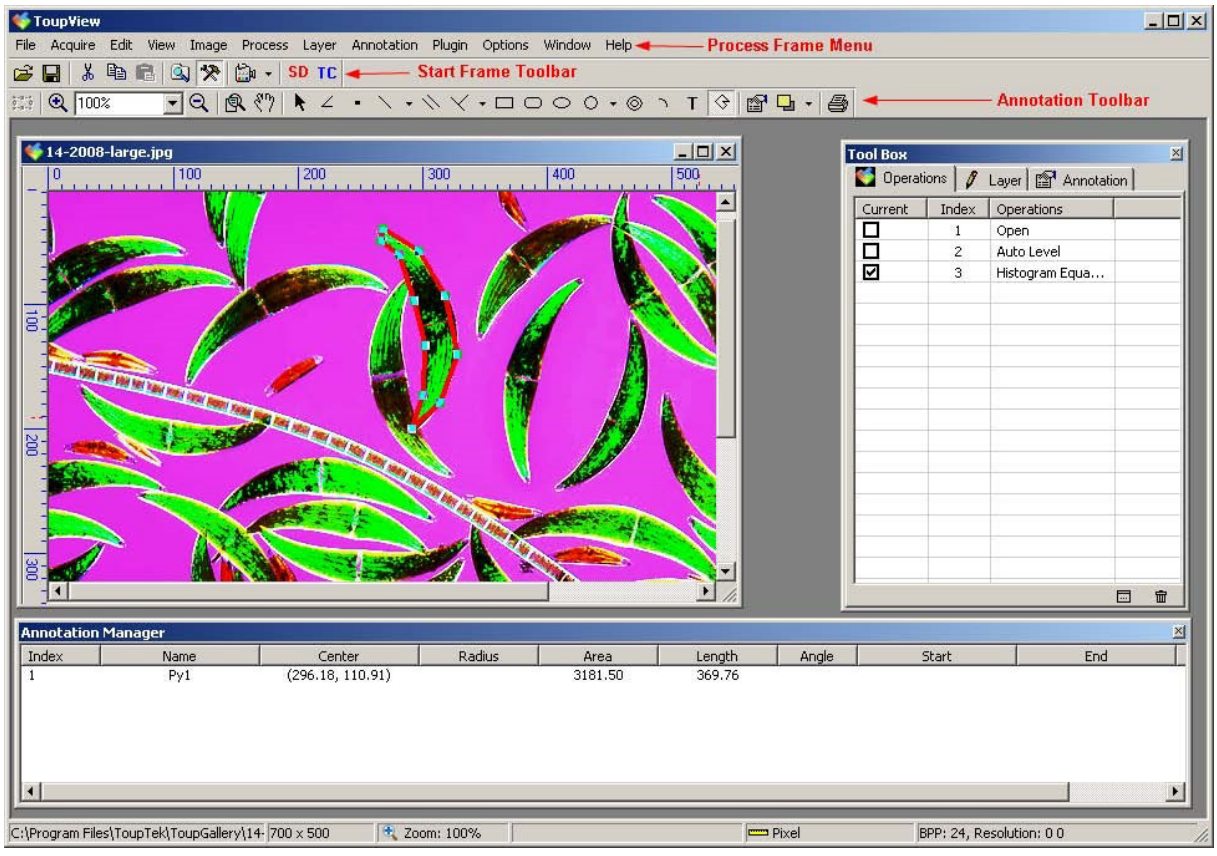
Process Frame: Process the captured images.

1 Process Frame

1.1 Process Frame Introduction

The **Process Frame** is specially designed to process the captured image. It includes:

1. **Process Frame Menu.**
2. **Start Frame Toolbar:** See **Start Frame: Start Frame Toolbar.**
3. **Annotation Toolbar:** See **Process Frame: Annotation Toolbar.**
4. **Tool Box:** See **Process Frame: Tool Box.**
5. **Annotation Manager:** See **Process Frame: View->Annotation Manager.**
6. **Process Frame Statusbar:** See **Process Frame: Process Frame Statusbar.**
7. **Image Window:** Window to display image.

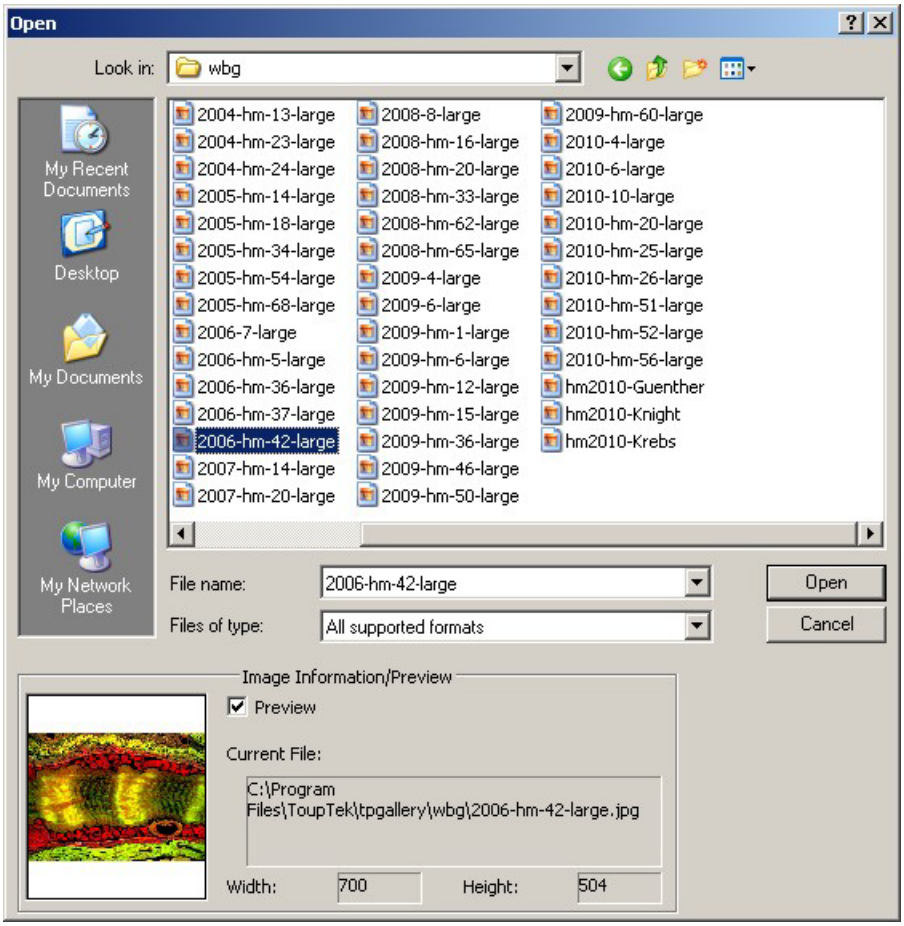


1.2 File

1.2.1 Open Image•••Ctrl+O

Choose **Open Image•••**  command to open an existing image file. **Open Image•••** can also be used to preview an image in small size, or to view its statistics without actually opening the image itself. These capabilities can be used to quickly locate a particular image.

ToupView supports and can open many image formats. These are identified in the **Files of type** list box.



When open an image, ToupView places it into a new image window. It then becomes the active image. More than one image can be opened within ToupView simultaneously.

Note: ToupView maintains, at the bottom of the **File** menu, a list of the last 4 opened files. Any of these files can be accessed by simply clicking on its

file name. If no files are listed (beneath **Exit**), the **Open Image•••** command must be used to open the file.

Also, **View->Browser** can be used to view images under any selected directory. Brief information is given in **View->Browser.**

File name: From this list box, select the name of the file want to open. Either the type of the file name (with its entire path, if it is not in the current folder), or selecting **Files of type** to obtain a list of file names. Double-clicking a file name in the large list box (where both folder and file names are listed) will automatically open it.

Note: If just type in the file name, be sure that the **Files of type** field correctly identify the format of the file to open. Otherwise error messages will pop-up when ToupView tries to open the file.

Files of type: In this list box, select the image format of the file to open. If one selects **All supported formats**, ToupView uses the file's extension to identify its format. ToupView supports the following file formats:

Window Bitmap(*.bmp,*.dib,*.rle) JPEG(*.jpg,*.jpeg,*.jpe,*.jif,*.jfif)
Portable Network Graphics(*.png)
Tag Image File Format(*.tif, *.tiff)
Compuserve GIF (*.gif)
Targa(*.tga)
PhotoShop(*.psd)
ICON(*.ico)
Enhanced Window Metafile(*.emf)
Window Metafile(*.wmf)
JBIG(*.jbg)
Wireless Bitmap(*.wbmp)
ToupView File Type(*.tft)

If the image file does not use standard format-identifying extensions, the file in the **File name** field must be typed, and then select its format from the **Files of type** list box. Otherwise, ToupView will select a format based on the file name extension.

Preview: Click this button to preview image in small size. In preview mode, statistics about the image (i.e. image **Width, Height** and image location) will be displayed. The default state is no **Preview.**

1.2.2 Open Video•••

Choose **Open Video•••** command to open an existing video file.

1.2.3 Save Ctrl+S

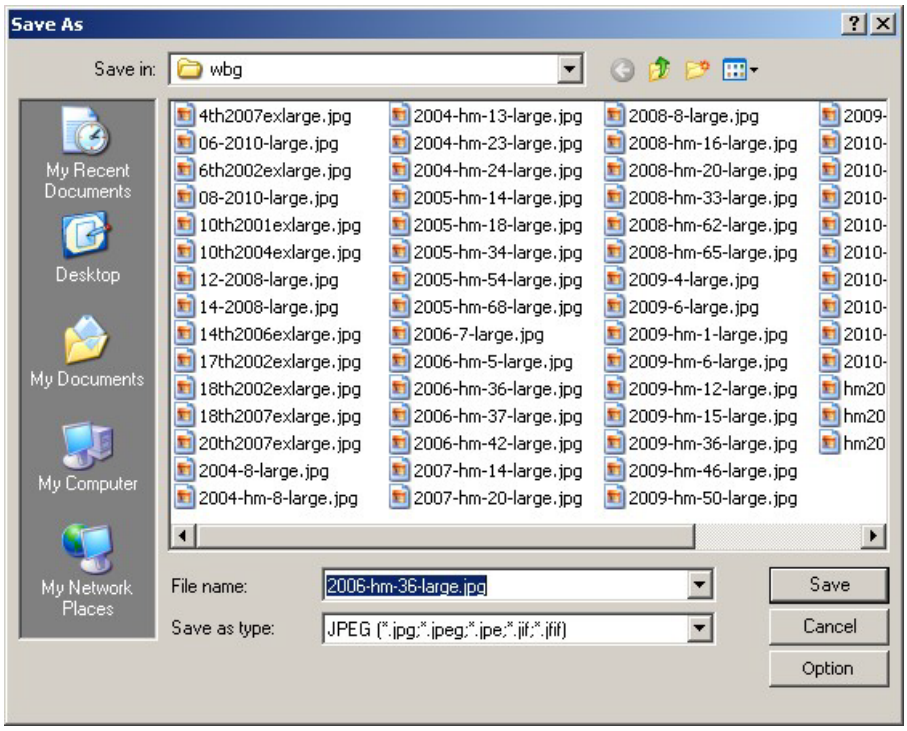
Choose **Save**  command to immediately store the contents of the current window to its file (the file listed on the window's title bar) while leaving the image still active in its window. If the image is in an untitled window, ToupView will issue the **Save As** dialog.

The **Save** command can be used to save the most recent changes to disk. It is often performed as a precautionary measure during lengthy or involved processes to reduce the amount of reprocessing that might be required in the event of a system failure or operational error. When an image is closed and not to save its changes is chosen, ToupView discards all changes made since the last **Save** operation.

Note: the **Save** command always saves the contents of the entire window, even if there is an **AOI (Area of Interest)** defined within it.

1.2.4 Save As•••

Choose **Save As** command to store the contents of the current window to a specified file format. At the end of a **Save As** operation, the image window will be associated with the new file and the new format (i.e., its title bar will display the new file name).



ToupView supported file save formats are:

Window Bitmap(*.bmp,*.dib,*.rle)
JPEG(*.jpg,*.jpeg,*.jpe,*.jif,*.jfif)
Portable Network Graphics(*.png)
Tag Image File Format(*.tif, *.tiff)
Compuserve GIF (*.gif)
PCX(*.pcx)
Targa(*.tga)
JBIG(*.jbg)
ToupView File Type(*.tft)

Save in: Find the folder where the file wishes to be saved. A new folder may be created using the **New Folder** button.

File name: Enter to be saved file name. To specify the file's location, either enter its entire path (disk and folder), or specify its location using the **Save in** list box.

Save as type: In this list box, select the format in which the image wants to be saved. **Save As** is also used to convert a single image from one format to another. For example, if a **TIFF** file needs to convert to **PCX** format, open the **TIFF** image first, then choose the **Save As** command with the **PCX** format option to save it to a new file.

The **Save As** command has several important uses beyond simply storing an image to a new file name.

Click the **Option** button to select the different parameters to save the file.

For **Window Bitmap(*.bmp,*.dib,*.rle)**, **Option** will be in gray style, which means that no operations are needed

For **JPEG(*.jpg,*.jpeg,*.jpe,*.jif,*.jfif)**, **Option** has the following items:

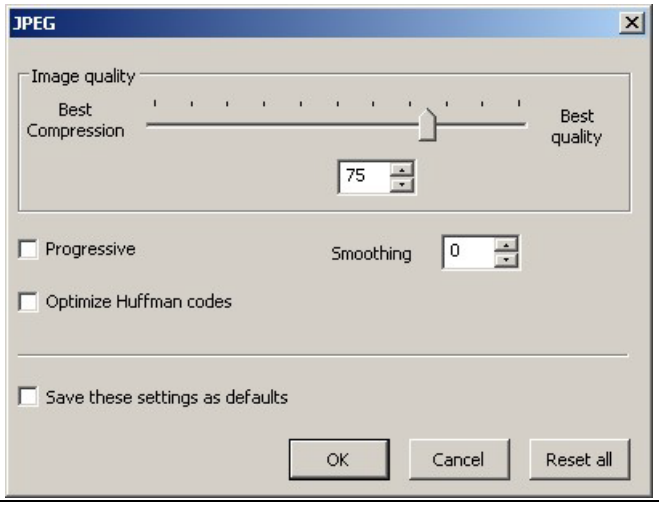
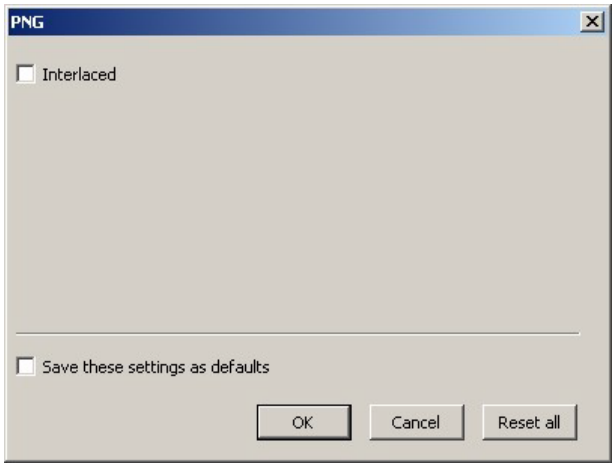


Image quality	If one save an image in **JPEG format (*.jpg)**, one may adjust image quality in the edit box. The values range from **0** to **100**. Default value: **75**.
Progressive	The default is unchecked.
Optimize Huffman codes	The default is unchecked.
Smoothing	The values range between **0** and **100**. Default value: **0**.
Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

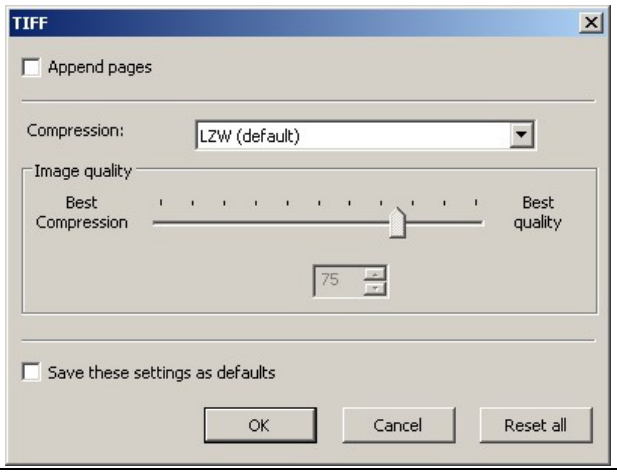
For **Portable Network Graphics(*.png)**, **Option** has the following items:



Interlaced	The default is unchecked.

Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

For **Tag Image File Format(*.tif, *.tiff)**, **Option** has the following items:



Appended pages	Determine whether the current image will be saved in multiple pages style or not.
Compressions	Specifies a method for compressing the composite image data. For saving a 32-bit TIFF file, one can specify that the file be saved with predictor compression, but have no option to use JPEG compression. Predictor compression offers improved compression by rearranging floating point values, and works with both LZW and ZIP compression.
Image quality	If choose **Compressions as "JPEG"**, the **Image quality** can be adjusted by the slider bar. The values range between **0** and **100**. Default value: **75**.
Save these setting as defaults	When saving a file, the current settings will be saved as
	defaults for the next file save operation.

For

Compuserve GIF (*.gif)

PCX(*.pcx)

Targa(*.tga)

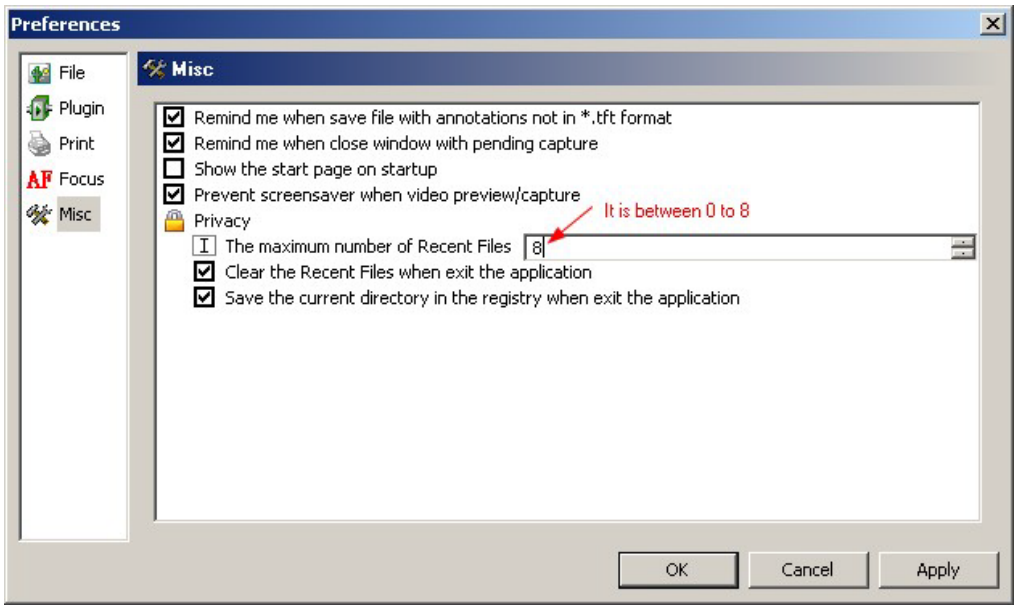
JBIG(*.jbg)

ToupView File Type(*.tft)

There is no **Option**.

Note: 1. Detailed information of the above academic terminologies can be found in books about image processing and image compression or on the internet.

2. One can check **Save the current directory in the registry when exit the application** to keep his directory unchanged when he starts ToupView the next time. See **Options->Preferences•••** for more details.



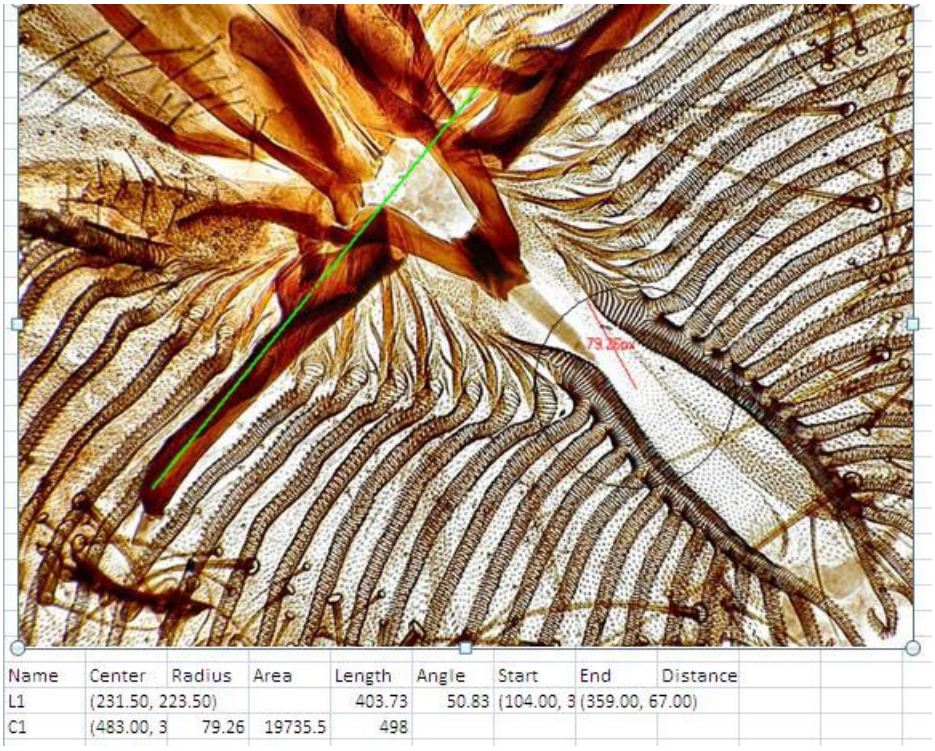
1.2.5 Export to Image

When there are **Annotation** objects above the **Background layer**, this menu will be enabled. If this menu is chosen, the **Annotation** objects on the image will be merged together with the **Background layer** and the image will be polluted and cannot be restored again.

After **Export to Image** is performed, there will only be a default layer called **Background layer** displayed in the list view on the **Tool Box Layer Page**, the **Layer** menu (Except the **New•••** submenu), the **Annotation** menu and the items about the **Annotation** menu on the **Annotation Toolbar**, will be disabled.

1.2.6 Export to Excel

When there are **Annotation** objects above the image **Background layer**, this menu will be enabled. If this command is chosen, the **Annotation** objects on the image will be exported to **Microsoft Excel** with the **Annotation** object and image together. The objects' parameters in the **Annotation Manager** will also be exported as a table on the same frame with the image.



Name	Center	Radius	Area	Length	Angle	Start	End	Distance
L1	(231.50, 223.50)			403.73	50.83	(104.00, 3	(359.00, 67.00)	
C1	(483.00, 3	79.26	19735.5	498				

1.2.7 Paste as New File•••

Choose the **Paste as New File•••** command to place the contents of the clipboard image into a new image window, which becomes the active image.

Before execute the **Paste as New File** command, valid image data must be copied to the clipboard first (see the **Copy** command). If there is no image data on the clipboard, the **Paste as New File•••** command will be disabled.

The new image type will be the same as that of the original image. ToupView will accept image data from other applications via the clipboard as long as it is in **Windows Bitmap (DIB)** format.

1.2.8 Print Setup•••

Choose this command to access the setup panel for the printer that have selected. ToupView will present the standard setup panel for the particular printer (this is the same panel one would receive if one were setting up the printer from the **Windows Control Panel**). Change printer's setup to satisfy the requirements, click **OK** button to return.

1.2.9 Print Preview••• Ctrl+Shift+P

Choose the **Print Preview** command to see the real-time effect of the printer without actually printing it out.

1.2.10 Print••• Ctrl+P

Choose the **Print**  command to print one or more copies of the current image to the selected output device. The ToupView **Print** command lets one take full advantage of the printer's capabilities. If the printer has built-in half-toning or color dithering capabilities, use them or instruct ToupView to perform these processes before sending the image to the device.

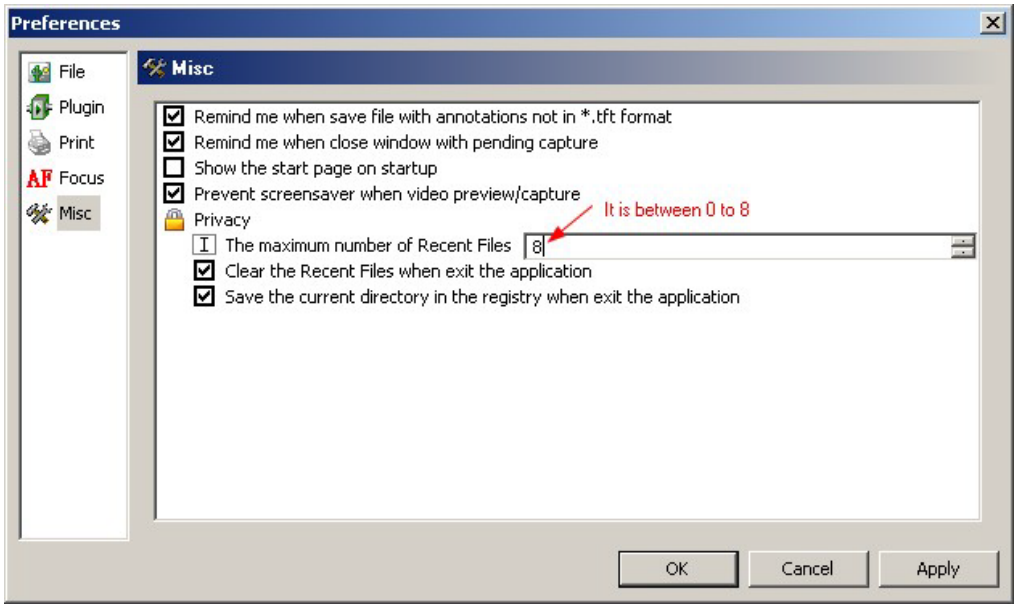
The **Print** command also has facilities that let one adjust the size and position of the image on the printed page.

1.2.11 Recent Files

ToupView maintains a recent 4 (default) most recently opened document files under the **Print** menu. Choose one of these menus immediately reopens that file.

1. **The maximum number of Recent Files** can be changed by choose the **Options->Preferences••• Misc** tab. Here, clicking the **4** (default) edit box will allow to input the number of items that want. The values range from **0** to **8**.

2. One can check **Clear the Recent Files when exit the application** to clear the **Recent Files**.



1.2.12 Exit

Choose the **Exit** command will close all of the active images and remove their windows from the screen. After all of the images are closed, ToupView will end itself.

Note: 1. If an image has been modified before attempting to **Exit** it, ToupView will issue a warning to ask if user want to save the image first.

1.3 Acquire

1.3.1 Live Capture

Introduction

DirectShow's main design goal is to simplify the task of creating multimedia applications on the **Windows**® platform by isolating applications from the complexities of data transports, hardware differences, and synchronization issues. It is designed to address each of these challenges.

To achieve the throughput necessary for streaming video and audio, **DirectShow** uses **DirectDraw** and **DirectSound** to render data efficiently to the system's sound and graphics cards. Synchronization is achieved by encapsulating the multimedia data in time-stamped media samples. To handle the variety of sources, formats, and hardware devices, **DirectShow** uses a modular architecture in which operating system components called filters can be mixed and matched to provide support for many different scenarios.

DirectShow includes filters that support codes written for the **Audio Compression Manager (ACM)** and **Video Compression Manager (VCM)** interfaces.

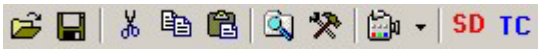
DirectShow enables applications to play files and streams from various sources, including local files and remote files on a network. **DirectShow** has native compressors and decompressors for some file formats, and there are many third-party hardware and software decoders that are compatible with **DirectShow**. In addition, **DirectShow** supports legacy **VFW** codes based on the **Video Compression Manager** (VCM) and Audio Compression Manager (ACM) interfaces. Playback makes full use of the **DirectDraw** hardware acceleration and **DirectSound** capabilities when the hardware supports it.

When should I use this technique?

The **DirectShow** technique is widely used in low-resolution video devices, such as those with resolutions smaller than 640X480. However, for UCMOS or UHCCD camera, any resolution can be displayed. For high resolution, **Twain Acquire** is suggested.

If the hardware and drivers support the **DirectShow** technique, this technique can be used to capture an image. To start **Live Capture** video, choose one of the following methods:

Start methods

1. **Live Capture** toolbar method 

Click the  button on the **Start Frame Toolbar**

2. **Live Capture** menu method

Choose **Acquire->Live Capture->XXX device** menu, XXX is the installed device name

3. **Live Capture Start Page** method
Click the device name on the **Start Page** under **Live Capture** item to start the **Live Capture** window.

1.3.2 Software Power

This command is used to choose the **Software Power** 

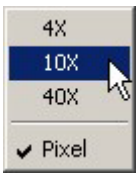
of the microscope to connect the video or image **resolutions** and the microscope objective in the **Live Capture** window or the image window.

The images captured under different **Software Power** will have different **resolution**s, so correct **Software Power** should be chosen before perform any video measurement or capture the image.

There are two methods to choose the **Software Power**. They are:

1. Menu method: **Acquire->Software Power**

If the microscope's **4X**, **10X**, **40X** Software Power is defined with **Live Capture Toolbar: Define Software Power**. There should be the following submenus under the **Software Power**.

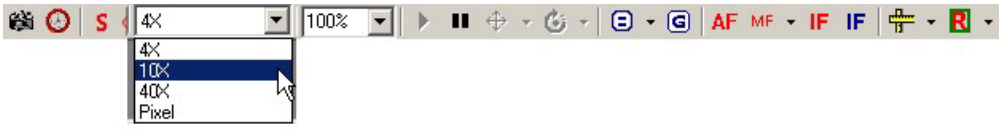


If nothing is set, only **Pixel** submenu is listed

2. **Live Capture** toolbar method

Click the **Zoom** dropdown arrow 

on the **Live Capture Toolbar** to choose the **Software Power**.



Note: Before image capture, the correct **Software Power** should be selected first. (For **Twain:Acquire**, one should check highest resolution on the **Setup->Video Stream Format•••** dialog)

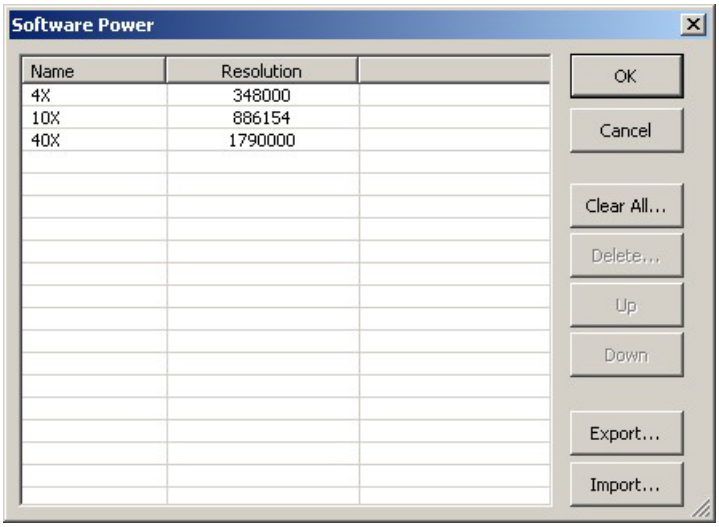
About the **Software Power** definition, see more in **Live Capture Toolbar: Define Software Power.**

1.3.3 Manage Software Power••• Ctrl+M

The **Manage Software Power•••**'s main functions are:

Modify the Software Power Order

The **Manage Software Power•••** menu will display a **Software Power** dialog as:



Select the **Software Power** item, click **Delete•••** button to delete the selected item.

Select the **Software Power** item, click the **Up** or **Down** button to change the **Software Power** list order.

Click **Clear All•••** to delete all of the **Software Power** items.

Export and Import the Software Power

If one wishes to reuse the **Software Power**, a backup is needed first.

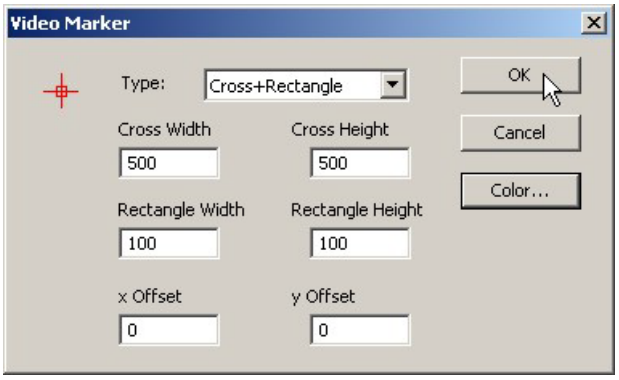
Click **Export•••** to backup the **Software Power** in a safe media. The file extension is ***.magn**.

After the new installation is finished, the **Software Power** can be import by choose **Acquire->Manage Software Power•••** and click **Import•••** to load the previously saved ***.magn** file.

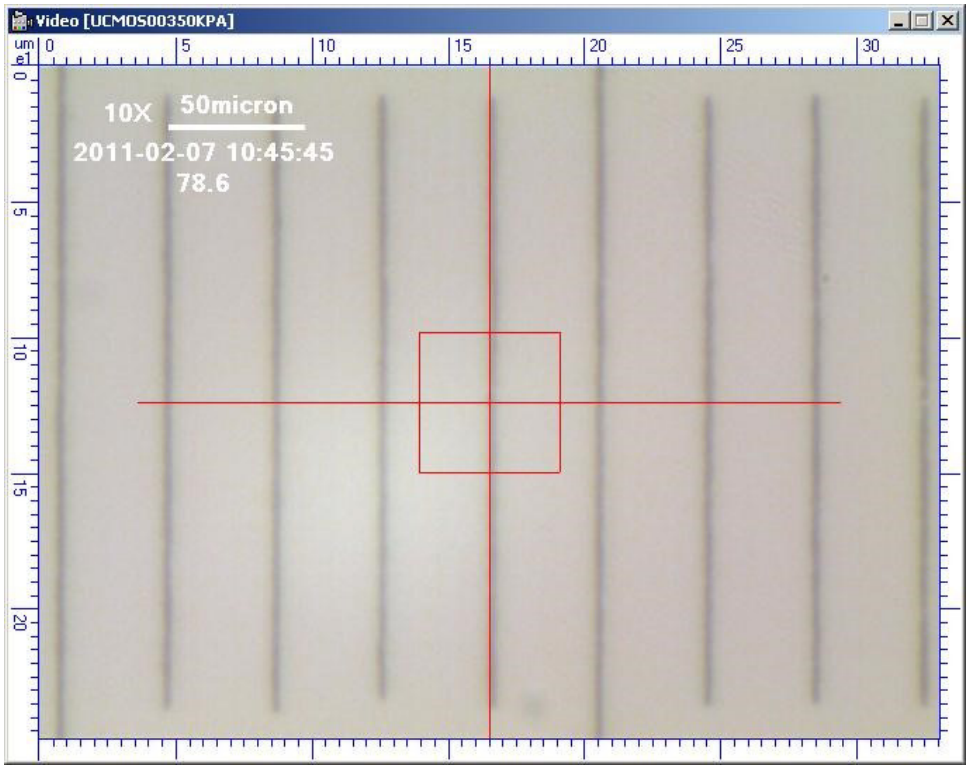
If everything is ok, press **OK** to end the management.

1.3.4 Video Marker•••

Choose **Video Marker•••** to overlay **Video Marker** on the **Live Capture** window. The **Video Marker** type may be **Cross**, **Rectangle**, **Circle**, **Cross+Rectangle**, or **Cross+Circle**. The **Video Marker** is as follows:



Choose **Type "Cross+Retangle"**, fill in the **Cross Width** and **Cross Height**, **Rectangle Width** and **Rectangle Height**, **x Offset** and **y Offset**, click **Color•••** to define the **Video Marker** color, click **OK** to end the **Video Marker** dialog. There should be a **Cross+ Rectangle** marker on the **Live Capture** window as shown below.

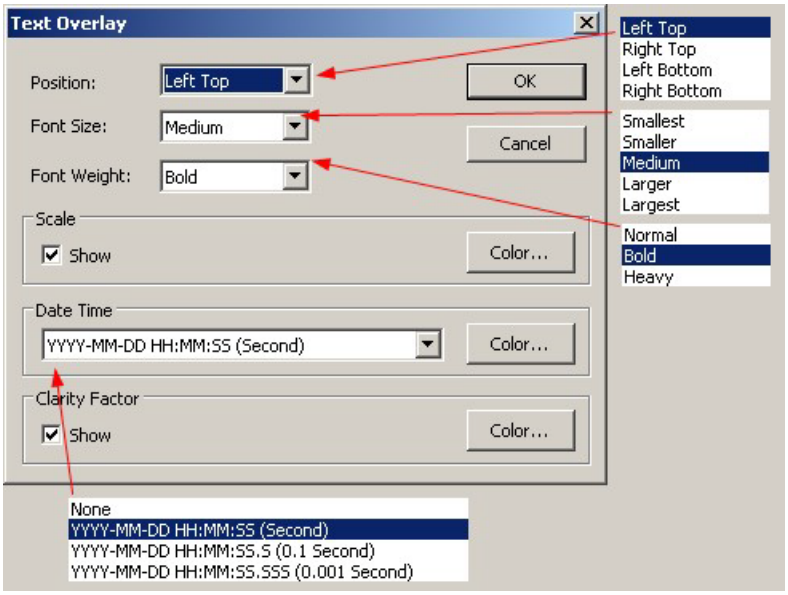


Note: Check  button the **Live Capture Toolbar** and using keyboard arrow key to move the **Video Marker**. See **Live Capture Frame: Live Capture Toolbar->Arrow key to move marker or watermark** for details.

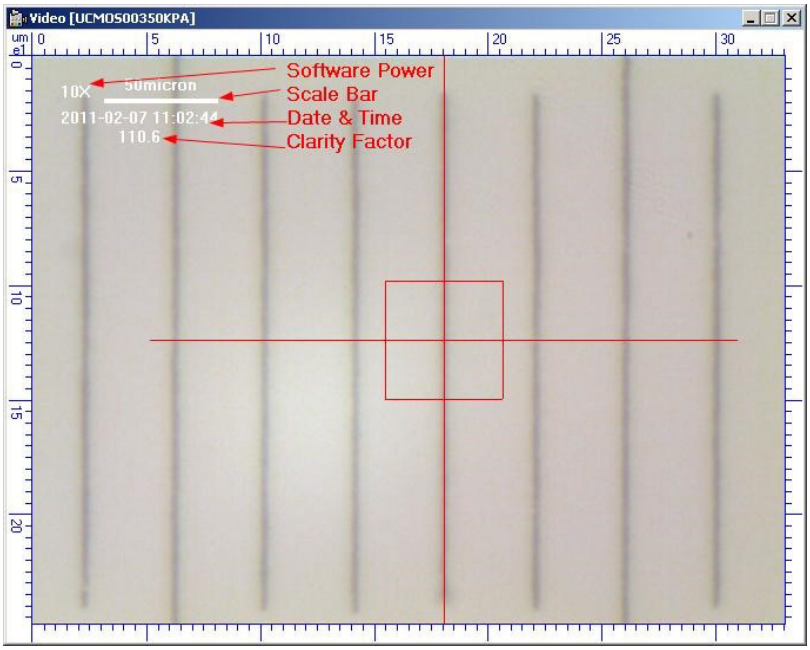
1.3.5 Video Overlay Text••• Ctrl+D

Choose **Acquire->Video Overlay Text•••** to overlay **Software Power, Scale** and **Date**, and **Clarity Factor** on the **Live Capture** window.

This command will invoke **Text Overlay** dialog box as below. The **Position, Font size, Font Weight** of the **Software Power, Scale** and **Date**, and **Clarity Factor** can be defined together. Their **Colors** can be defined separately.



Click **OK**, the **Software Power, Scale & Date** plus **Clarity Factor** are now overlaid on the **Live Capture** window. The **Clarity Factor** can tell if the sample is in good focus. The larger the **Clarity Factor**, the clearer the sample focused.



Note: To enable the **Scale** bar, the **Software Power** must be defined and selected. The **Unit** can be any unit except **Pixel**. Choose **Options->Annotation•••**, click **Unit**, **Length** to check the desired **Unit**. The **Unit** can also be chosen on **Live Capture Statusbar**. See **Live Capture Frame: Live Capture Statusbar** for details.

1.3.6 Video Watermark••• Ctrl+W

Fig.1 shows the **Live Capture** window. It is actually a **micro ruler**. The dark lines can be extracted as **Video Watermark** and overlaid on the **Live Capture** window.

The steps are:

1. Click  to capture the image as shown in Fig.1.

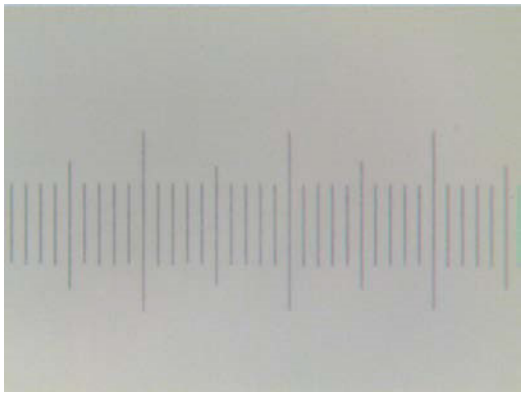


Fig.1 **Micro ruler** captured from the **Live Capture Window**

Fig.2 **Micro ruler** after binarized

2. Choose **Process->Binary•••** to binarize the image as in Fig.2.

3. Choose the **Image->Adjust->Invert** command to invert the image. Choose **Image->Color Quantize•••** to convert 24 bits as in Fig.3. Choose **File->Save As** to save the image in **24 bit BMP** format.

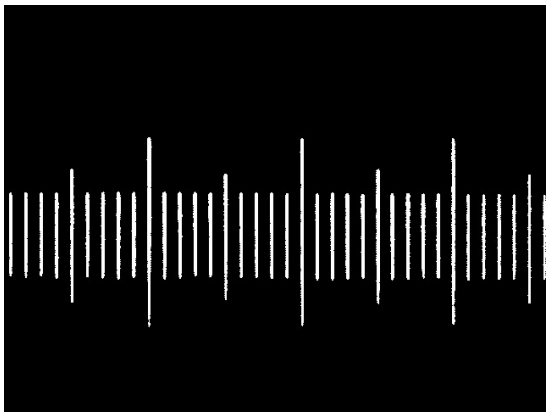


Fig.3 Inverted 24 bits image

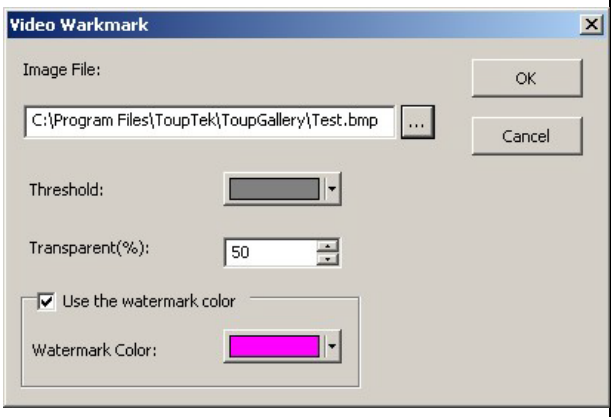


Fig.4 **Video Watermark** setup dialog

4. Choose **Acquire->Video Watermark•••**, and a dialog called **Video Watermark** is popped up as in Fig.4. Click the  button to locate the image saved in step 3. Set the **Threshold** in color, input the **Transparent(%)** value, and either check or uncheck **Use the watermark color**. If checked, choose the **Watermark Color**. If everything is ok, click **OK** button. The final **Video Watermark** is shown Fig.5.

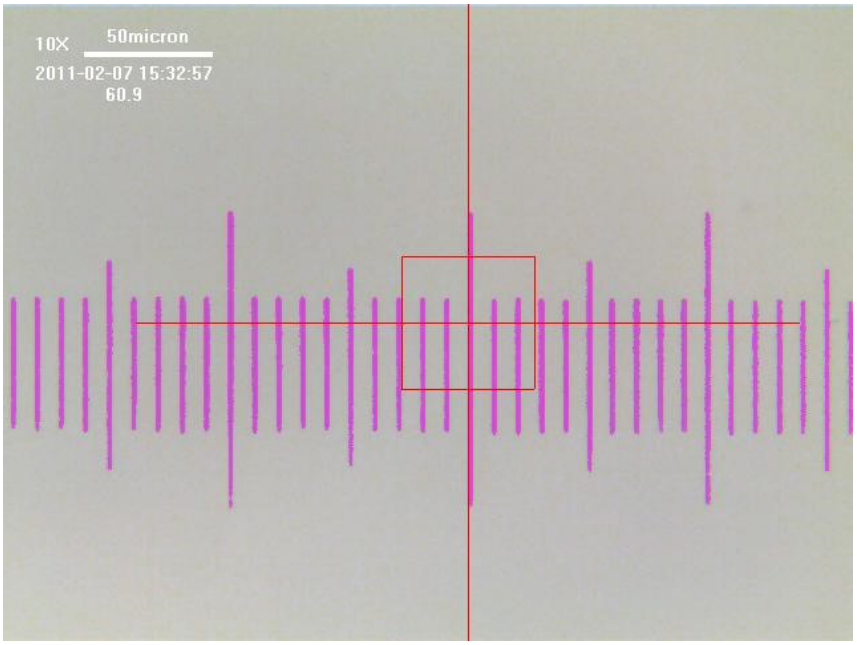


Fig.5 **Live Capture Window** with **Video Watermark** overlaid

5. Check  and use the keyboard arrow keys to move or rotate the **Video Watermark**. Please refer to **Live Capture Toolbar: Arrow key to move marker or watermark** and **Live Capture Toolbar: Arrow key to rotate watermark** for details.

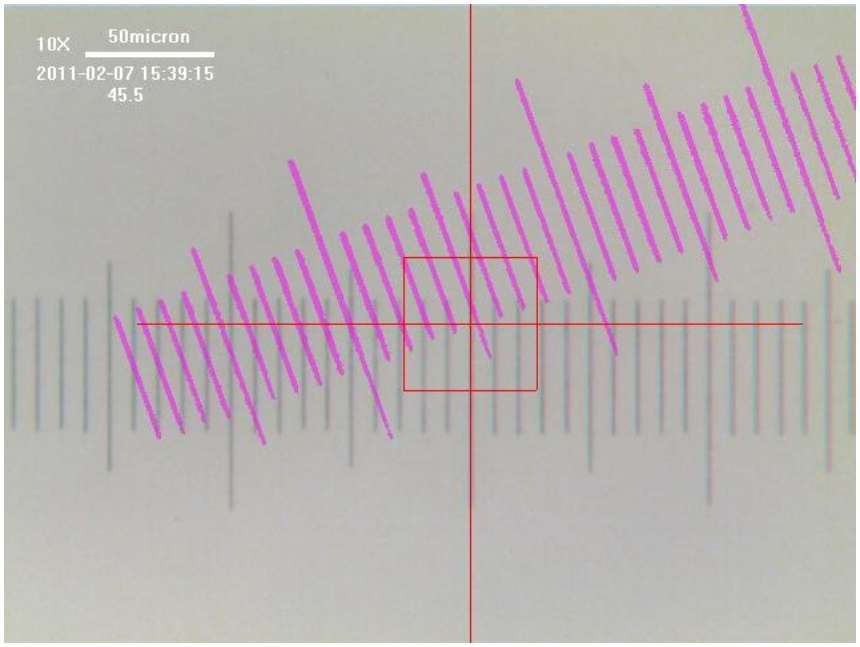
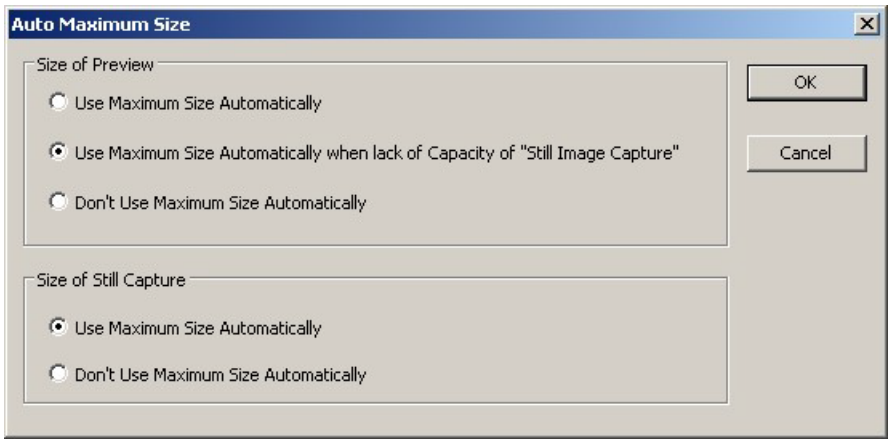


Fig.6 **Video Watermark** moved and rotated

1.3.7 Auto Maximum Size••• Ctrl+U

This is for **Live Capture** window only. Choose this menu will show an **Auto Maximum Size** dialog box as below:



In the **Size of Preview** group, 3 items can be checked.

1. **Use Maximum Size Automatically**: ToupView will enumerate the possible maximum size the camera support and set the **Live Capture** window to the maximum size for preview.

2. **Use Maximum Size Automatically when lake of "Capacity of Still Image Capture"**: If the camera does not support the **Still Image Capture** pin, ToupView will set the **Live Capture** window to the maximum size for preview. To check if the camera supports **Still Image Capture** or not, choose **Setup->View Property•••**and see if **Still Image Capture**'s value is **Y** or **N**.

3. **Don't Use Maximum Size Automatically**: If one wish to preview the video in a smaller size at high speed, the video can be set to a specific size (see **Setup->Video Stream Format•••**). Check this item will load the specified size after ToupView start again at next time.

In the **Size of Still Capture** group, there are 2 items:

1. **Use Maximum Size Automatically**: If this item is checked, ToupView will enumerate the possible **Still Image Capture** maximum size the camera supports and set the **Still Image Capture** to maximum one to capture the image (suggested).

2. **Don't Use Maximum Size Automatically**: If one wish to capture in smaller sizes, set the **Still Image Capture** to specific size (**Setup->Still Capture Options•••**). Check this item will load the specified size after ToupView start again at next time.

1.3.8 Capture with Marker and Watermark Ctrl+F

If this submenu is checked, the captured image will be merged with the **Video Marker** or **Video Watermark.**

1.3.9 Twain: Select Device•••

Introduction

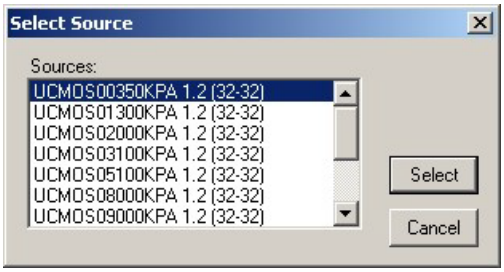
Twain is a cross-platform interface for acquiring images captured by certain scanners, digital cameras, or frame grabbers. The manufacturer of the **Twain Device** must provide a **Source Manager** and **Twain Data Source** to work with ToupView.

Select the active device for **Twain: Acquire•••** from all devices available in the device list box which are enumerated by the application.

One must install the **Twain Device** and its driver and restart computer before one can use it to import images into ToupView. See the documentations provided by the device manufacturer for the installation instructions.

Menu method

Before begin to start **Twain: Acquire** at the first time with ToupView, choose **Acquire->Twain:Select Device**  first, then select the device. One does not need to repeat this step for subsequent use of the **Twain Acquire.**



Toolbar Method

Click  to invoke the **Select Source** dialog and select the listed camera name, click **Select** to end the command.

Note: If more than one **Twain Devices** are installed, choose the **Twain:Select Device** command to select the right one.

1.3.10 Twain:Acquire•••

Introduction

There are basically two techniques used to capture the video images from video devices such as a PC camera, digital camera, and scanner. They are the **Twain:Acquire** technique and the **DirectShow** technique (previously called **VFW**).

The most obvious characteristics of the **Twain** technique is that it displays the live video in smaller resolution but captures the image in high resolution. ToupTek's **USCMOS** and **UHCCD** series cameras support all of these two image capture techniques.

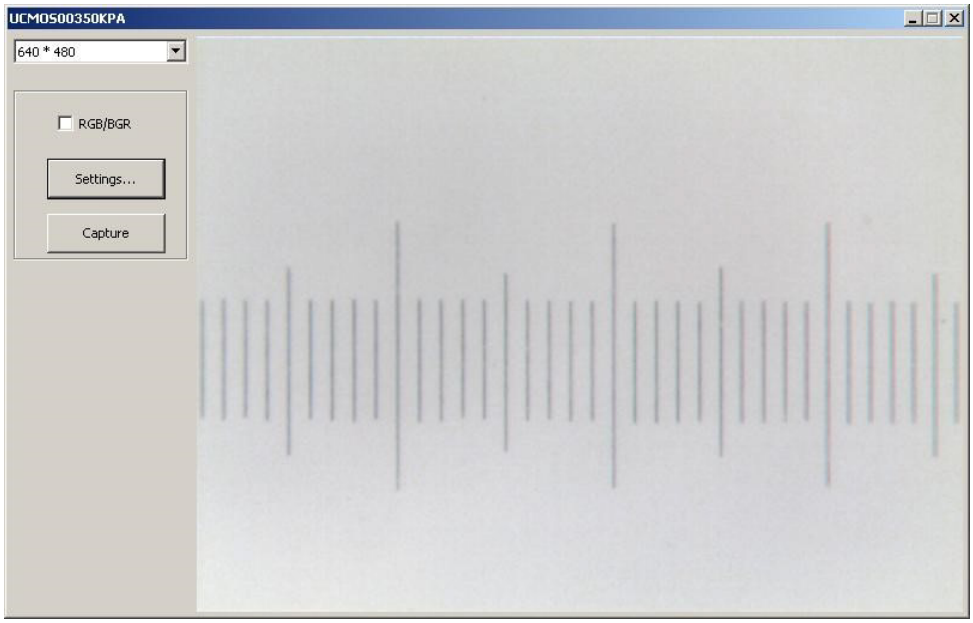
Steps for Twain Acquire

Here we illustrate how to capture the image using a **UCMOS00350KPA** (350K pixels, USB2.0) camera as an example.

1. Install the driver **UCMOS00350KPA** from the disc.
2. Install the software ToupView from the disc.
3. Plug the cameras **UCMOS00350KPA** (USB2.0) into the computer.
4. Double click the icon ToupView to start it.
5. Choose the **Acquire->Twain:Select Device•••** command or click button on the

Live Capture Toolbar. Select the device **UCMOS00350KPA** from the **Select Source** dialog.

7. Choose the **Acquire->Twain: Acquire•••** menu as shown in the figure or click on the **Live Capture Toolbar**.
8. There should be a dialog box like the following:



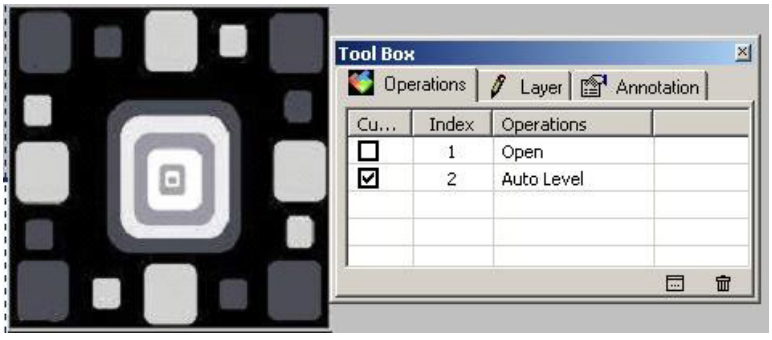
9. In this dialog, Video **Resolution** can be selected (dropdown list). The **Video Source Property•••** can be set by click the **Setting•••** button. Click the **Capture** button to capture the image.

1.4 Edit

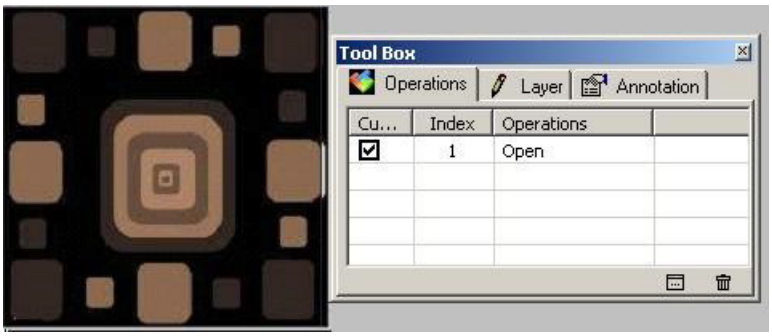
1.4.1 Undo

Most of the operations in ToupView can be undone. Alternatively, one can restore all or part of an image to its last saved version. The basic **Undo** process is:

1. Choose **Open Image•••** to open an image.
2. Choose **Image->Adjust->Auto Level**, then **Edit->Undo** will be enabled.



3. Choose **Edit->Undo**. This will cancel the **Image->Auto Level** operation and return the image to its initial opened state.



If return to the **Edit** menu, one will find that **Edit->Undo** now becomes **Edit->Redo**. One can select one of these two operations to see the **Undo** and **Redo** changes:

1. Choose **Edit->Redo**. The image will return to **Image->Auto Level** status and **Edit->Undo** will be enabled again.

2. Choose **Image->Auto Contrast**, then **Edit->Redo** will become **Edit->Undo**.

Note: ToupView supports only one step **Undo** and **Redo** operations.

1.4.2 Forward

This command will move the current displayed image to the next step listed in the **Tool Box Operations Page** (If it is not in the last step).

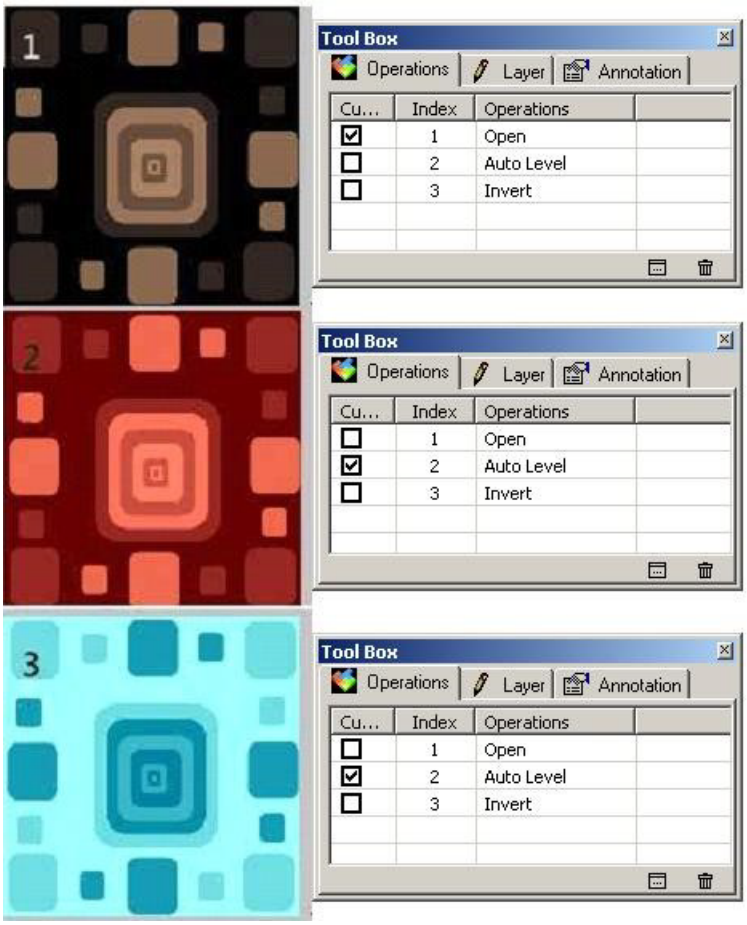
Forward Demo

Now we continue the **Edit->Backward** demo. Since it is in Index 1, **Edit->Backward** is disabled and **Edit->Forward** is enabled. The status is shown in Fig.1.

1. Choose **Edit->Forward** and the image and the index will advance forward to Fig.2. Now **Edit->Backward** is enabled.

2. Choose **Edit->Forward** again to go to Index 3 as shown in Figure 3. Now **Edit->Backward** is still enabled, but because it is in the last step, **Edit->Forward** is disabled.

See **Edit->Backward** for further information.



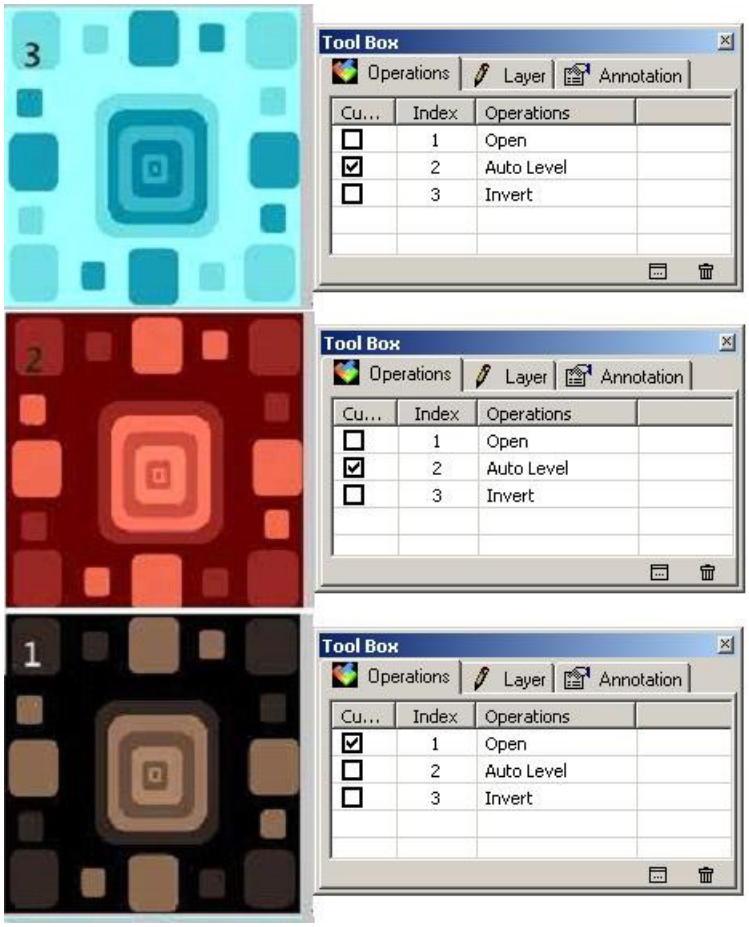
1.4.3 Backward

This command will move the current displayed image to the previous index listed in the **Tool Box Operations Page** (If it is not in the **"Open"** status).

Backward Demo

1. Choose **Open Image•••** to open an image.
2. Choose **Image->Adjust->Color**.
3. Choose **Image->Adjust->Invert**. The final image is shown in Index 3. Since it is in the last step, not in Index 1, the **Edit->Backward** will be enabled.
4. Choose **Edit->Backward**, and the image and the index will return to Index 2 as shown in Index 2. Since it is in Index 2, **Edit->Forward** will be enabled.
5. Choose **Edit->Backward** again, and the image and the index will return to Index 1 as shown in Index.3. Since it is in the 3rd step, **Edit->Forward** will still be enabled, but **Edit->Backward** will now be disabled.

See **Edit->Forward** for further information.



1.4.4 Cut Ctrl+X

Choose **Cut** command to copy the selected **Annotation** objects to the clipboard and delete the selected objects on the image. Any data already exist on the clipboard will be replaced.

The data copied to the clipboard can be pasted into the active window or into another opened image window on the extra layer using the **Paste** command (when the current layer is not in the **Background layer**, this command can be activated, otherwise, it is disabled).

Note: This command does not support **Background layer Cut** operation.

1.4.5 Copy Ctrl+C

Choose **Copy** command to **Copy** the selected objects (on **Annotation** layer) or an image's selected area on the **Background layer** to the clipboard. 1. Copy the selected area on the Background layer to the clipboard.

a) Select the source area to **Copy** using the  button on the **Annotation Toolbar**. The **Copy** menu and the  button on the **Start Frame Toolbar** will be enabled.

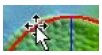
b) Choose **Edit->Copy** or click  to copy the selected image area to the clipboard.

2. Copy object(s) on the Annotation layer to the clipboard.

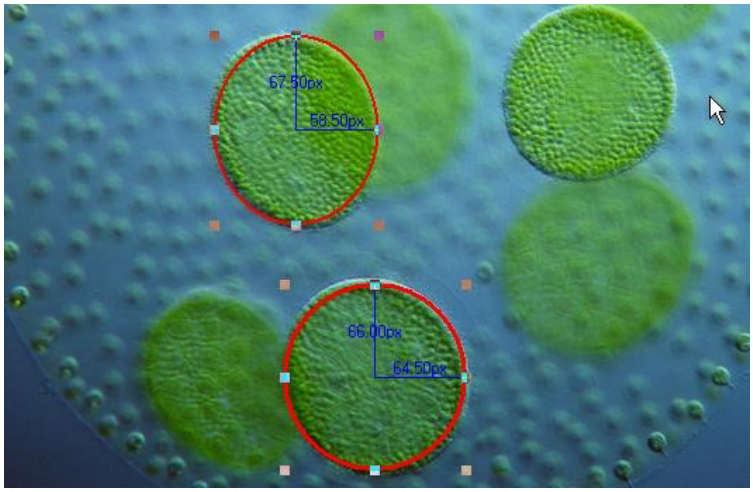
a) For the layer operation, see the **Tool Box Layer Page**.

b) For the annotation operation, see the **Tool Box Annotation Page**.

c) After the **Annotation** operating has been done, check the **Object Selection** button  . The cursor will change into  .

d) Move the mouse until the cursor becomes  , this means the cursor is now right on the **Object**. Click it and the **Object** will be highlighted and selected.

e) Optional: Continue to move the mouse until the cursor becomes  , this means the cursor is now right on the object again. Click it with SHIFT+left mouse button and the second object will be selected and highlighted.



f) Optional: (1) With the cursor over the image, click down the left mouse button. (2)Drag the mouse to draw a rectangle on the image. A dotted rectangle will appear around the selected area. (3) Release the mouse and

all of the **Annotation** objects within the dotted rectangle will be highlighted and selected.

g) After the **Annotation** objects are selected, the menus **Edit->Copy** and the  button on the **Start Frame Toolbar** will be enabled.

h) Choose **Edit > Copy** to **Copy** the object(s) to the clipboard. Then the **Edit->Paste** menu and  button will be enabled. One can then **Paste** the objects above the **Background layer** or onto the other image that has an **Annotation** layer. If one switches to the Background layer, the **Paste** command will be disabled, but if one returns to the **Annotation** layer, the **Paste** command will be enabled again.

Note: If there is no **Annotation** object selected, the **Copy** command will be disabled. **Copy** will not delete the **Annotation** objects on the image. Any data already existing on the clipboard will be replaced with the new data.

The copied object(s) can be pasted into the active window or into another opened window using the **Paste** command as long as the current window is not on the
Background layer (the command is disabled). See **Tool Box Layer Page** for detail.

1.4.6 Paste Ctrl+V

Choose **Paste**  command to put objects from the clipboard onto the active image's

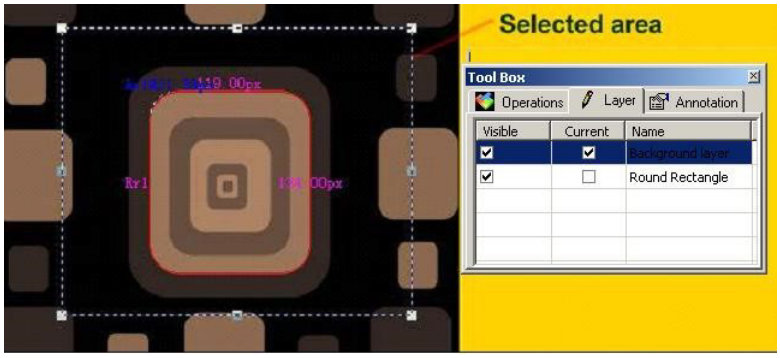
Annotation Layer. One can also choose the **Paste** command to transfer a layer's **Annotation** objects from one image window's **Annotation Layer** to another image's **Annotation Layer**.

Before executing the **Paste** command, valid **Annotation** object must have been copied into the clipboard (see the **Copy** command). If there is no **Annotation** object data in the clipboard, the **Paste** command will be disabled. When the current layer is not the **Background layer**, this command can be activated as long as the clipboard has the **Annotation** object, otherwise, it is disabled. This means that the command does not support the image area **Paste** operation.

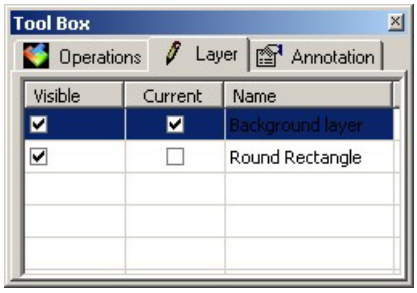
1.4.7 Image Select

This command turns the cursor into an **Image Select**  tool. One can mark areas to **Cut**, **Copy**, or relocate.

To select an area, drag the mouse cursor across the image with the left button held down until the area is selected. Release the button and the area will be marked. Handles will appear on the area that will allow alter the selection after it is marked. Zooming in or out on the image will delete the selected area.



The **Image Select** button (or **Edit->Image Select** menu) will be enabled when the **Background** is active.



Check this button or choose this menu will keep down its button on the **Annotation Toolbar** or check its menu. After the area is selected, the **Edit->Copy** button (or menu) will be enabled and then the selected area can copy to the clipboard for further application.

When the **Background Layer**'s **Current** check box is not checked, this button will be disabled.

1.4.8 Select All Ctrl+A

1. Select All on the Background layer

To **Select All** pixels on the **Background layer** within the canvas when the **Background layer** is active, Choose **Edit->Select All** (shortcut: **Ctrl+A**).

2. Select All objects on the extra layer

When the **Background layer** is not active, choose the **Edit->Select All** command. **Select All** will select all of the objects on the object layer.

1.4.9 Select None

Deselect any selected area on the image or the layer objects.

1. When the current layer is the **Background layer** and an area is selected, the **Select None** option will be enabled. Choose **Edit->Select None** will delete the dotted rectangle representing the selected area.

2. When the current layer is not the **Background layer** and the **Annotation** objects is selected, the **Select None** menu will be enabled. Choose **Edit->Select None** will deselect all of the selected **Annotation** objects.

1.5 View

1.5.1 Browser Ctrl+B

Choose **Browser** from the **View** menu (shortcut: **Ctrl+B**) or click the **Browser** toolbar button  to browse images on the hard disk. When clicks **Browser**, ToupView will display a **Browser** window that looks like Windows Explorer. The child window on the left part of the **Browser** window is used to browse images on the hard disk. Images in the current directory are displayed in **Large Icons** or **Small Icons** mode on the right side of the **Browser** window.

The **Browser** can be used to perform tasks such as creating new folders, renaming, moving, and deleting files. Individual file information and import data from digital cameras can also be displayed. Double clicking the left mouse button on the icon will open the image as an active image in full size. See **Browser Frame** for more details.

1.5.2 Tool Box Ctrl+T

The **Tool Box** is a property sheet that has 3 tabbed pages, which are:

Tool Box Operations Page shows the operations performed on the active image and one can easily jump to the other operation step. One can also delete the selected steps.

Tool Box Layer Page allows one to annotate the opened image on a layer above the **Background layer** without polluting the original image information. Think of layers as sheets stacked one on top of the other. When there is no image on a layer, one can see through to the layers below.

Tool Box Annotation Page shows the selected layer object. One can also modify the object's **Appearance** and **Coordinates** here. It also shows the **Calculation** results according to the object's **Coordinates**.

For details, please See: **Process Frame: Tool Box.**

1.5.3 Annotation Manager

When choose the **Annotation Manager** command, the **Annotation Manager** shows the object's possible features, such as **Name**, **Center Point**, **Radius**, **Area**, **Perimeter**, **Angle**, **Start Point**, and **End Point**, drawn on the extra layer. One can resize the columns for the best fit, or hide the uninteresting item.

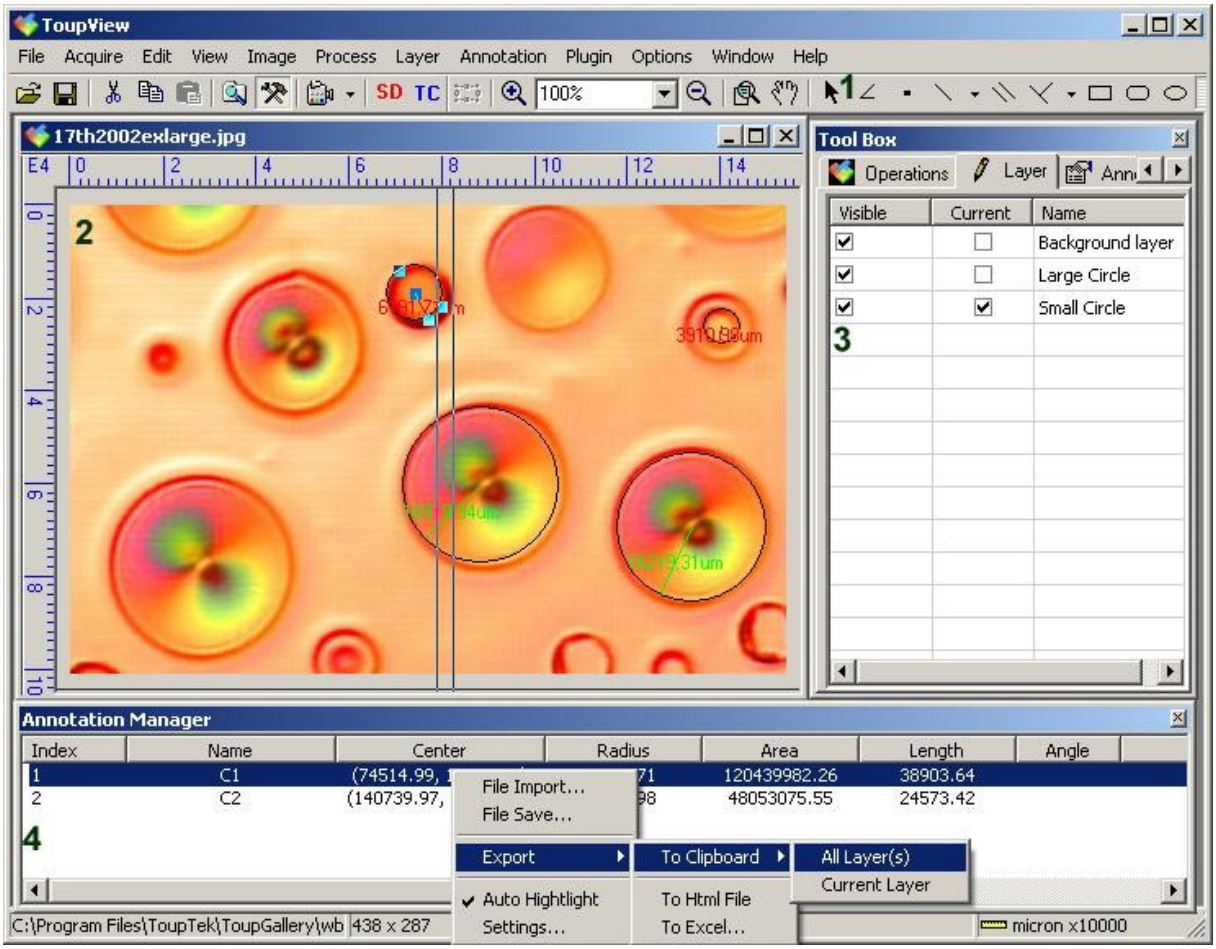
Click the right mouse button on the **Annotation Manager•••** and the following context menus or submenus will be popped up on the **Annotation Manager•••**:

File Import•••.

Choose this item to load an outline or **Annotation** file (***.annotation**) and display it on the current image.

File Save•••

Choose this item to save the **Annotation** objects on the current image to an annotation file (***.annotation**).



Export->To Clipboard->All Layers

Export all layers' **Annotation** objects to the clipboard.

Export->To Clipboard->Current Layer

Only export current layer's **Annotation** objects to the clipboard.

Export->To Html File

Export the **Annotation** objects to the *.html file in tabbed format.

Export->To Excel•••

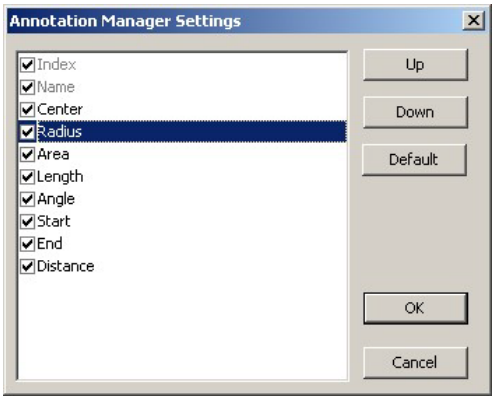
Export the **Annotation** objects to the excel file.

Auto Highlight

When this menu is checked, clicking the row in the **Annotation Manager** will **Highlight** the corresponding **Annotation** object on the image layer. Clicking the object on the image will **Highlight** the corresponding row in the **Annotation Manager**.

Settings•••

1. Changing the **Annotation Manage** item order. Select one item, and click the **Up** or **Down** button to move the selected item forward or backward.
2. Check the item will show/hide the item in the **Annotation Manage**.
3. Click **Default** will return to the ToupView's default settings.



1.5.4 Rulers and Grid

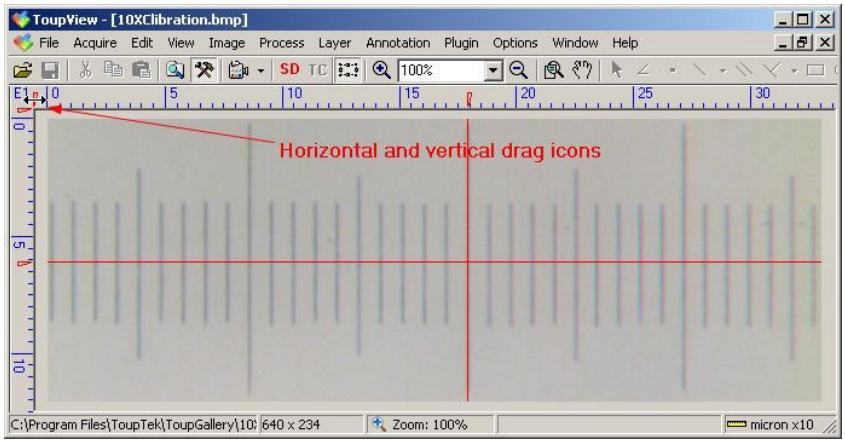
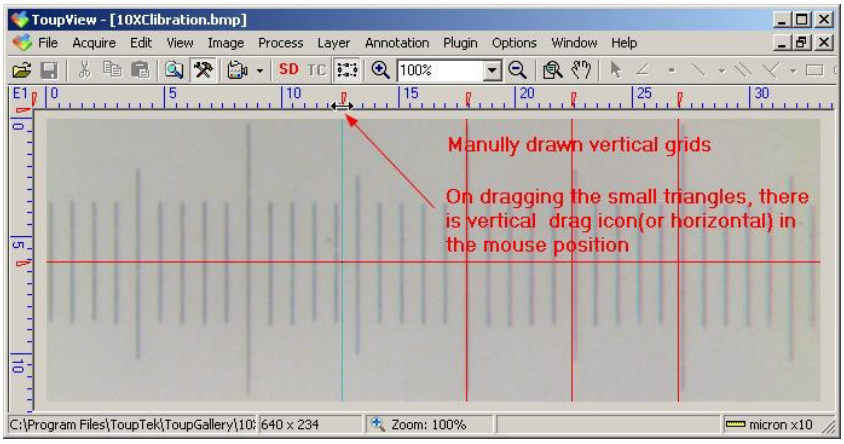
Ruler and Grid menu has 3 submenus, they are:

1.5.4.1 Show/Hide Rulers

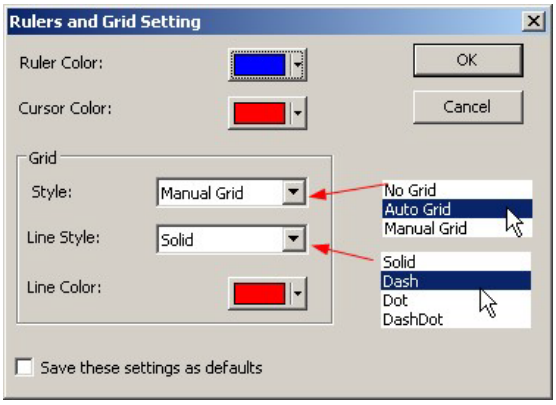
Choose this menu will show/hide the horizontal and vertical rulers on the image top and right area

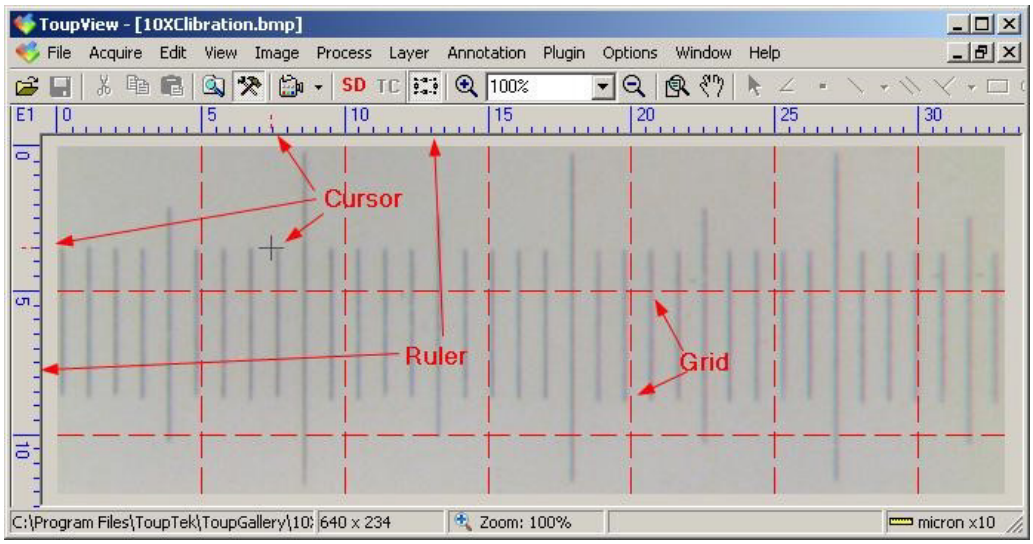
1.5.4.2 Grids

No Grids	There are no grids overlaid on the image.

Manual Grids	Set the grids manually. This command will display two small triangles on the active window's upper left corner.  Move the mouse to the small triangle will show horizontal or vertical **drag icons**. Drag this small triangle horizontally or vertically to the desired position and release it will, a line will overlay there as **Manual Grids**. Continue the drag operation
	will draw the other grid on the image. 
Auto Grids	Overlay the grids on the image automatically.
Remove All Grids	Remove all of the manually or auto set grids.

1.5.4.3 Settings•••





Choose this menu will show the **Ruler and Grid Setting** dialog. In this dialog, one can select **Ruler Color**, **Cursor Color**, **Grid Style**, **Line Style**, and **Line Color**.

Check **Save these settings as defaults** will save the current settings for the next time when ToupView launches. The figure shown above displays the **Ruler and Grid** set.

1.5.5 Cursor Settings•••

This command will set the mouse cursor for the **Layer Annotation** operation.

Select the **Horizontal** cursor in:

None (window default), **Single (single line)**, **Double(1 Pixel)**, **Double(3 Pixels)**, **Double(5 Pixels)**, **Double(7 Pixels)**, and **Double(9 Pixels)** formats.

Single means single line. **Double** means two parallel lines. **1 Pixel** means the line space between the two lines is 1 pixel in space. The other sizes also have this ratio.

Select the **Vertical** cursor in:

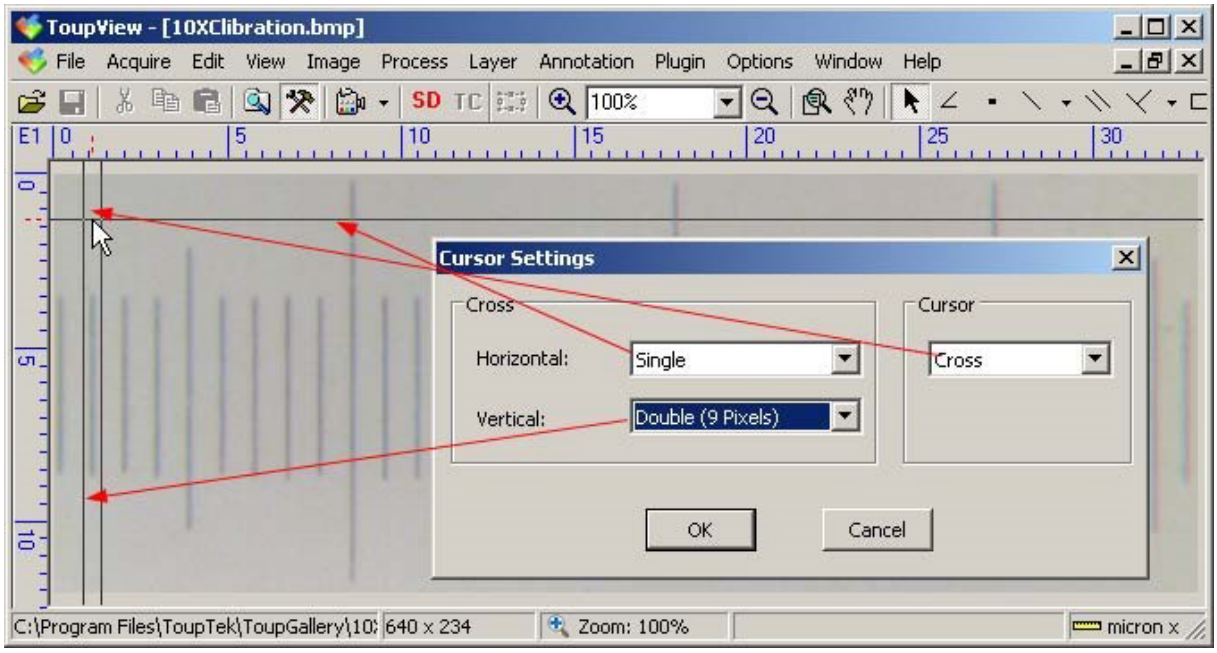
None (window default), **Single (single line)**, **Double(1 Pixel)**, **Double(3 Pixels)**, **Double(5 Pixels)**, **Double(7 Pixels)**, and **Double(9 Pixels)** formats.

Single means single line. **Double** means two parallel lines. **1 Pixel** means the line space between the two lines is 1 pixel in space. The other sizes also have this ratio.

Select the cursor shape: **Cross**, **Point**, and **Null**.

In the following figure, cursor with a **Single** horizontal line, **Double vertical lines with 9 Pixels**, and the **Cursor** as a **Cross** is defined

Note: The **Cursor** will be active only when there is an extra **Layer** (excluding the **Background layer**) above the image.



1.5.6 Best Fit NumPad*

Choose **Best Fit** to automatically resize the image to fit in the window.

1.5.7 Actual Size NumPad/

Choose **Actual Size** to set the active image to its actual size (e.g. 100%). This option will not be enabled if the image is currently viewed at 100%. At any other zoom ratio, **Actual Size** will be enabled.

1.5.8 Zoom Tool

1. Choose **Zoom Tool** to **Zoom In** or **Zoom Out** using the left and right mouse buttons.

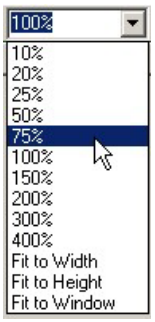
Choose this menu will automatically check  on the **Annotation Toolbar**. The cursor will become  . One can **click the left mouse button** on the image to zoom in the image and **click the right mouse button** to zoom out the image.

Choose this menu again will uncheck this menu and the  button will return to its unchecked state.

2. **Zoom In** by click the  button on the **Annotation Toolbar**.

3. **Zoom Out** by click the  button on the **Annotation Toolbar**.

4. One can also choose **Zoom** button's dropdown arrow to select the image display ratio on the **Process Frame: Annotation Toolbar**.



1.5.9 Track

If the image's actual size is larger than the image window, check this command to move the image to display the specified area. Its function is similar to the scroll bars.

Check this menu will change the cursor to  and the button on the **Annotation Toolbar** will be checked.

Then press down the mouse button to drag the region of interest on the image to any location in the image window.

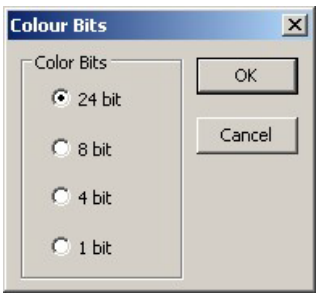
1.6 Image

1.6.1 Mode

1.6.1.1 Color Quantize

The **Color Quantize** command is widely used to change the image bit. ToupView supports the mutual changes among 1, 4, 8, and 24 bit images.

When the dialog is opened, the default checked color bit is the image's color bit. Check the desired bit and click **OK** to end the command. The image will converted to the selected color bits.



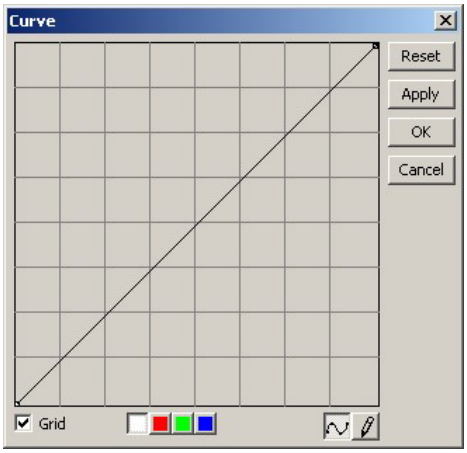
1.6.1.2 Gray Scale

Choose the **Gray Scale** command to convert a color image (true color image or index color image) to a gray scale image. If the original image is 24 bit, the new image is 8 bit. Otherwise the bit of the image will not modified.

1.6.2 Adjust

1.6.2.1 Curve•••

Choose the **Curve•••** dialog to adjust the entire tonal range of an image. But instead of making adjustments using only three variables (highlight, shadow, midtone), one can adjust any point on the curve along a 0-255 scale while keeping up to 15 other values constant. One can also use **Curve** to make precise adjustments to individual color channels on an image.



The horizontal axis of the graph represents the original intensity values of the pixels (**Input** levels).

The vertical axis represents the new color values (**Output** levels). In the default diagonal line, all of the pixels have identical **Input** and **Output** values.

Curve: Drag the **Curve** until the image looks satisfactory.

Pencil: Check the pencil button at the bottom of the dialog, and drag it to draw a new arbitrary **Curve**.

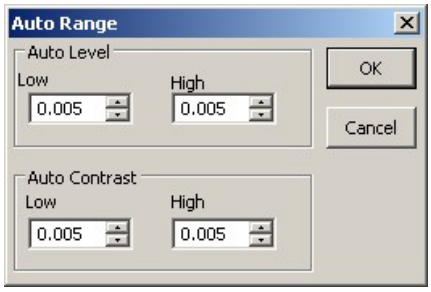
Channel: To adjust the color balance of the image, check the channel(**R**, **G** or **B**) from the **Channel** button. Check the white button to select **RGB** channels at the same time, which is located on the left of the **R** (Red), **G** (Green) and **B** (Blue) buttons.

1.6.2.2 Auto Level

The **Auto Level** command moves the level's sliders automatically to set highlight and shadow. It defines the lightest and darkest pixels in each color channel as white and black and then redistributes the pixels' color values proportionately. Since **Auto Level** adjusts each color channel individually, it may remove or introduce color casts. The **Auto Level** command moves the level's sliders automatically to set highlight and shadow. It defines the lightest and darkest pixels in each color channel as white and black and then redistributes the pixels' color values proportionately. Since **Auto Level** adjusts each color channel individually, it may remove or introduce color casts.

By default, this feature clips the white and black pixels by **0.5%**--that is, it ignores **0.5%** of the lightest pixels and **0.5%** of the darkest pixels when identifying the lightest and darkest pixels on the image. Choose the **Options-**

>Auto Correction•••.menu to modify this default setting. This ensures that white and black values are representative without being determined by extreme pixel values.
The **Auto Correction•••** dialog is shown below:



Auto Level gives good results when an image with an average distribution of pixel values needs a simple contrast adjustment or when an image has an overall color cast. However, adjusting the **Curves** manually is more precise.

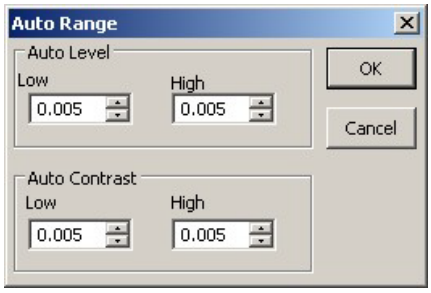
See **Auto Contrast** for another auto adjust command.

1.6.2.3 Auto Contrast

The **Auto Contrast** command automatically adjusts the overall contrast and mixture of colors in an RGB image. Since it does not adjust channels individually, **Auto Contrast** does not introduce or remove color casts. It maps the lightest and darkest pixels in the image to white and black, which makes highlights appear lighter and shadows appear darker.

When identifying the lightest and darkest pixels on an image, **Auto Contrast** clips the white and black pixels by **0.5%**--that is, it ignores the first **0.5%** of either extreme.

Choose the **Options->Auto Correction•••**.menu to modify this default setting. This ensures that white and black values are representative without being determined by extreme pixel values. The **Auto Correction•••** dialog is shown below:



Auto Contrast can improve the appearance of many photographic or continuous-tone images. It does not improve flat-color images.

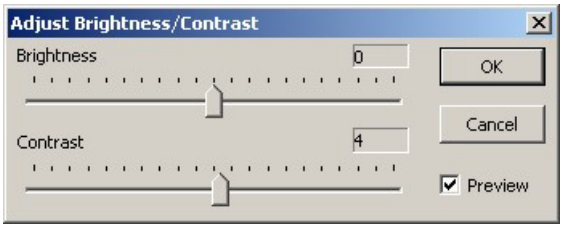
See **Auto Level** for another auto operation.

1.6.2.4 Histogram Equalization

Histogram Equalization is a kind of histogram process. The histogram can reflect the statistical information for the **R**, **G**, **and B** of the pixels of the original image. The algorithm calculates each separately, equalizes the **R**, **G**, **and B** of the points linearly, and reassigns them

1.6.2.5 Brightness/Contrast•••

The **Brightness/Contrast•••** command offers simple adjustments to the tonal range of an image. This command makes the same adjustment to every pixel in the image. The **Brightness/Contrast** command does not work with individual channels and is not recommended for high-end output because it can result in the loss of details about the image.



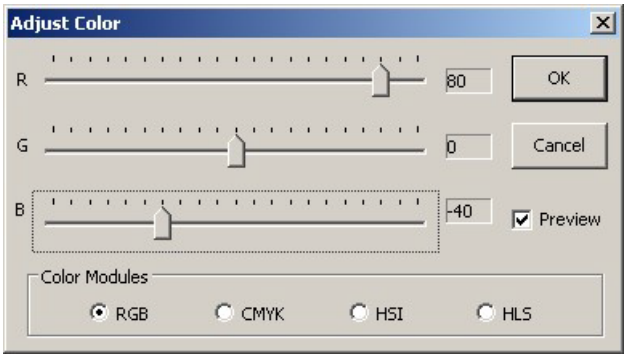
Preview: Check this button to display real-time effects when drags the slider bar.

Brightness: Dragging the slider bar to the left decreases the level and dragging it to the right increases the level. The numbers on the right of the slider bar displays the **Brightness** value. Values can range from **-100** to **+100**.

Contrast: Dragging the slider bar to the left decreases the level and dragging it to the right increases the level. The numbers on the right of the slider bar displays the **Contrast** value. Values can range from **-100** to **+100**.

1.6.2.6 Color•••

Choose the **Color•••** command to modify the overall mixture of the colors in an image.



There are four color modules:

RGB	ToupView uses the **RGB** model. It assigns an intensity value to each pixel ranging from 0 (black) to 255 (white) for each of the **RGB** components in a color image. For example, a bright red color might have an **R** value of 246, a **G** value of 20, and a **B** value of 50. When the values of all three components are equal, the result is a shade of neutral gray. When the value of all components is 255, the result is pure white; when the value is 0, pure black. **RGB** images use three channels to reproduce up to 16.7 million colors on-screen. In addition to being the default mode for new ToupView images, the **RGB** mode is used by computer monitors to display colors. This means that when working in color modes other than **RGB**, such as **CMYK**, ToupView uses **RGB** mode for display on-screen. Although **RGB** is a standard color mode, the exact range of colors represented can vary, depending on the application or display device.
CMYK	The **CMYK** mode is based on the light-absorbing quality of ink printed on papers. As white light strikes translucent inks, certain visible wavelengths are absorbed while others are reflected back to the eyes. In theory, pure cyan (**C**), magenta (**M**), and yellow (**Y**) pigments should combine to absorb all light and produce black. For this reason these colors are called subtractive colors. Because all printing inks contain some

	impurities, these three inks actually produce a muddy brown and must be combined with black (**K**) ink to produce a true black. (**K** is used instead of B to avoid confusion with blue.) Combining these inks to reproduce color is called four-color process printing. The subtractive (**CMY**) and additive (**RGB**) colors are complementary colors. Each pair of subtractive colors creates an additive color, and vice versa.
HSI	Based on the human perception of color, the **HSI** model describes three fundamental characteristics of colors: **Hue** is the color reflected from or transmitted through an object. It is measured as a location on the standard color wheel, expressed as a degree between **0°** and **360°**. In common use, **Hue** is identified by the name of the color such as red, orange, or green. **Saturation**, sometimes called chroma, is the strength or purity of the color. **Saturation** represents the amount of gray in proportion to the hue, measured as a percentage from 0% (gray) to 100% (fully saturated). On the standard color wheel, **Saturation** increases from the center to the edge. **Intensity** is the relative lightness or darkness of the color, usually measured as a percentage from **0%** (black) to **100%** (white).
HLS	The **HLS** model is very similar to the **HLS** color model. The main difference between them is the calculation used to produce the brightness value. In the **HLS** model, a pixel's brightness (**L**) is derived from its three (**R**, **G** and **B**) color values. In the **HLS** model, a pixel's brightness (**L**) is determined by the minimum and maximum values of its three color values.

Preview: Check this button to display the real-time effect when the slider bar's position is changed.

The values beside the slider bar show the color changes in various color channels.

For **RGB** channel values, they can range from **-100** to **+100**.

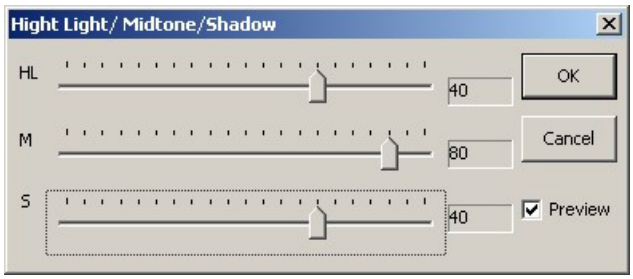
For **CMYK** channel values, they can range from **-100** to **+100**.

For **HSI** channel values, the **H** value can range from **-180** to **180**, the **S** value can range from **-275** to **275**, and the **I** value can range from **-442** to **442**.

For **HLS** channel values, the **H** value can range from **-180** to **180**, the **L** value can range from **-100** to **100**, and the **S** value can range from **-100** to **100**.

1.6.2.7 HMS…

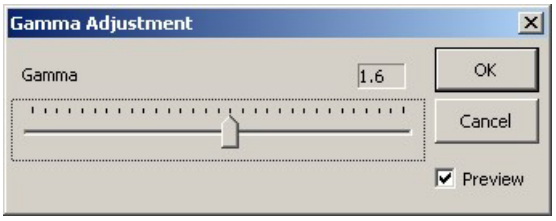
Choose **HMS** command to adjust the **HL** (Highlight), **M** (Midtone), and **S**(Shadow) parts of the image. Each part's value ranges from **-100** to **100**. This command is only available for 24 bits true color image.



Preview: Check this button to display the real-time effect when one changes the slider bar's position.

1.6.2.8 Gamma•••

Gamma measures the brightness of midtone values produced by a device (often a monitor). A higher gamma value yields an overall darker image.

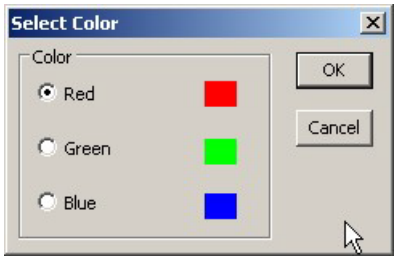


Preview: Check this button to display the real-time effects when one changes the slider bar's position.

Gamma: Dragging the slider bar to the left decreases the level, while moving it to the right increases the level. Values can range from **0** to **3.0**.

1.6.2.9 Filter Color•••

Choose the **Filter Color** command to filter a special color channel from a color image. Check either **Red**, or **Green**, or **Blue** color to filter. For every pixel, if check **Red** color to filter, only information about the red channel will be discarded, and **Green** and **Blue** information will remain.

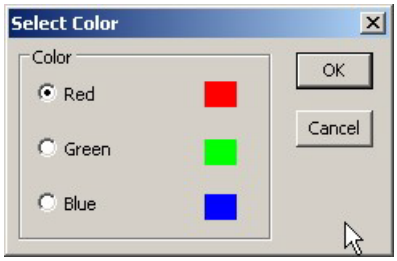


See **Extract Color•••** for another color operation.

1.6.2.10 Extract Color•••

Choose the **Extract Color•••** command to extract a special color channel from a color image. Choose either **Red** or **Green**, or **Blue** color to extract.

For every pixel, if check **Red** color to extract, only information about the red channel will be kept, and **Green** and **Blue** information will be discarded.



See **Filter Color•••** for another color operation.

1.6.2.11 Invert

Choose **Invert** command to reverse the pixel values of the active image without going through the lookup table

1.6.3 Rotate

Choose the **Rotate** command to rotate the entire image. One has the following options:

1.6.3.1 90(CW)

Rotate the image clockwise by a quarter-turn.

1.6.3.2 180(CW)

Rotate the image clockwise by 180 degrees.

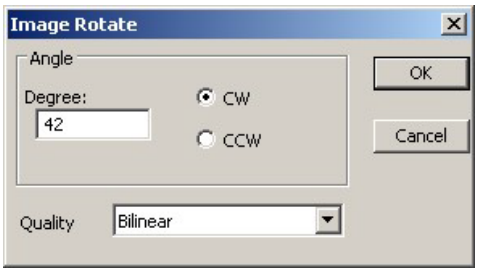
1.6.3.3 270(CW)

Rotate the image clockwise by 270 degrees.

1.6.3.4 Arbitrary•••

Rotate the image by a specified angle. If choose this option, enter an angle between 0 and 360 degrees in the angle text box, and check **CW** or **CCW** to rotate clockwise or counterclockwise.

For the **Arbitrary•••** operation, it will open a dialog like below:



Degree: The degree that the image to be rotated.

CW: Rotates the image clockwise.

CCW: Rotates the image counterclockwise.

Quality: One can select one of the three methods for the image rotation among **Nearest Neighbor**, **Bilinear**, and **Bicubic**. The default is **Bilinear**.

1.6.3.5 Flip Horizontal

Reverses the image in the application area so that the top right corner of the original image is now the top left, and the top left corner of the original image is now the top right corner.

1.6.3.6 Flip Vertical

Reverses the image in the application area so that the top right corner of the original image is now the bottom right corner, and the top left corner of the original image is now the bottom left corner.

1.6.4 Crop

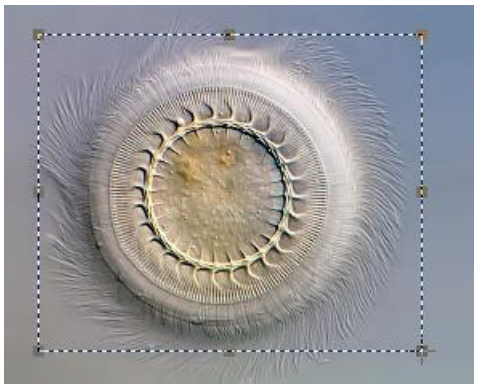
Choose the **Crop** command to remove the portions of an image that does not want so that the focus is on the part of the image that is left. This document instructs users on how to **Crop** an image in ToupView.

Crop Demo

1. Choose **Open Image•••** to open the image to **Crop**.

2. Click  on the **Annotation Toolbar**, the cursor will change to a small cross.

3. Move the cursor over the image to the desired location, click the mouse button and hold it down.



4. Drag the mouse over the part of the image to be kept, a dotted rectangle appears around the selection.

5. **Optional**: To move the rectangle

   a) Move the mouse over the selected area and when it becomes a move cursor, click and hold the left mouse button.

   b) Drag the selected area to the desired position.

6. **Optional**: To change the size of the rectangle

   a) Put the mouse cursor on one of the handles that appear on the edges of the selected area.

   b) Click and hold the mouse button.

   c) Drag the box to the desired size.

Note: Each of the handles that appear on the edges of the box sizes the box differently.

7. To **Crop** the image, select **Image->Crop**.

1.6.5 Image Scale•••

Choose the **Image Scale** command to change the image to a specified size. This process actually changes spatial resolution by adding (replicating) or removing (decimating) pixels to achieve the specified dimensions.

Width and **Height**: When choose the **Image Scale** command; the dialog displays the dimensions of the original image in pixels. The **Width** and the **Height** can be set on the new image by adding or removing pixels. If **Constrain Proportions** is checked, the **Width** and **Height** will stay proportionate to each other. If **Constrain Proportions** is unchecked, the **Width** and the **Height** can set independently, but this will distort the image.

Reset: Reset the image **Width** and **Height** to the original ones.

Constrain Proportions: To maintain the current proportions of pixel **Width** and **Height**, check **Constrain Proportions**. This option automatically updates the **Width** as the **Height is modified**, and vice versa. Otherwise, uncheck the **Constrain Proportions** button.

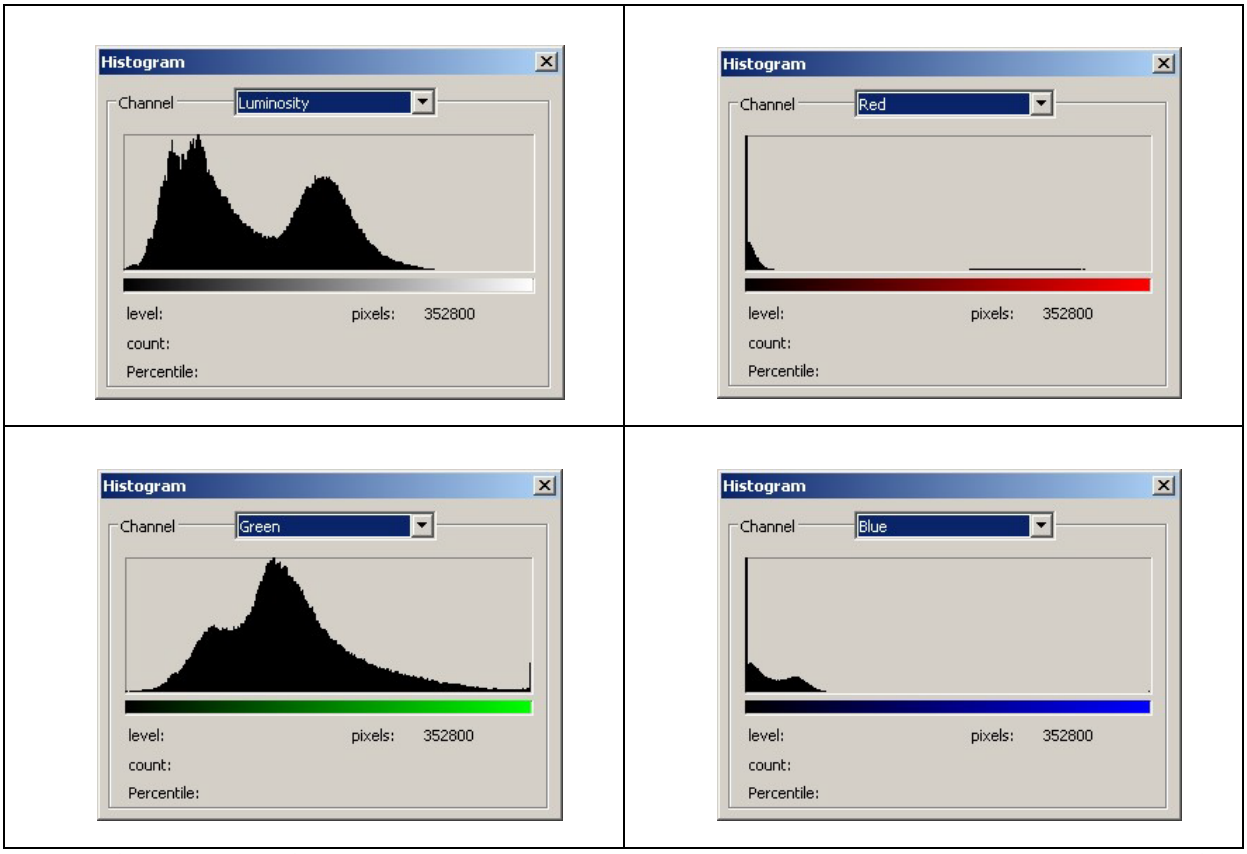
Scale method: There are 3 options for the **Scale method**. They are: **Nearest Neighbor**, **Bilinear**, and **Bicubic**. The default is **Bilinear**.

1.6.6 Histogram•••

A **Histogram** illustrates how pixels in an image are distributed by graphing the number of pixels at each color intensity level. The **Histogram** shows whether the image contains enough detail in the **shadows** (shown in the left part of the **Histogram**), **Midtones** (shown in the middle), and **highlights** (shown in the right part) in order to make a good correction.

The **Histogram** also gives a quick picture of the tonal range of the image, or the image key type. A low-key image has detail concentrated in the shadows, a high-key image has detail concentrated in the highlights, and an average-key image has detail concentrated in the **Midtones**. An image with a full tonal range has a number of pixels in all areas. Identifying the tonal range helps determine the appropriate tonal corrections.

Choose **Image->Histogram•••** to open the **Histogram** dialog as shown below.



Depending on the image's color mode, choose **R, G** and **B**, or **Luminosity** to view a composite **Histogram** of all the channels.

If the image is **RGB** true color, choose **Luminosity** to display a **Histogram** representing the luminance or intensity values of the composite channel.

If the image is **RGB** true color, choose **R, G** and **B** to display a composite **Histogram** of the individual color channels in color.

Do one of the following:

To view information about a specific pixel value, place the mouse pointer in the **Histogram**.

To view information about a range of values, click down the left mouse button and drag it in the **Histogram** to highlight the range.

The dialog displays the following statistical information below the **Histogram**:

Pixels: Represents the total number of pixels used to calculate the **Histogram**.

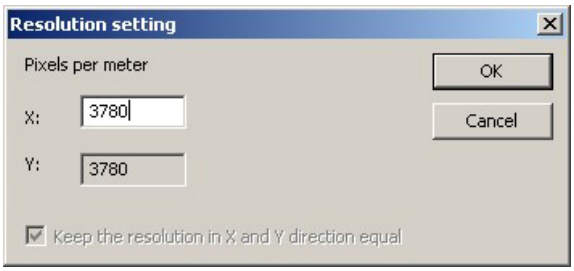
Level: Displays the intensity level of the area underneath the pointer.

Count: Shows the total number of pixels corresponding to the intensity level underneath the pointer.

Percentile: Displays the cumulative number of pixels at or below the level underneath the pointer. This value is expressed as a percentage of all of the pixels in the image, from **0%** at the far left to **100%** at the far right.

1.6.7 Resolution•••

Choose this command to set the image **Resolution** to calibrate the spatial scale. By default, ToupView expresses spatial measurements in terms of pixels. This **Resolution** command is used to change the terms in which ToupView reports such measurements. This command should be run first if in order o measure objects in terms of units other than pixels.



X: Horizontal **PPM** (**Pixels per meter**) of current **Resolution**.

Y: Vertical **PPM** (**Pixels per meter**) of current **Resolution**.

Note: The resolution in the **Y** direction need not to be filled. ToupView will always let it equal to the **X** direction.

After the new **Resolution** is set, all of the measurements will be calculated according to the new **Resolution**. (See more in the **Annotation Manager•••**).

1.7 Process

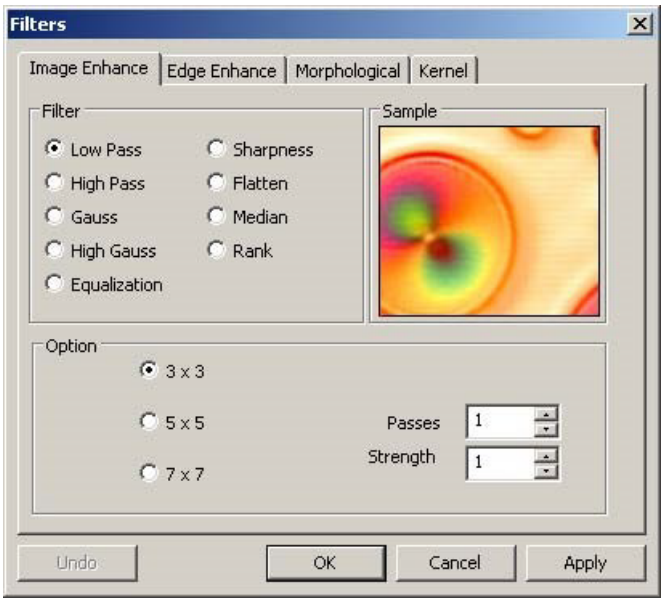
1.7.1 Filter••• Shift+F

Choose **Filter** command to apply one of ToupView's numerous **Filter**s to the active image. If one is not familiar with the process and effects of filtering, some discussions about spatial filtering should be reviewed. ToupView provides an extensive set of convolution and no convolution (morphological) **Filter**s. One can also create custom filter kernels and apply them with the **Filter** commands.

Choose the **Filter** command will open the **Filter** dialog. Each group of **Filter**s has its own property sheet or tab, where the **Filter** type and size can be selected. Filtered results are almost always written to the active image. **Edit->Undo** command can be used to remove **Filter** operations that have been applied.

Choose the **Filter** command displays the **Filter** property dialog.

1.7.1.1 Image Enhance



Low Pass	Check this filter to soften an image by eliminating high-frequency information (this has the effect of blurring sharp edges). The **Low Pass** filter replaces the center pixel with the mean value in its neighborhood. The **Low Pass** filter can also be used to remove noise.
High Pass	Check this filter to enhance high-frequency information. The **High Pass** filter replaces the center pixel with a convolved value that significantly increases its contrast from its neighbors. The **High Pass** filter leaves only elements of high contrast.
Gauss	Check this filter to soften an image by eliminating high-frequency
	information using a **Gauss** function. This has the effect of blurring sharp edges. The operation of the **Gauss** filter is similar to the **Low Pass** filter, but it degrades the image less than the **Low Pass** filter.
High Gauss	Check this filter to enhance fine details. This operation is similar to the unsharp masking technique (see the Sharpen filter), but it introduces less noise into the image. It uses a Gaussian curve type of kernel. Available in 7x7 and 9x9 kernel sizes.
Equalization	This filter is used to enhance the contrast based on the histogram of the local neighborhood (See **Option** below).
Sharpness	Check this filter to enhance fine details, or refocus an image that is blurred. The sharpen filter sharpens the image using the unsharp masking technique.
Median	Check this filter to remove impulse noise from an image. The **Median** filter replaces the center pixel with the **Median** value in its neighborhood. It will also blur the image.

Rank	Check this filter to remove impulse noise from an image. The pixels in the kernel are ranked by order of intensity, and the pixel in that range at the rank percentage is chosen for comparison. For example, in a 5x5 kernel, there are 25 pixels. A rank percentage of 95% would choose the second-brightest pixel for comparison. If the difference between the selected pixel and the center pixel is greater than the threshold value, the **Rank** filter replaces the value of the center pixel with the value of the selected pixel.

Option:

1. If one of the **Enhancement** filters is checked, the following options will be displayed:

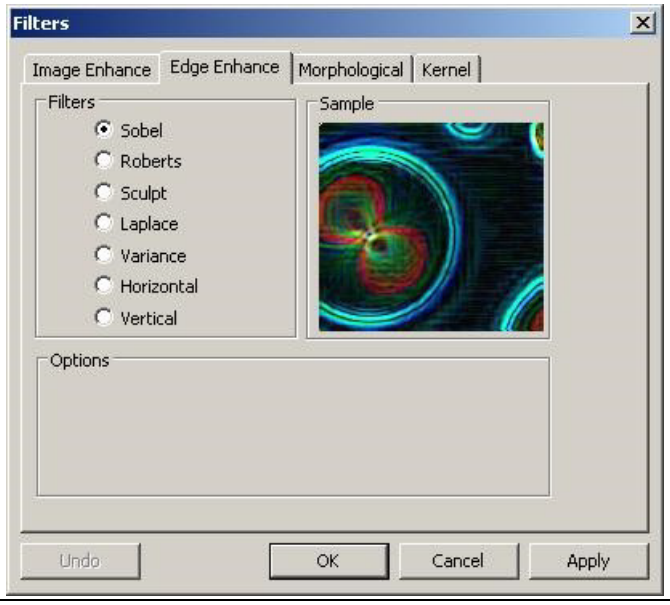
3 x 3	Check **3 x 3** kernel will produce a more subtle filtering effect.
5 x 5	Check **5 x 5** kernel will produce a moderate filtering effect.
7 x 7	Check **7 x 7** kernel will produces a more extreme filtering effect.
Passes	Set the filter applied times on the image. When a filter is applied multiple times, its effect is amplified by each pass. An image that has been softened by one pass of the **Low Pass** filter will be softened further by a second pass.
Strength	Enter an applied value from 1-10 that reflects how much of the filtering effect on the image. A value of 10 specifies the full strength (100%) of the filtered result applied to each pixel. Values less than 10 cut the full weight of the
	filter. A value of 1 indicates that only 10% of the difference between the filtered pixel value and the original pixel value should be applied, a value of 2 indicates that 20% of the difference should be applied, and so forth.

Rank	This value specifies which pixel in the sorted array will be used to replace the center pixel. Pixels in the array will be sorted in ascending order. The pixels are indexed from 0 to **Kernel Size** x **Kernel** Size-1. In the pixel index 0 corresponds to the lowest pixel value. The **Rank** will be specified in terms of a percentage of the indexes (**Kernel Size** x **Kernel Size**-1). A 50% **Rank** means the middle of the array. 0% rank means the lowest index (lowest gray value), and 100% rank means the highest index (highest gray value).

2.If **Equalization** filters is checked, the options will relate to the histogram equalization. **Local Histogram Equalization** modifies the contrast of an image based on the pixel values in a small window surrounding each pixel.

Window	Image pixels statistics (min, max, histogram, mean, standard deviation, etc.) will be calculated on a small **Window** of the image. These measurements are then used to derive the local contrast for that area of the image. In short, an area of **Window x Window** around each pixel is all that is considered when modifying the intensities in the image. Larger **Window** produces smoother results, while small **Window** track small details more closely.
Best Fit	Choose **Best Fit** command to optimize the values for the particular image. The results are achieved by stretching the local histogram to maximize the contrast between the brightest and darkest pixels in the local window region.
Linear	This option distributes the histogram linearly across the intensity scale. This function produces a high contrast image with the highest possible dynamic range.
Logarithmic	This option concentrates the histogram at the low end of the scale. This function produces a high contrast image with little dynamic image. It will tend to darken the image overall. It is useful for increasing the contrast in a very light image.
Exponential	This option concentrates the histogram at the high end of the scale. This function produces a high contrast image with little dynamic image. It will tend to lighten the image overall. It is useful for increasing the contrast in a very dark image.

1.7.1.2 Edge Enhance



Sobel	Check this filter to enhance just the principal edges in an image. The **Sobel** applies a mathematical formula to a 3x3 neighborhood to locate and highlight its edges.
Roberts	Check this filter to enhance fine edges in an image. The **Roberts** filter is not a convolution filter. It applies a mathematical formula upon a 4 x 4 neighborhood to produce its effect. The upper left pixel in the neighborhood is the one that is replaced.
Sculpt	Check this filter to apply a sculpted effect on the image.
Horizontal	Check this filter to detect and emphasize horizontal edges.
Vertical	Check this filter to detect and emphasize vertical edges.

Options:

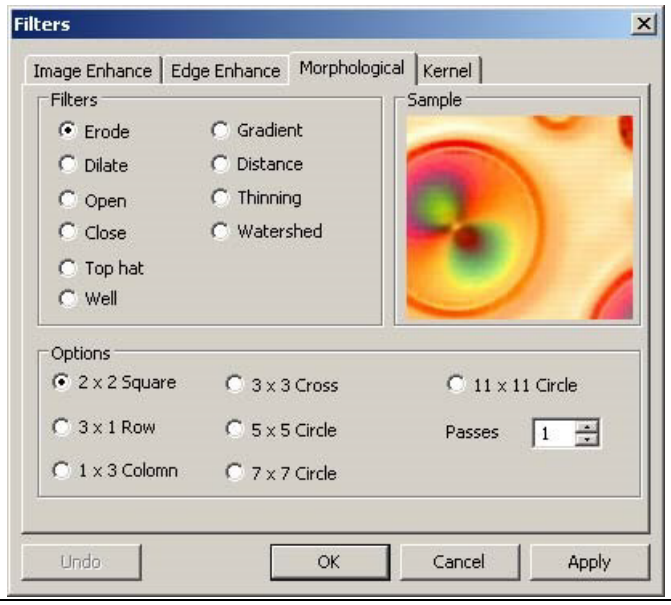
1. If one of the **Edge** filters have been checked, the options will relate to kernel size and filtering strength. The following options will be displayed:

3 x 3	Check 3x3 kernel to produce a more subtle filtering effect.
5 x 5	Check 5x5 kernel to produce a moderate filtering effect.
7 x 7	Check 7x7 kernel to produce a more extreme filtering effect.

Passes	Enter the number of times that the filter will be applied to the image. When a filter is applied multiple times, its effect is amplified by each pass. An image that has been softened by one pass of the **Image Enhancement Filter**, will be softened further by a second pass.
Strength	Enter a value from 1-10 that reflects how much of the filtering effect to apply to the image. A value of 10 specifies that the full strength (100%) of the filtered result will be applied to each pixel. Values less than 10 cut the full weight of the filter - a value of 1 indicates
	that only 10% of the difference between the filtered pixel value and the original pixel value should be applied, a value of 2 indicates that 20% of the difference should be applied, and so forth.

2. If **Sobel** or **Roberts** is checked, no options are available.

1.7.1.3 Morphological



Erode	Check this morphological filter if one wants to modify the size of objects in the image. The Erode filter erodes the edges of bright objects and enlarges the edges of dark ones.
Dilate	Check this morphological filter if one wants to modify the size of objects in the image. The Dilation filter dilates bright objects and erodes dark ones.

Open	Check this morphological filter if one wants to modify the shape of objects in the image. Assuming the image contains bright objects on a dark field, the Open filter will smooth object contours, separate narrowly connected objects, and remove small dark holes.
Close	Check this morphological filter if one wants to modify the shape of the objects in the image. Assuming the image contains bright objects on a dark field; the **Close** filter will fill gaps and enlarge protrusions to connect objects that are close together.
Tophat	Check this filter to detect and emphasize points, or grains, that are brighter than the background. There are 3 kernel sizes for this processing. Click the radio button to change the kernel size to the value that most closely matches the size of the grains to detect.
Well	Check this filter to detect and emphasize points, or grains, that are darker than the background. There are 3 kernel sizes for this
	processing. Click the radio button to change the kernel size to the value that most closely matches the size of the grains to detect.
Gradient	Check this filter to enhance edges in an image.
Watershed	Check this filter to separate objects that are touching. The Watershed filter erodes objects until they disappear, then dilates them again, but will not allow them to touch. The Watershed filter will not operate upon True Color images. If one wants to separate objects in a True Color image, he must first convert it to **Gray Scale** (see **Process Frame: Image->Gray Scale**).
Thinning	Check this filter to reduce an image to its skeleton. When choose this filter, one must set the threshold that determines whether a pixel is part of the subject, or part of the background (see Options below). The Thinning filter will not operate upon True Color images. If one wants to thin a **True Color** image, he must first convert it to **Gray Scale**.

Distance	The distance filter is used to show the distances of pixels within blobs to the outer boundaries of those blobs. After applying the distance filter, the background will be black (i.e. pixels with value 0). Only the area within the blobs will have non-zero values (will be white). The values of each pixel within the blob will be a count of the shortest distance from that pixel to the edge of the blob. Thus, all pixels along the blob's border will have a value of 1 (since they are one pixel away from the edge of the blob); pixels that are a distance of 2 from the border will have the value 2, and so on. This creates a distance map of the image. The **Distance** filter will not operate upon **True Color** images. If one wants to use the **Distance** filter with a **True Color** image, he must first convert it to **Gray Scale**.

Options:

1. If **Erode**, **Dilate**, **Open**, or **Close** filters is checked, the options will relate to the kernel size and shape. The following options will be presented:

2 x 2 Square	Check to use the 2x2 square kernel configurations.
3 x 1 Row	Check to use the 3x1 row kernel configuration.
1 x 3 Column	Check to use the 1x3 column kernel configuration.
3 x 3 Cross	Check to use the 3x3 cross kernel configuration.
5 x 5 Circle	Check to use the 5x5 circular kernel configurations.
7 x 7 Circle	Check to use the 7x7 circular kernel configurations. This is a two-pass filter, accomplished using a 5 x 5 circle followed by a 3x3 cross.
11 x 11 Circle	Check to use the 11 x 11 circular kernel configurations. This is a three-pass filter, accomplished using a 5 x 5 circle followed by another 5 x 5 circle, followed by a 3 x 3 cross.
Passes	Set the number of times iterate the filter.

Note: The circular kernels are especially effective on round objects (cells, grains and so on) because their circular configuration preserves the circular shape of the objects better than square configurations.

2. If the **Tophat**, **Well**, or **Gradient** filter is selected, the options will relate to kernel size and shape. The following options will be presented:

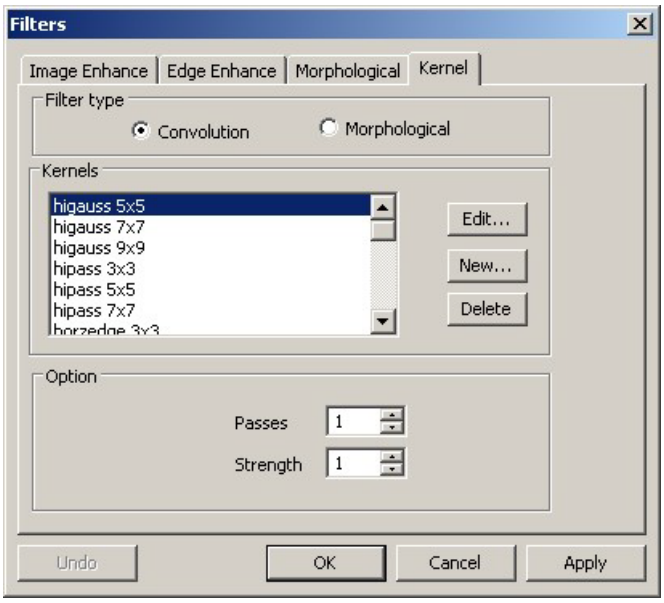
3 x 3	Check to use the 3x3 square kernel configurations.
5 x 5	Check to use the 5x5 square kernel configurations.
7 x 7	Check to use the 7x7 square kernel configurations.

3. If **Watershed**, **Thinning**, or **Distance** filter is checked, the options will relate to the threshold. The following option will be presented:

Threshold	Enter a percentage value from 1-100 that specifies the intensity value to binarize the image. For example, a Threshold of 50% on a **Gray Scale** image would set all values ≤127 to 0 (black) and all values ≥128 to the maximum value for that image class (white).

1.7.1.4 Kernel

The **Kernel** page allows edit the kernel files for the morphological and convolution filters.



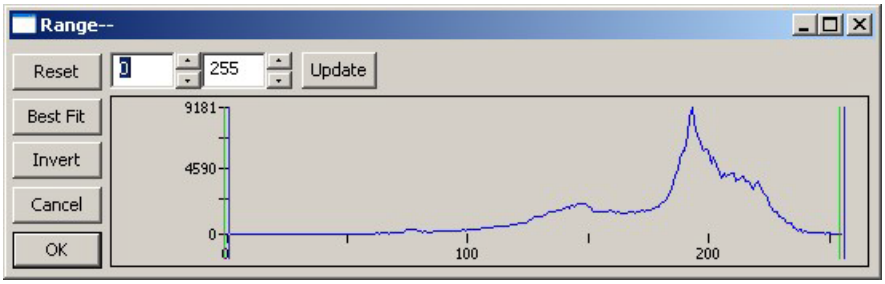
Note: The **HiPass**, **LowPass**, **Laplacian** and **Unsharp** kernel files are used by the **HiPass**, **LowPass**, **Laplacian**, and **Sharpen** options listed in the **Image Enhancement Filters** tab dialog window (i.e. there is no difference between selecting one of these kernel files and selecting its **Option** button in the **Filter** window -- the two methods ultimately do the same thing). Because these kernel files are essential to the operation of these filtering options, they must not be deleted or renamed.

Filter type	Check to modify the kernel for a selected **Filter type**, either **Convolution** or **Morphological** filters.	
Edit•••	Check to modify the selected filter kernel using the **Edit** Kernel dialog.	
	Name•••	This list box contains the name of the selected kernel file. If one wants to save the modified kernel file to the same file, leave it as it is. If one wants to save the file to a new location, enter the new filename here.
	Kernel Size	Click the spin buttons or enter the number to change the size of the kernel. Either direction may take into account one to nine pixels. As one modifies the **Kernel Size**, the shape of the kernel representation changes accordingly. In the center of the dialog, there are white boxes containing coefficients that will be multiplied with each pixel that will be taken into account by the filter kernel. One can change any coefficient by clicking on it and adjust it as desired.
	Fill	Click this button to fill every element of the kernel with a particular value. The Fill kernel dialog appears. One may enter a value between 0 and 10. Using the Fill button is useful for setting all coefficients to the same value. One may then change the coefficients that require a different value.
	Offset.	The pixel whose value is being changed is usually the center-most pixel. One may, however, designate any pixel. ToupView signals the pixel to be changed by putting a box around it. Choose **X** and **Y Offset** spin buttons to apply

New•••	Click to create a new filter kernel. The **Edit Kernel** dialog will appear. The functions of the dialog are the same way as the dialog for **Edit•••** described above), with the exception that the file name for the new kernel file must be provided.
Delete	Click to delete the selected filter kernel file.
Options	The choices in this group box will vary depending upon the kind of selected filter.

1.7.2 Range••• Shift+R

The **Range** command allows set the intensity levels of the image to increase the contrast and enhance the display in low-light situations. Choose the **Range** command opens the **Range** dialog.



Two **vertical markers** show the **upper** and **lower** limits of the intensity levels. These markers can be moved with mouse through the drag and drop process. For a color image, the histogram will reflect the **red**, **green**, and **blue** values with corresponding colors lines.

Two edit controls indicate the values of the intensity levels. Choose spin buttons to increase or decrease these values. All values between 0 and the lower limit will be black and all values between the upper limit and the upper end of the scale will be white.

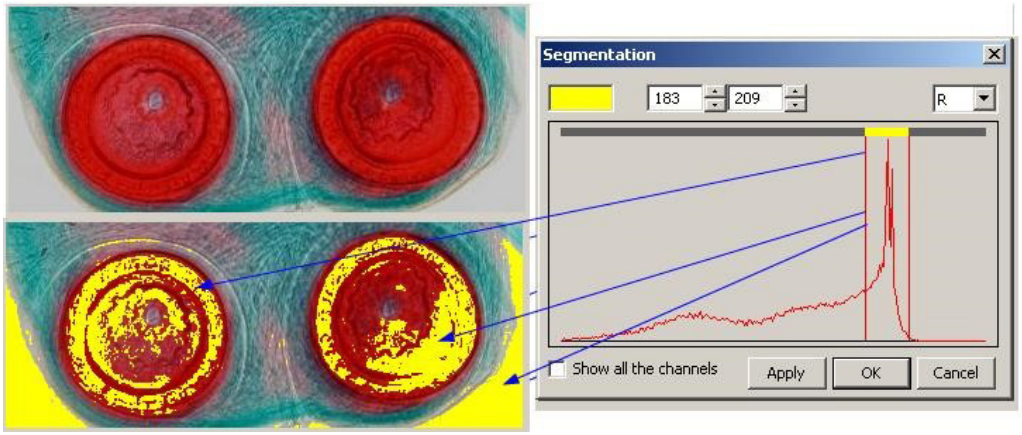
Reset	The **Reset** button allows **Reset** the black and white levels to the high and low ends of the dynamic **Range**.
Best Fit	The **Best Fit** button automatically sets the intensity levels to the **Best Fit**. **Best Fit** instructs ToupView to optimize the brightness and contrast values for the particular image.
Invert	The **Invert** button reverses the color of the image.

Update	**Update** will refresh the display **Range** with the most current image information.

1.7.3 Segmentation••• Shift+S

Segmentation is a process through which certain colors (or gray levels) in an image can be visually identified when they are isolated from the image as a whole. Areas identified by **Segmentation** (classes) can either be removed from or kept in the image, while discarding the remainder of the image. Therefore, this process can be used for separating items or objects of interest from the "background noise" that normally occurs in most acquired images.

The process of identifying colors is the key to the operation of **Segmentation**. Due to the vast possibilities of differences in the images, and the color composition of the object(s) to be identified, ToupView provides **Histogram** based models for identifying the segmented area.



Choose the **Segmentation** command on a **True Color** image, select either **Red(R), Green(G), or Blue(B)** channel to do the operation.

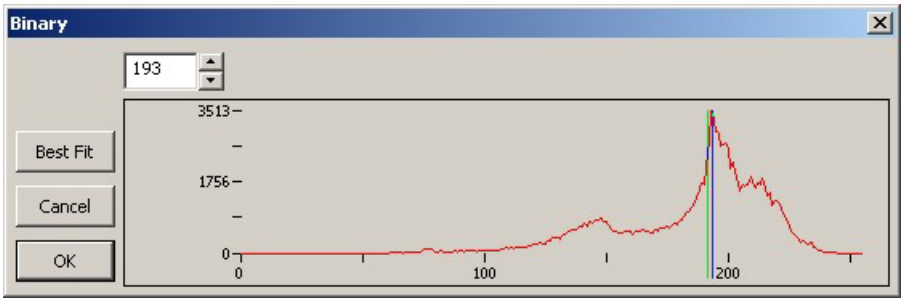
1.7.4 Binary••• Shift+B

Binary is a kind of gray level process. If the gray of the pixel is greater than the given threshold, the pixel's color will be changed into white. Otherwise, the pixel's color will be changed into black. Although the process may lose some information, it is an important step of other processes.

The curve on the **Binary** dialog shows the gray distribution of the image.

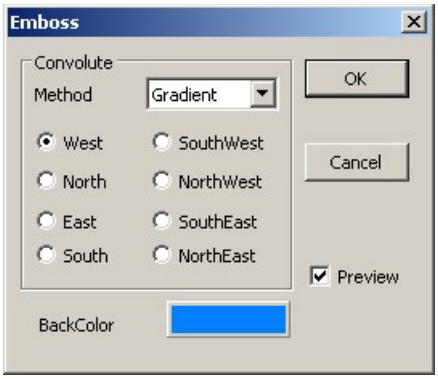
The line in the dialog indicates the threshold value. Drag the line to change the threshold, or change the number in the top left corner of the dialog to change it.

Click the "**Best Fit**" button to apply the auto threshold process to the image. It uses an automatic threshold to make the image **Binary**.



1.7.5 Emboss••• Shift+E

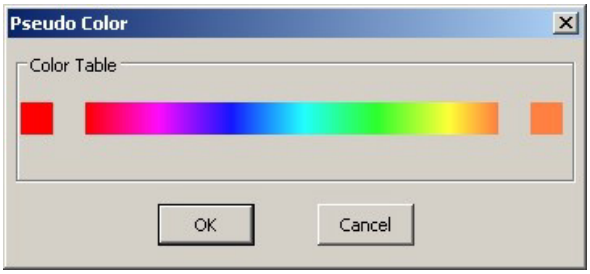
Emboss is a kind of artistic process. The process can make the image look like an empaistic image. The **Preview** button allows previewing the image before creating it. The process supplies 3 kinds of convolutions including **Gradient**, **Different**, and **Prewitt**.



There are 8 directions in every kind of convolution. Users can get different effects with different convolution methods or directions.

1.7.6 Pseudo Color•••

Note: Image must be in **Gray Scale**. Choose **Pseudo Color** command to "colorize" the active monochromatic image. This is used to highlight certain features in a gray scale image such as display all densities above a certain point in red, or, the imaging device recorded thermal information, all temperatures below a certain point can be revealed in blue color.



When **Pseudo Color** a monochromatic image, a special palette need to be build with which the monochromatic image is displayed. **Pseudo Color**ing an image does not modify the pixels' values in image bitmap (it does not convert image to true color or palette,). It simply associates a **Pseudo Color** palette with the image that interprets the gray-level values in the image as color.

Pseudo Colored images are very similar in structure to palette class images, but they differ in a couple of important ways. First, the pixels' values in a **Pseudo Color**ed image actually represent continuous-tone intensity information, whereas a palette image's pixels carry no intensity significance. Secondly, a palette image includes a palette table that is actually part of the image file.

The colors used to map the gray values can be selected. The buttons at each end of the color strip will bring up the color dialogues separately, which allows select the start and end colors of the range.

1.7.7 Surface Plot•••

The **Surface Plot** (or 3-D Plot) tool creates a 3-D representation of the intensity of an image. When choose the **Surface Plot** command, keep in mind that X=height Y=width, and Z=gray.

In the viewpoint window, the **elevation** and **rotation** of the image can be adjusted by dragging the mouse on the image.

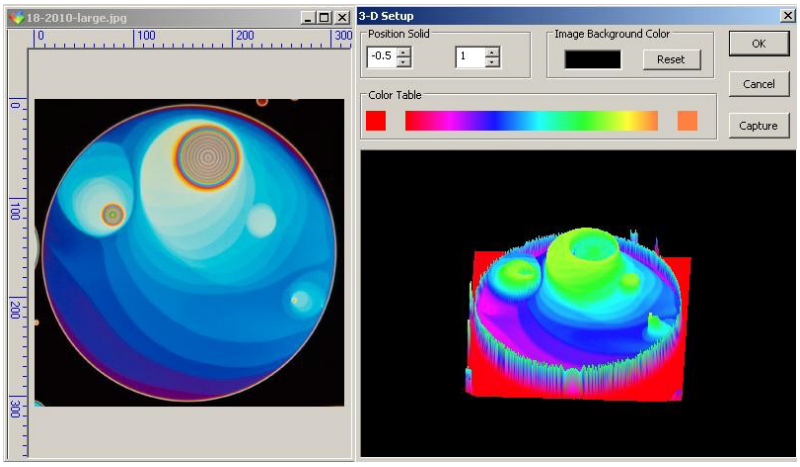
Position Solid: The left edit control indicates the relative position of the entire image in the viewpoint window, whose default value is 0.5. The right edit control indicates the relative height of the display of the Z scale, whose default value is 1.

Reset: Set the **Position Solid**'s two edit controls to their default values.

Image Background Color: Choose this command to display a color dialog where one can adjust the background color of the viewpoint window.

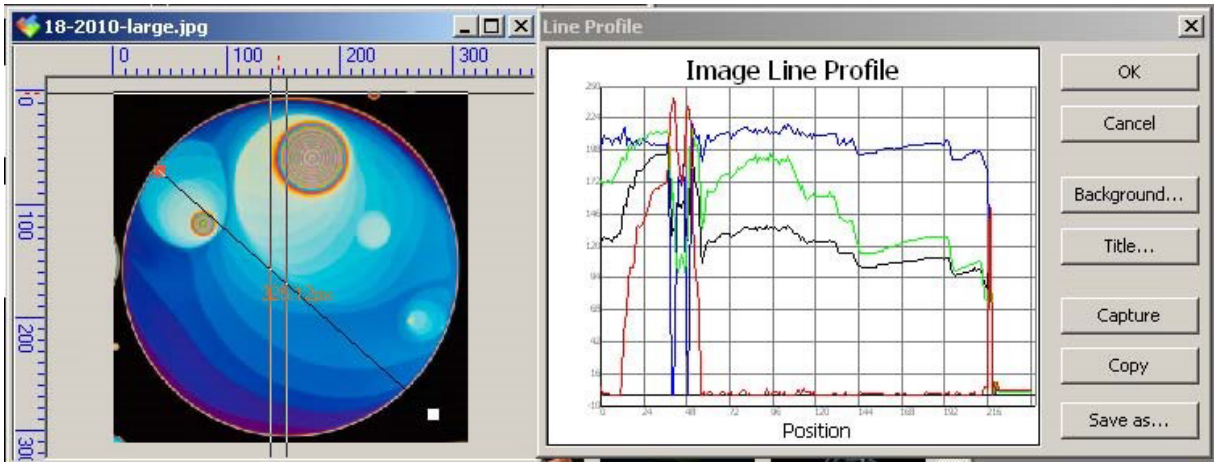
Capture: **Capture** the active image in the viewpoint window as a new image.

Color Table: Select the colors to map the gray values found in the surface plot. The button at each end of the **color table** brings up the color dialog, which allows select the start and end colors of the range. (Please refer to **Pseudo Color** for more information)



1.7.8 Line Profile•••

Choose **Line Profile•••** command to illustrate how pixels along a selected line are distributed by graphing the number of pixels at each color intensity level. Before choose this command, select the **Tool Box Annotation Page** first to make or set the active layer and draw the line object above the image.



In a **Line Profile**, the X-axis represents the spatial scale, and the Y-axis represents the intensity values which range from 0 to 255.

Background: Open the windows color dialog to set the background color of the histogram window.

Title: Use this command to set a title on the image's **Line Profile**.

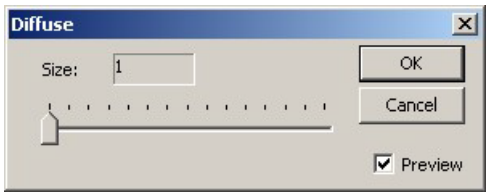
Capture: Capture the image in the **Line Profile** window as a new untitled image.

Copy: Copy the **Line Profile** window's content onto the clipboard.

Save as•••: Save the **Line Profile** image in bmp format.

1.7.9 Diffuse••• Shift+D

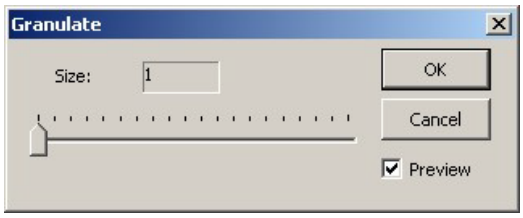
Diffuse is a kind of artistic process. It can diffuse the image. Users can adjust the parameter in the dialog to control the degree of the diffusion.



Preview: Check it to display the real-time effect when drag the slider bar.

1.7.10 Granulate••• Shift+G

Granulate is a process that can make the image fuzzy. One can adjust the parameter in the dialog to control the degree of the fuzziness.



1.7.11 Mosaic•••

Mosaic is a process that can combine the images opened into a new image. This will open the following dialog:

ImgList

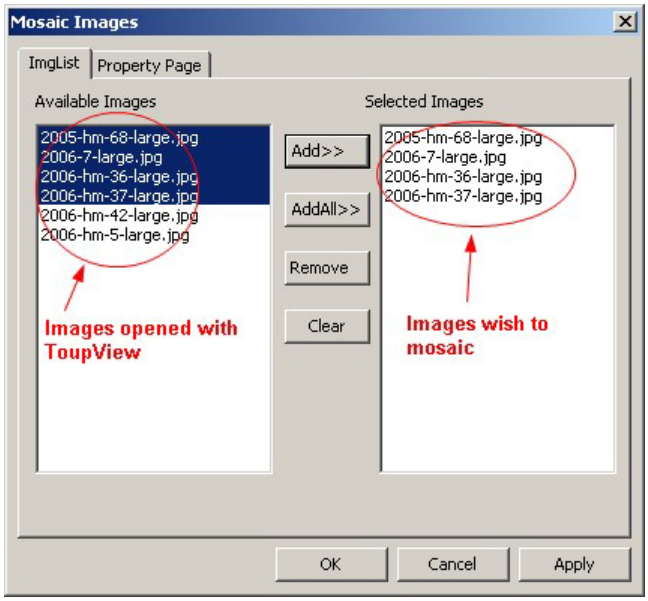
Available Images: Images opened with Toupview.

Add>>: Add the opened images to the **Selected Images** list view

Add All>> Add all the opened images to the **Selected Images** list view **Remove**:

Select the images and remove them from the **Selected Images** list view.

Clear: Remove all the images from the **Selected Images** list view.



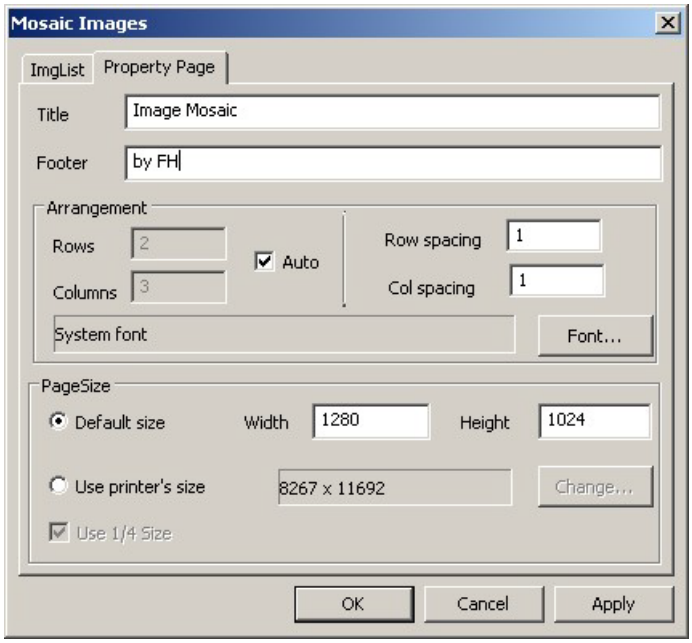
Property Page

Title: The title wanted

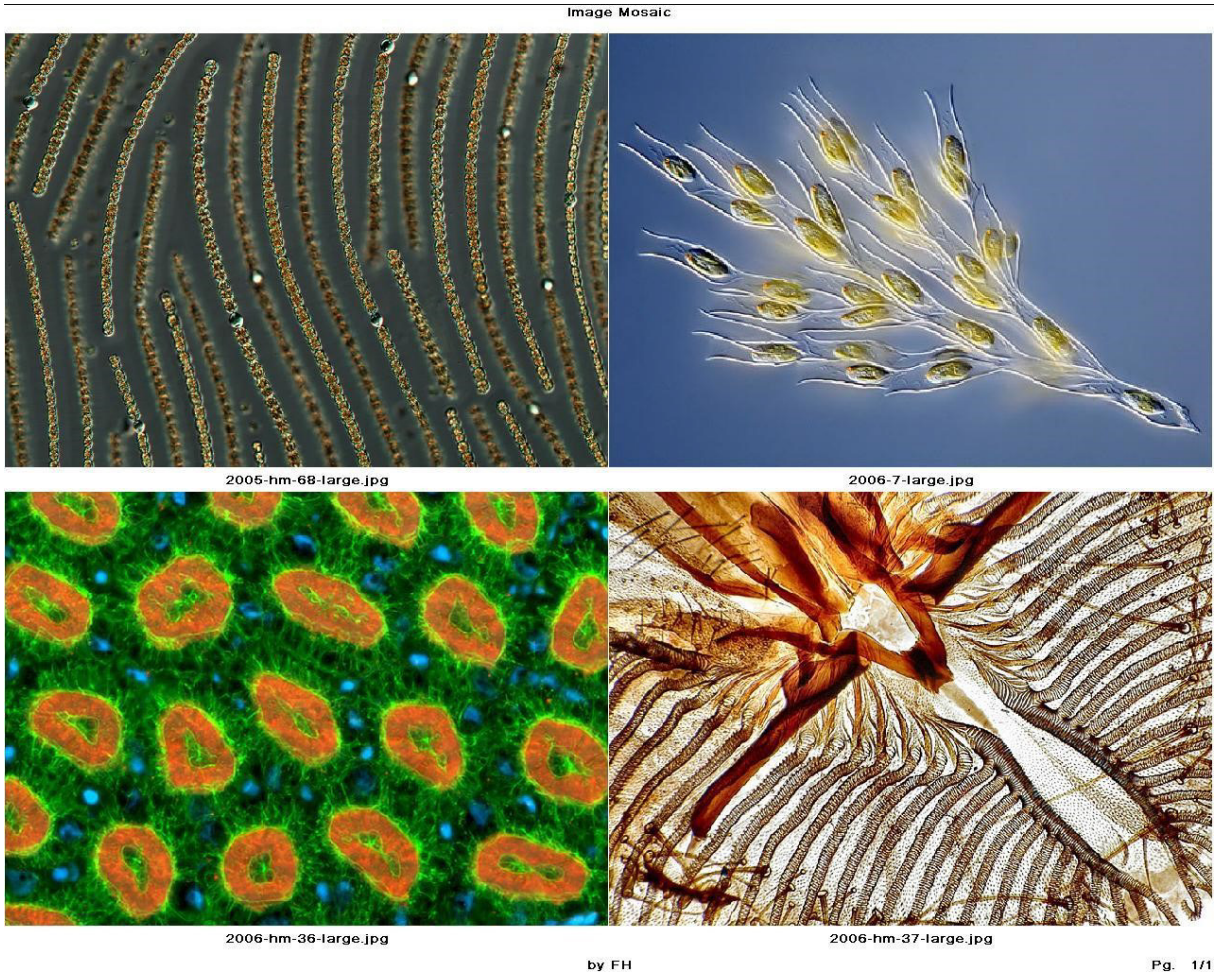
Footer: The footer wanted

Arrangement: The Mosaic Images distribution on the page

PageSize: The page size for the Mosaic Images

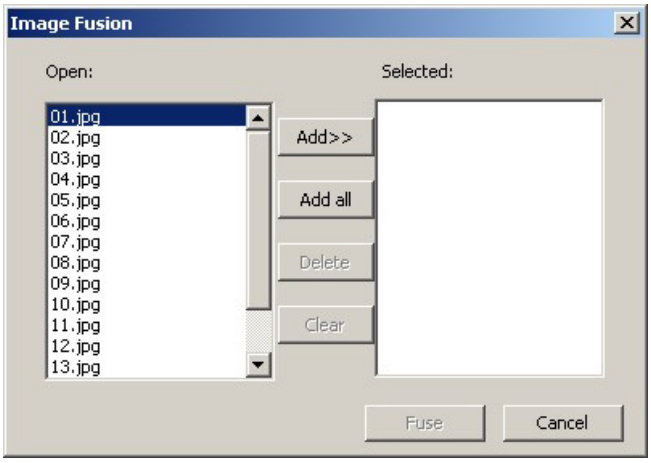


If everything is set, click **OK** to end the Mosaic Images operations and a new image window will be displayed and the final results should be



1.7.12 Fusion•••

Similar to the dynamic multi-focus image fusion with the live video stream, **Static Fusion** is a very useful tool to generate a clear image by combining a sequence of previously captured multi-focus images. Choose **Process->Fusion•••** menu, the following dialog will open (assume 01.jpg 02.jpg … 15.jpg are already opened in ToupView):



Click on the image file name in the **Open** list view will select the image, and then the **Add>>** button is enabled (Click on the selected images will deselect them). Click **Add>>** button, the selected images will be added into the **Selected** list view, which will be fused later.

Click **Add all** button will add all images in the **Open** list view into the **Selected** list view.

If images in the **Selected** list view is selected, the **Delete** button will be enabled. Click the **Delete** button, the selected images in the **Selected** list view will be removed.

Click on the **Clear** button will remove all the images in the **Selected** list view, including the unselected ones. NOTE: Images used to fuse must be the same size, or there will be a prompt when adding different sizes of images as below:

The prompt dialog indicates which image is not the same size with the others.

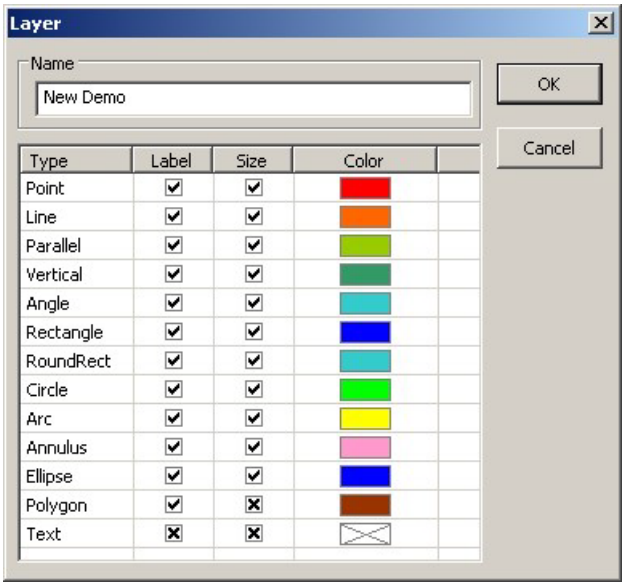
When the desired images are all selected, the **Static Fusion** process can start. Click on the **Fuse** button will start the **Static Fusion** process, and the mouse cursor becomes an hourglass. When the fusion process finishes, the fused image will be generated in a new image window as below:

1.8 Layer

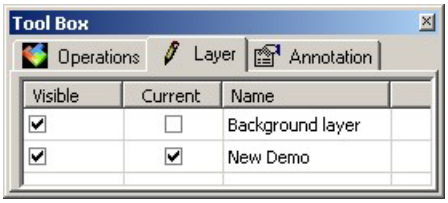
1.8.1 New••• Ctrl+N

Create a **New** layer. When creating a **New** layer, the following item can be checked or set:

1. Input a layer **Name**.
2. Check or uncheck to show or hide the **Label** and **Size**.
3. Set the **Color** for both the layer object's **Label** and **Size**.



Click **OK** button, the **Tool Box Layer Page** will look like below:



A new item called **New Demo** has been added. This new **Layer** is checked as **Current** and **Visible**.

Note: After the **New** layer is made, buttons on the **Annotation Toolbar** are enabled and all of the **Annotation** menu items are also enabled.

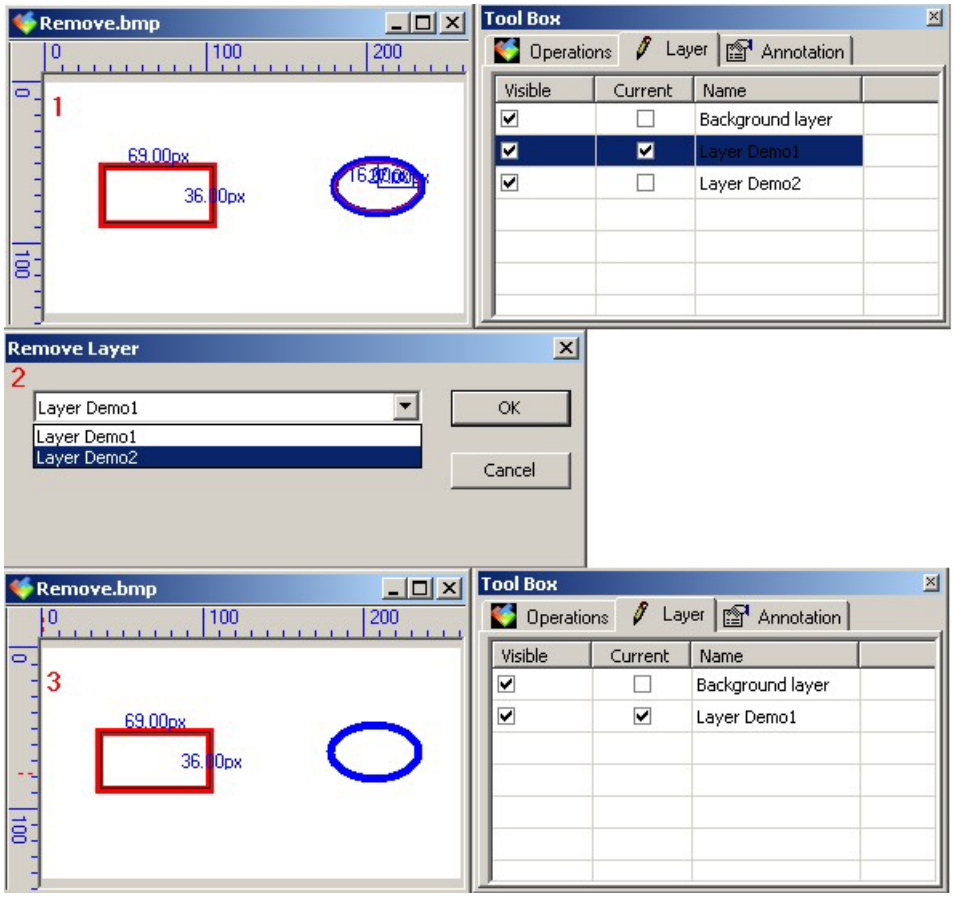
1.8.2 Remove•••

Remove a layer by selecting the layer name. The **Current** active layer cannot be removed.

Remove••• steps

1. Choose **Layer->New•••** to make **Layer Demo1**, Choose **Annotation->Rectangle** to draw a **Rectangle** objects in red color.
2. Choose **Layer->New•••** to make **Layer Demo2**, Choose **Annotation->Ellipse** to draw an **Ellipse** objects in black. The results are shown in Fig 1.
3. Check the **Layer Demo1** on the **Tool Box Layer Page** to set it as **Current**.
4. Choose **Layer->Remove•••**. Select **Layer Demo2** and click **OK**. See Fig 2.

5. The final result is shown in Step 3. One can see that the **Ellipse** objects on **Layer Demo2** have been removed and the **Rectangle** objects on **Layer Demo1** are still there. The item of **Layer Demo2** on the **Tool Box Layer Page** has also been removed.



1.8.3 Current•••

Select the **Current** layer as an active layer.

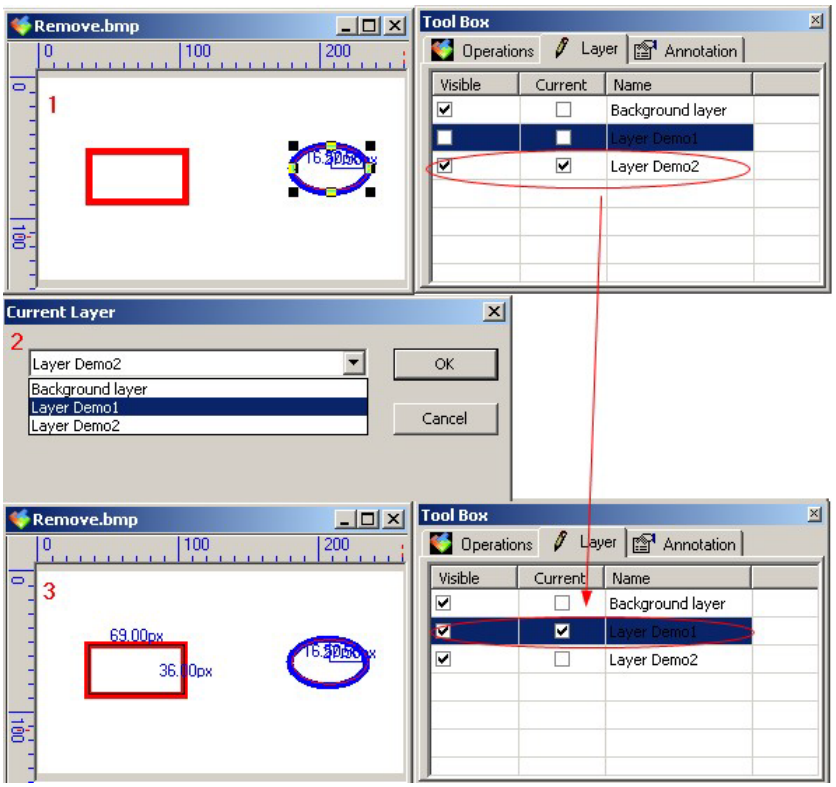
Current••• steps

1. Choose **Layer->New•••** to make the **Layer Demo1**. Choose **Annotation->Rectangle** to draw a **Rectangle** objects in blue.

2. Choose **Layer->New•••** to make the **Layer Demo2**. Choose **Annotation>Ellipse** to draw an **Ellipse** objects in red. Uncheck the **Visible** button of **Layer Demo1**. The **Rectangle** objects will be hidden. The results are shown in Fig.1.

3. Choose **Layer->Current•••**. Select the **Layer Demo1** and click **Ok**. See Fig.2.

4. The final result is shown in Fig.3. The **Rectangle** objects on **Layer Demo1** are automatically visible and the **Current Layer Demo1** item on **Tool Box Layer Page** is checked.



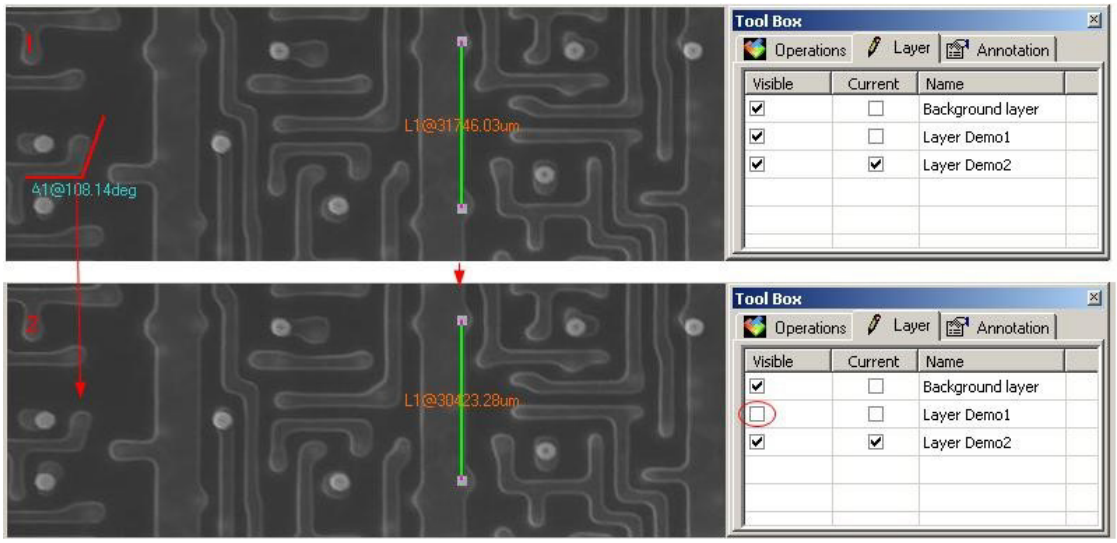
1.8.4 Show/Hide•••

Show or **Hide** the layer. The **Current** layer must be shown and cannot be hidden.

Show/Hide••• steps

1. Choose **Layer->New•••** to make **Layer Demo1**, Choose **Annotation->Angle** to draw 1 **Angle** objects in red color.

2. Choose **Layer->New•••** to make **Layer Demo2**, Choose **Annotation->Line->Vertical Line** to draw a **Line** objects in green color. The results are shown in Fig. 1.

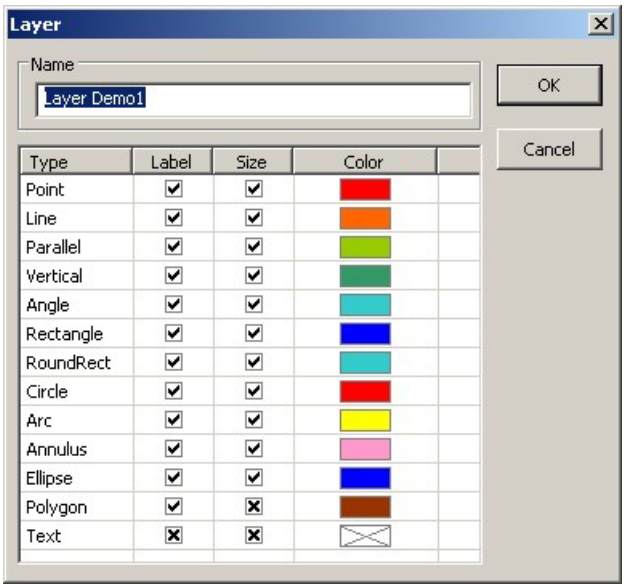


3. Uncheck **Visible** on the **Tool Box Operations Page**'s **Layer Demo1** row or choose **Layer->Hide/Show•••**.The **Layer** status is listed. Uncheck the **Visible** item in **Layer Demo1** and end the dialog.

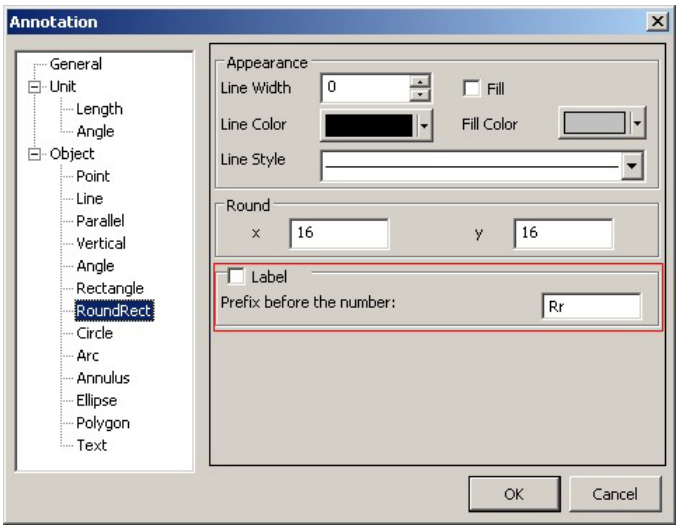
4. The final result is shown in Fig 2. One can see that the **Angle** objects on **Layer Demo1** are hidden. The **Current** button of **Layer Demo1** item on the **Tool Box**
Layer Page is still unchecked

1.8.5 Property•••

This **Properties** command will show/hide the object **Label** and object **Size**, change **Label Color**. The **Layer->Property•••** is shown below



Note: The **Layer Property** only controls the named layer, for example **Layer Demo1**'s **Label**, **Size** and **Color**. The **Label's** show/hide property is actually controlled by the **Options->Annotation•••->Object->XXX** as shown below.



1. If the **Label** is checked here, then uncheck **RoundRect Label** on the above **Layer** dialog will make the **RoundRect Label** invisible.

2. If the **Label** is unchecked here, then the **Label** will always be invisible, regardless of whether the **RoundRect Label** on the above **Layer** dialog is checked or unchecked.

3. Check the **Label** on the **Annotation** dialog first, and then check it on the **Layer** dialog to make the **Label** visible.

1.8.6 Export

1.8.6.1 Export->To Clipboard->All Layers

Export all layers' **Annotation** objects to the clipboard.

1.8.6.2 Export->To Clipboard->Current Layer

Only export current layer's **Annotation** objects to the clipboard.

1.8.6.3 Export->To Html File

Export the **Annotation** objects to the ***.html** file in tabbed format.

1.8.6.4 Export->To Excel•••

Export the **Annotation** objects to the excel file.

1.9 Annotation

1.9.1 Object Select

This **Object Select** menu or toolbar button  will be enabled only when a new **Layer** above the **Background layer** is created.

After **Annotation** is done on the specific layer, choose this menu to select the interested objects.

1. The object can be selected by clicking on it.
2. Select a group of objects by including them in a rectangular area or by press down the **Shift** key and clicking the object with mouse until all the desired objects are selected.

To check or modify the parameters of the selected object, choose **View->Tool Box**, and click the **Tool Box Annotation Page**.

Note: The **Appearance, Coordinates** and **Calculation** on **Tool Box Annotation Page** will be enabled only when a single object is selected.

1.9.2 Angle

Draw Angle on image in layer format

After a new layer above the **Background layer** is created with **Layer->New•••** menu, the **Angle** item on the **Annotation** menu and its button  on the **Annotation Toolbar** will be enabled.

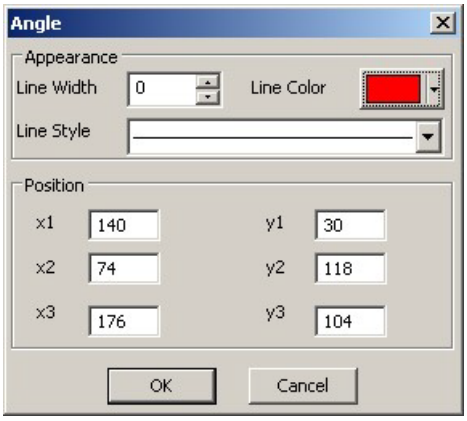
Steps:

1. Move the mouse on the image to point 1, mark it by click the mouse button.
2. Move the mouse to point 2, mark it by click the left mouse button.
3. Move the mouse to point 3, mark the final point by click the left mouse button.

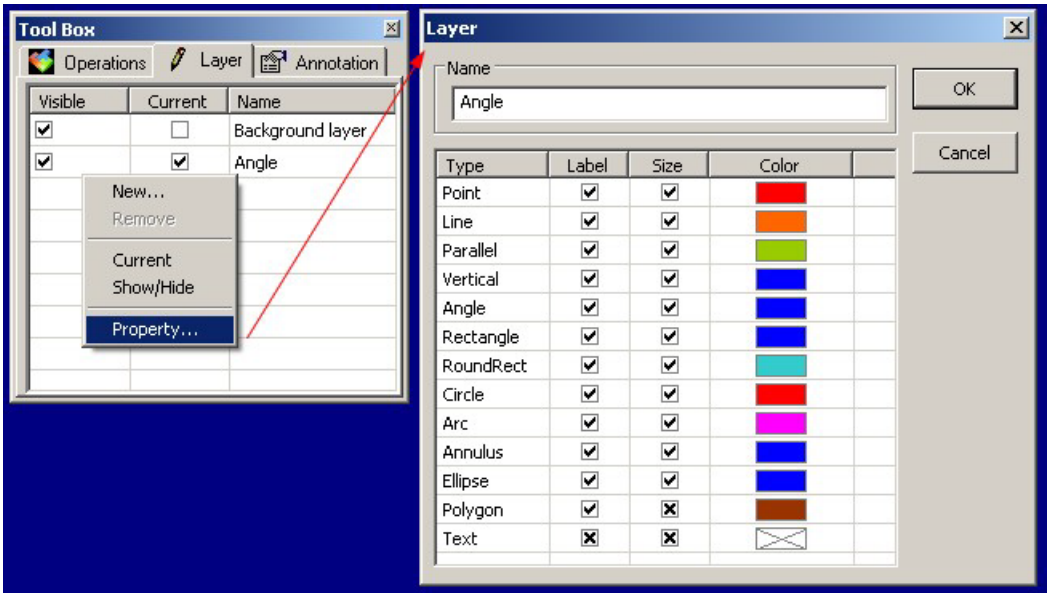
A label A1@50.26deg will be shown near point 2.

Changing the Angle Property

If the **Angle** object is selected, the **Annotation->Property•••** menu and the **Property**  button on the **Annotation Toolbar** will be enabled. Use either one to invoke the **Angle** dialog. Here its **Appearance**, and the three marked point **Positions** can also be precisely adjusted.



Change the Label Property



1. Click on the **Current** layer item (for example angle) with right mouse button on the **Tool Box Annotation Page** will invoke a context menu.
2. Choose **Property•••** will show the **Layer** dialog.
3. Here, one can change **Layer Name**, to determine whether to show or hide **Label** and **Size** items, to modify **Label**, **Size**'s **Color** by just click the mouse button on **Color** button.

1.9.3 Point

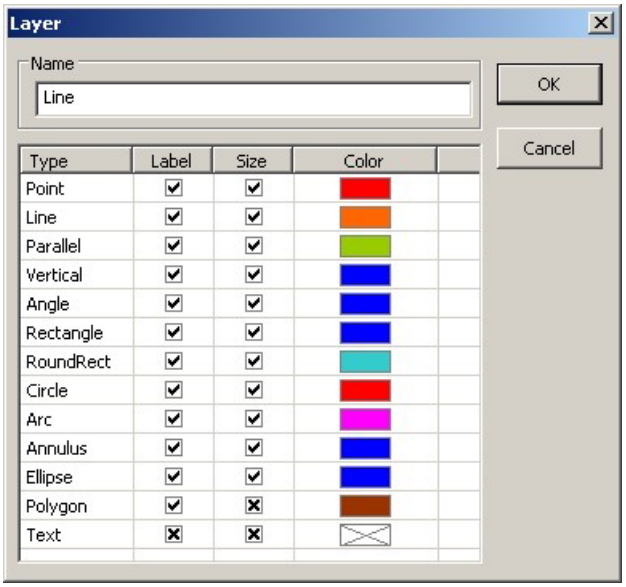
The **Annotation->Point** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command.

Draw point on the image in layer format

Move mouse to the point; click the left mouse to mark it. It will show the point **Label** P1 and its position x and y on the image.

1.9.4 Line

The **Annotation-> Line** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.

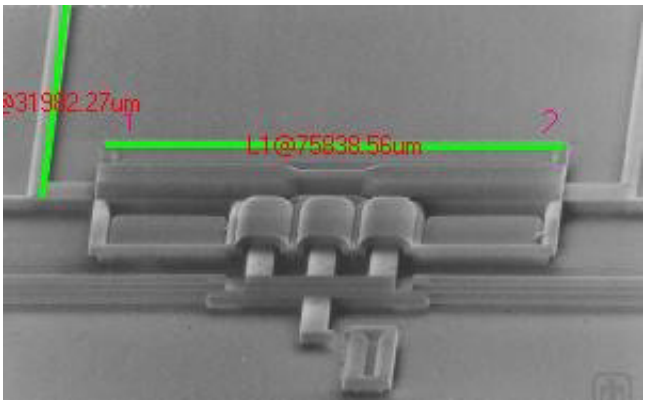


Draw Line on the image in layer format

1. Choose **Annotation->Point** command

2. Move mouse to the 1st point, click the left mouse to mark it.

3. Move mouse to the 2nd point, click the left mouse to mark it again, a line with L1 and its length will be shown.

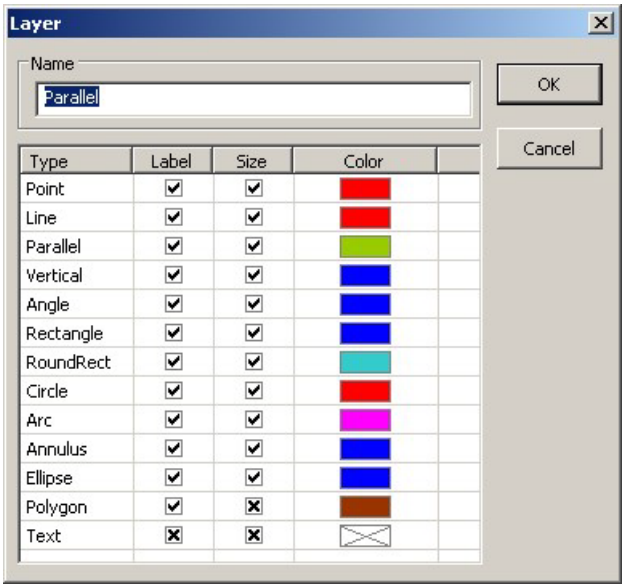


The other **Annotation->Line**'s submenu can be chosen for **Annotation**:

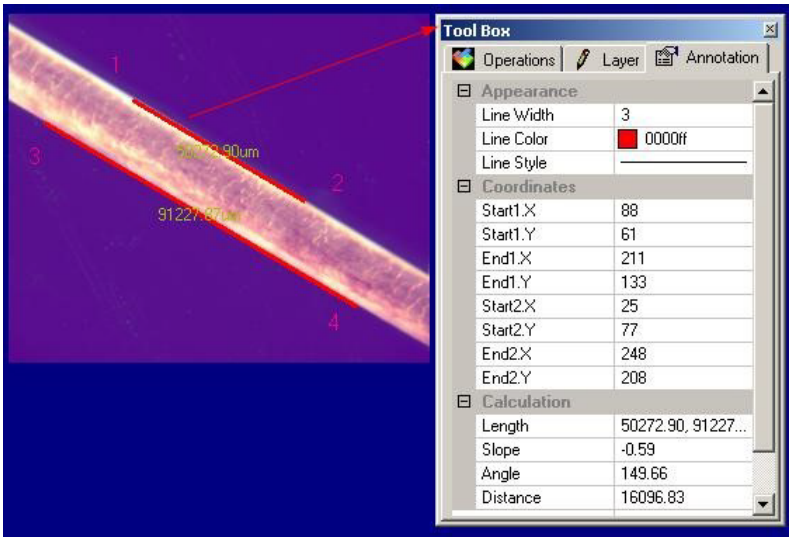
Any Line	Draw **Any Line** between the two points on the specified layer.
Horizontal Line	Draw a **Horizontal Line** between the two points on the specified layer.
Vertical Line	Draw a **Vertical Line** between the two points on the specified layer.

1.9.5 Parallel

The **Annotation-> Parallel** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.



Draw two Parallel lines on the image in layer format

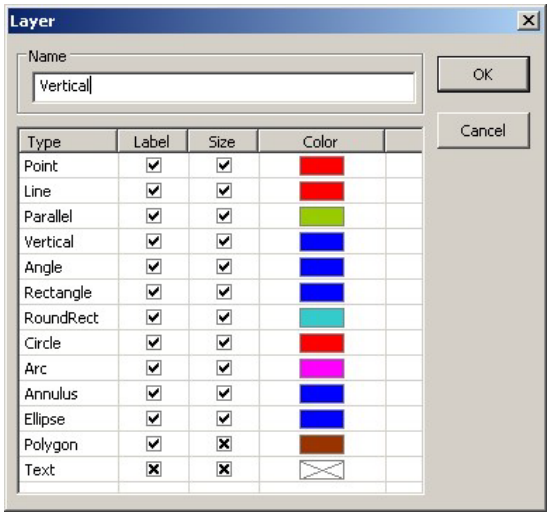


1. Choose **Annotation->Parallel.**
2. Move mouse and click to mark the 1st point.
3. Move mouse and click to mark the 2nd point.
4. Move mouse and click to mark the 3rd point.

5. Move mouse again, one will find the 4th point is always restricted to parallel to the line of point 1 and point 2. Click to mark the 4th point. Two parallel lines will be labeled and numbered.
6. Choose **Tool Box Annotation Page** to modify the parallel line **Appearance**, **Coordinates.**

1.9.6 Vertical

The **Annotation->Vertical** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.



Choose **Annotation->Vertical->Four Points** or **Three Points** menu **or** click  's dropdown arrow and choose **Four Points** or **Three Points** item. Draw two Vertical lines on the image in layer format

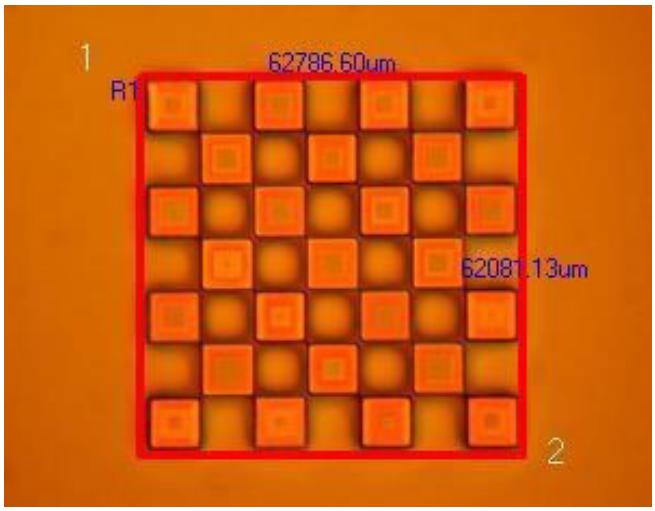
1. Choose **Annotation->Vertical->Four Points.**
2. Move mouse and click its left button to mark the 1st point.
3. Move mouse and click its left button to mark the 2nd point.
4. Move mouse and click its left button to mark the 3rd point.
5. Move mouse again, one will find the 4th point is always restricted to perpendicular to the line of point 1 and point 2. Click to mark the 4th point.

Two vertical lines will be labeled and numbered.

6. Choose **Annotation->Vertical->Three Points** to draw vertical line.
7. Choose **Edit->Tool Box** and click **Tool Box Annotation Page** to check or modify the object's **Appearance** and **Coordinates**.

1.9.7 Rectangle

The **Annotation->Rectangle** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.



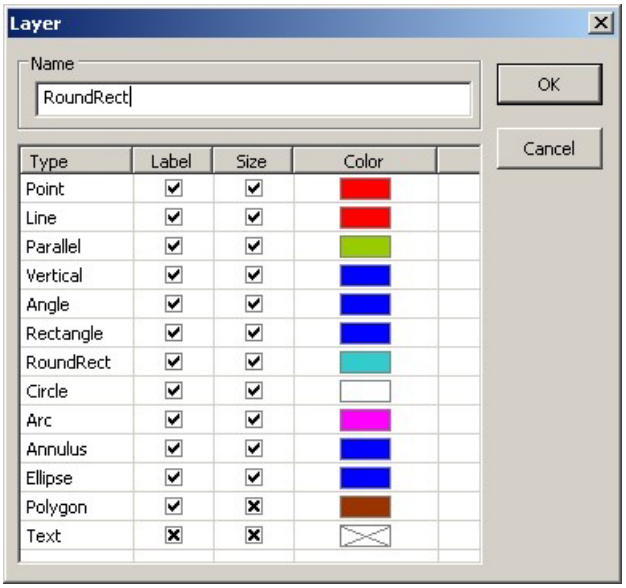
Draw Rectangle on the image in layer format

1. Move mouse to the 1st point; click its left mouse button to mark it.
2. Move mouse to the 2ed point; click its left mouse button to mark.

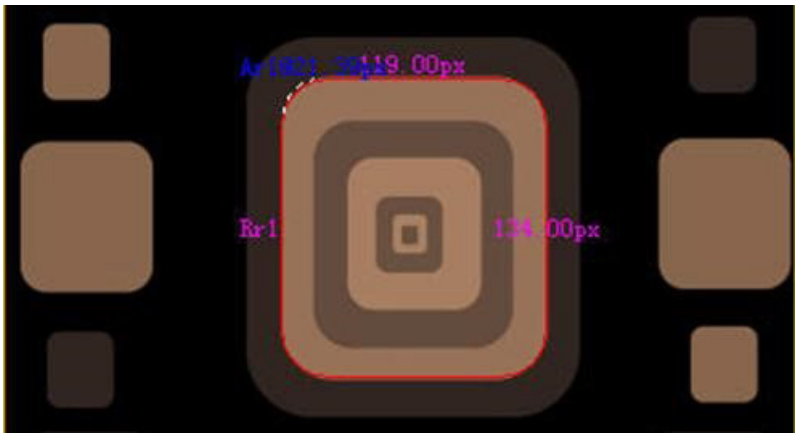
1.9.8 RoundRect

The **Annotation->RoundRect** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created

with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.

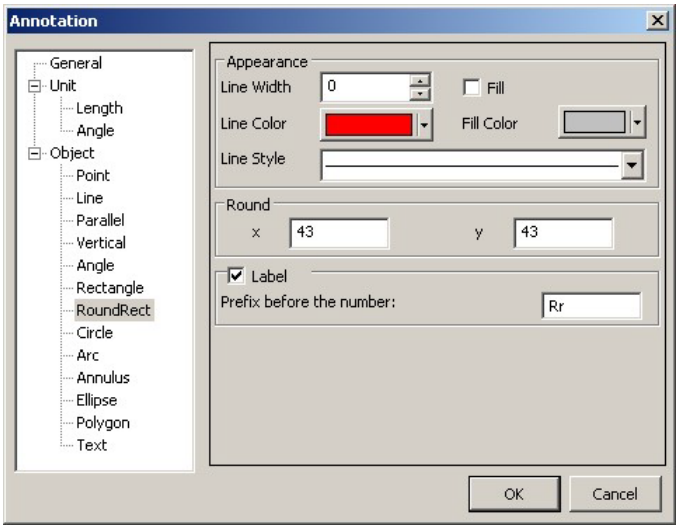


Draw a Round Rectangle on the image in layer format



1. Draw **Arc** object to determine the round size. Its size is 21.39X2=42.8.
2. Choose **Options->Annotation•••**, click **Round Rectangle** to set the **Round** to 43 and 43 respectively.
3. Move mouse to the 1st point; click its left mouse button to mark it.
4. Move mouse to the 2nd point, click its left mouse button to mark it, a round rectangle with Rr1 and its lengths of the two dimensions will be shown.

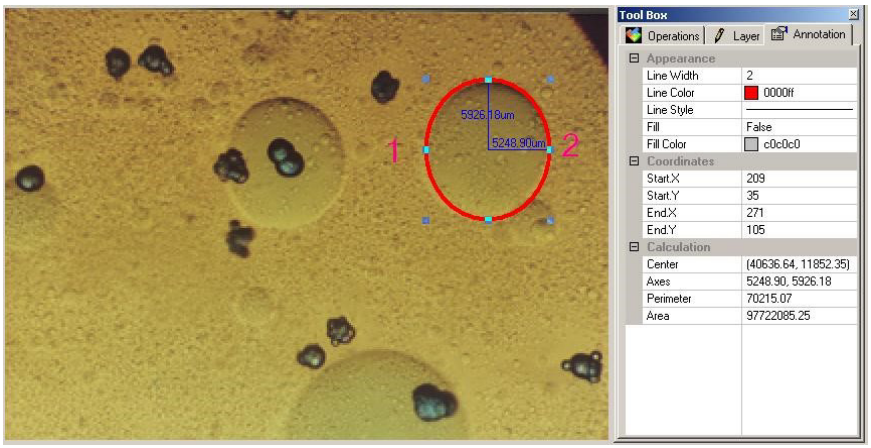
Note: User can also annotate round rectangle 1st, then choose **Annotation ->Property•••** to adjust the round or to choose **Annotation->Select**, select object to adjust the round rectangle position and size.



1.9.9 Ellipse

The **Annotation-> Ellipse** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.

Draw Ellipse on the image in layer format



1. Choose **Annotation->Ellipse** menu.
2. Move mouse to mark the 1st point.
3. Move mouse to mark the 2nd point.
4. If it is not superpose with the shape on the image, choose **Annotation->Select** to adjust the position to get the right shape.

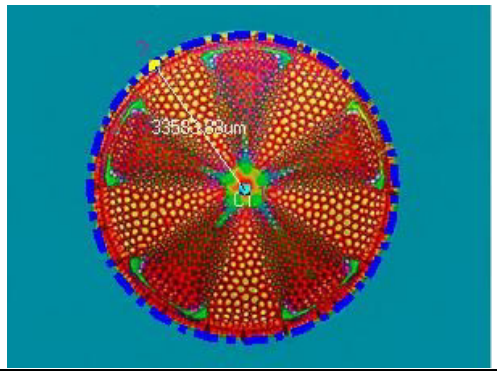
Note: The object on the image only displays **Label** and its long and short axis length. The other parameters can be found on the **Annotation Manager**.

1.9.10 Circle

The **Annotation->Circle** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.

Draw Circle on the image in layer format

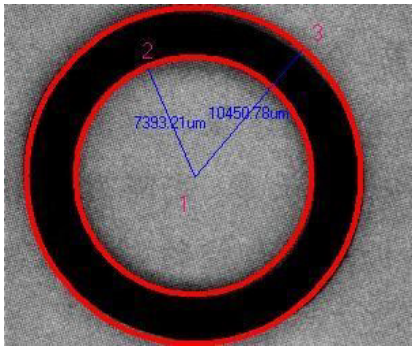
1. Choose **Annotation ->Circle->Center+Radius** to draw circle with center and radius method on the specified layer. Its radius is C1@33583.88um.
2. Choose **Annotation ->Circle->Two Points** to draw circle with two point method on the specified layer.
3. Choose **Annotation ->Circle->Three Points** to draw circle with three point method on the specified layer.



Center+Radius	Draw circle with center and radius method on the specified layer.
Two Points	Draw circle with two point's method on the specified layer.
Three Points	Draw circle with three point's method on the specified layer.

1.9.11 Annulus

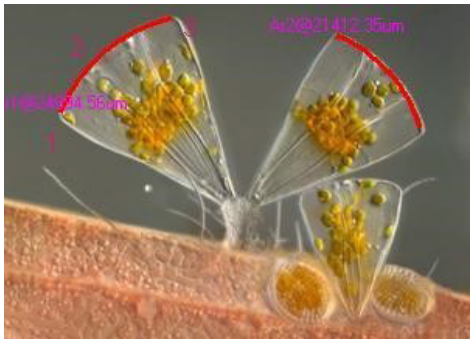
The **Annotation-> Annulus** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.



1. Find Annulus center 1 and click mouse button to mark the annulus center.
2. Move mouse to let the first circle superpose the image circle, click mouse button.
3. Move mouse to let the second circle superpose the circle on the image, click mouse button. Two radiuses with number and units will be shown on the annulus.

1.9.12 Arc

The **Annotation->Arc** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.

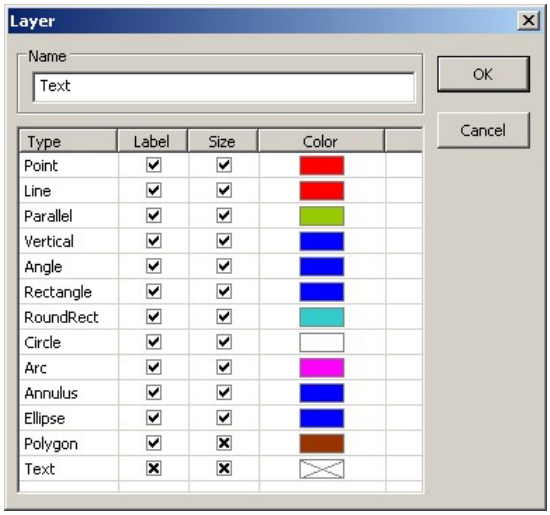


1. Move mouse to mark the 1st point.
2. Move mouse to mark the 2nd point.
3. Move mouse to mark the 3rd point, then an **Arc** with **Label** and its **Length** will be shown near the final point.

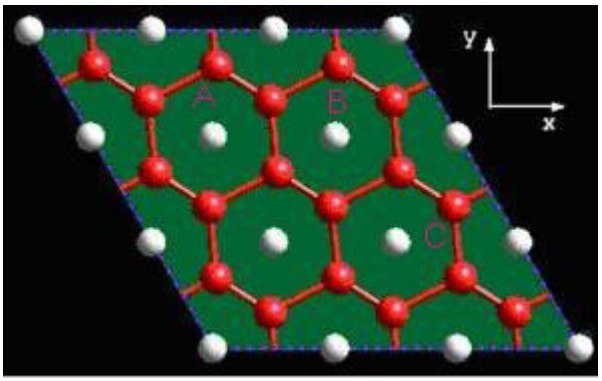
Note: The text indicates the Name and its length. The other parameters can be found in the **Annotation Manager**

1.9.13 Text

The **Annotation->Texts** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.



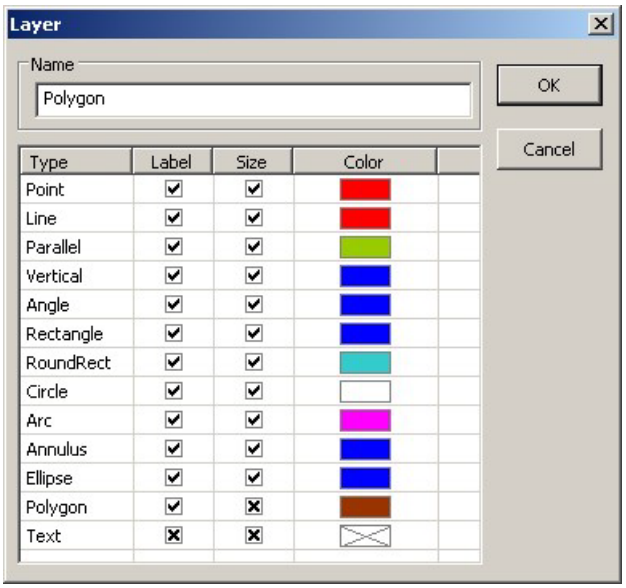
Draw Text on the image in layer format



1. Choose **Annotation->Text** menu.
2. Move mouse to mark the 1st point.
3. Move mouse to mark the 2nd point, a rectangle with dash line shows the Text window size.
4. Input the text. Click right mouse button to end the Text object. Note: Only the input text is shown. The other parameters are name and the center coordinate pairs which can be found on the **Annotation Manager**.

1.9.14 Polygon

The **Annotation->Polygon** menu and its button  on the **Annotation Toolbar** will be enabled only after a new layer above the **Background layer** is created with **Layer->New•••** command. In the **Layer** dialog, the object's **Label** and **Size** can be checked to hide or show them, the **Label**'s **Color** can also be set at here.



Draw Polygon on the image in layer format

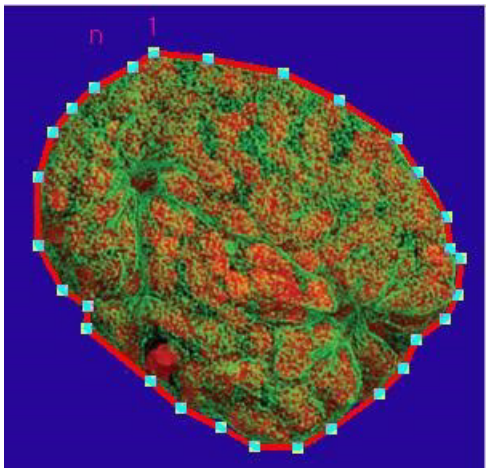
1. Choose **Annotation->Polygon** menu.
2. Move mouse to mark the 1st point.
3. Move mouse to mark the 2nd point.

•••

n. Move mouse to mark the nth point.

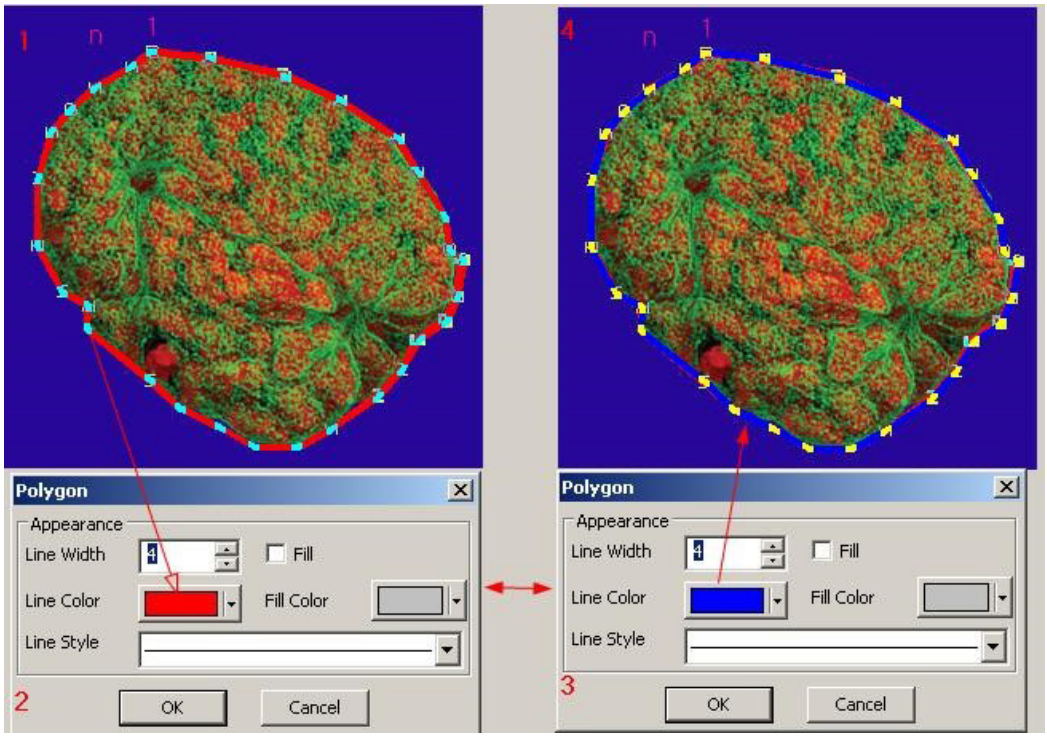
n+1. Repeat step1 to n to draw the other **Polygon**

Note: For **Polygon**, the **Center**, **Area** and **Length** will be listed in the **Annotation Manager**.



1.9.15 Property•••

The **Property** command on the **Annotation** menu is used to check or modify the object **Property**  . Different objects have different **Properties**.



1. Make a new layer: **Annotation->New•••**.
2. Choose **Annotation->Polygon** to draw **Polygon** in Fig.1.
3. Choose **Annotation->Property•••** to check **Polygon Property** as show in Fig.2.
4. Modify the **Polygon Appearance Property** as shown in Fig.3. Click **OK** button.
5. The modified **Appearance** is shown in Fig.4.

1.9.16 Z Order

Choose **Annotation->Z Order** or click  on the **Annotation Toolbar**, then select one of the 4 submenus: **Top**, **Bottom**, **Move Up**, and **Move Down**.

Create a new layer above the **Background layer** using **Layer->New•••** (shortcut: **Ctrl+N**). After **2 or more objects** above the image's **Background layer** are drawn, this menu's submenus or its button's submenus on the **Annotation Toolbar** will be enabled. The functions of these 4 submenus are listed below:

Top	Change the selected object's relative position to the **uppermost** place of all objects.
Bottom	Change the selected object's relative position to the **lowest** place of all objects.
Move Up	Change the selected object's relative position to the **higher** place of the two.
Move Down	Change the selected object's relative position to the **lower** place of the two.

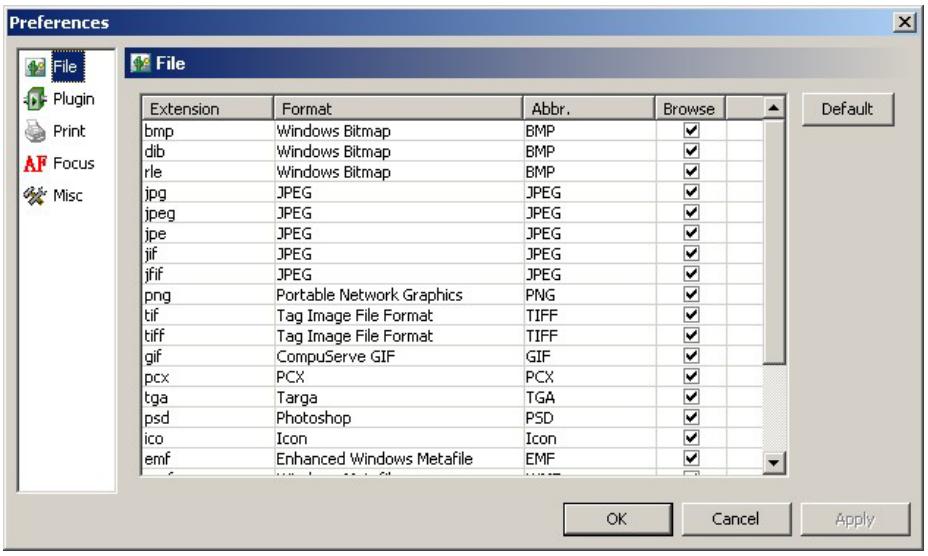
1.10 Options

1.10.1 Preference••• Shift+P

There are 4 tabs for the **Preference** dialog. They are the **File**, **Plugin**, **Print**, and **Misc** tabs.

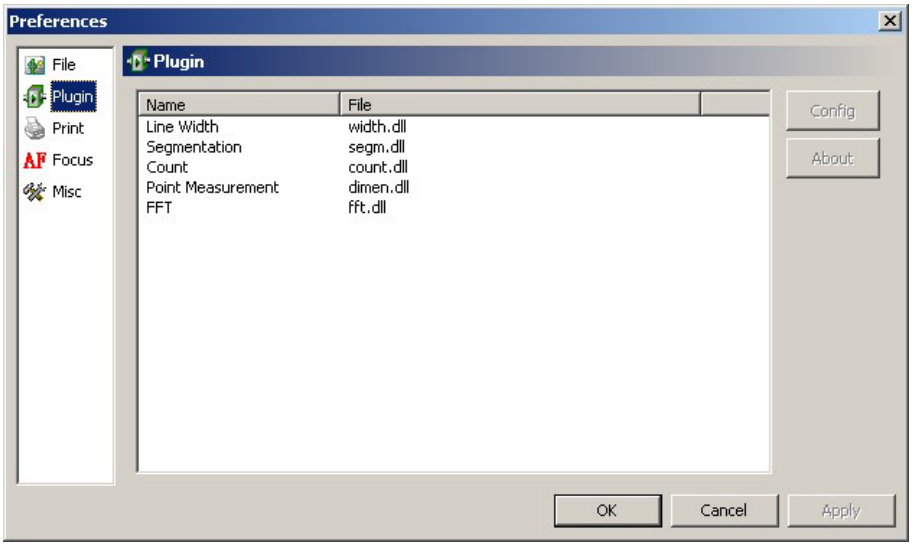
File Preference

One can check a file **Extension** for the specified file **Format** and its **Abbr.**(abbreviation), to determine whether it will be displayed in the image **Browser** window or not.



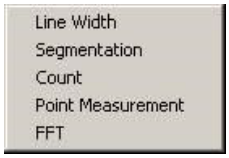
Plugin Preference

The ToupView installed **Plugins** will be listed with their **Name**(s) and dll **File** name(s) in the **Plugin** menu. If the dll includes **Config** and **About** modules, one can configure this **Plugin** and check the **About** information.



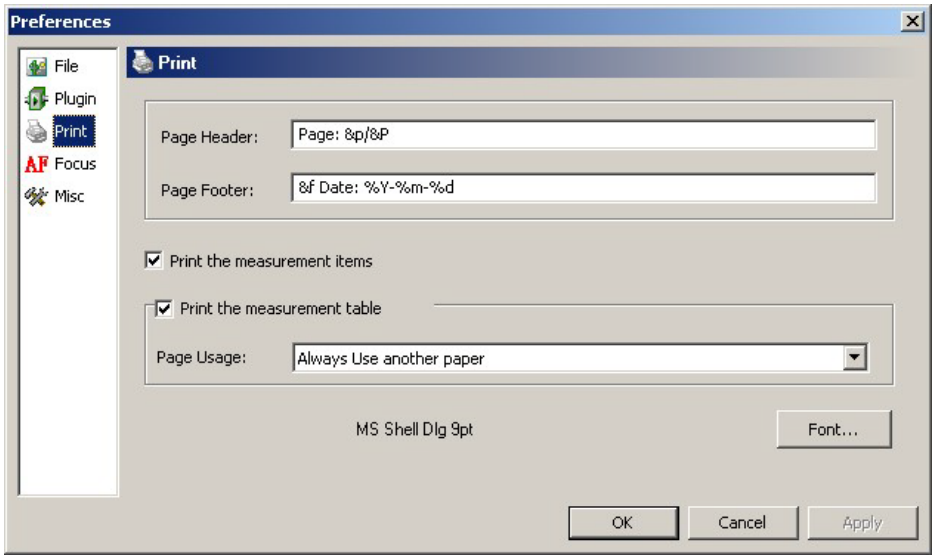
Click the left mouse button on the item to highlight it, and **Config** it (supported by the provider, if this function is not provided, the **Config** button will be disabled). One can also find the **About** information (if this function is not provided, the **About** button will be disabled). ToupView currently only provide **Line Width**, **Segmentation**, **Count**, **Dimensioning**, and **FFT Plugins** as shown below.

This will create the submenus on the **Plugin** menu, as shown below:



Print Preference

One can select the **Page Header** and **Page Footer** in following format:



&f File Name
&p Current Page
&P Total Pages
%A Full weekday name
%b Abbreviated month name
%B Full month name
%c Date and time representation appropriate for locale
%d Day of month as decimal number (01 - 31)
%H Hour in 24-hour format (00 - 23)
%I Hour in 12-hour format (01 - 12)
%j Day of year as decimal number (001 - 366)
%m Month as decimal number (01 - 12)
%M Minute as decimal number (00 - 59)
%p Current local times A.M./P.M. indicator for 12-hour clock
%S Second as decimal number (00 - 59)
%U Week of year as decimal number, with Sunday as first day of week(00-53)

%w Weekday as decimal number (0 - 6; Sunday is 0)
%W Week of year as decimal number, with Monday as first day of week(00-53)
%x Date representation for current locale
%X Time representation for current locale
%y Year without century, as decimal number (00 - 99)
%Y Year with century, as decimal number
%z %Z Time-zone name or abbreviation; no characters if time zone is unknown

%% Percent sign For example:

&f Date:%Y-%m-%d

Page:**&p/&P**

Misc Preference

One can let the application:

Remind me when save file with draw items not in *.sft format (Checked).

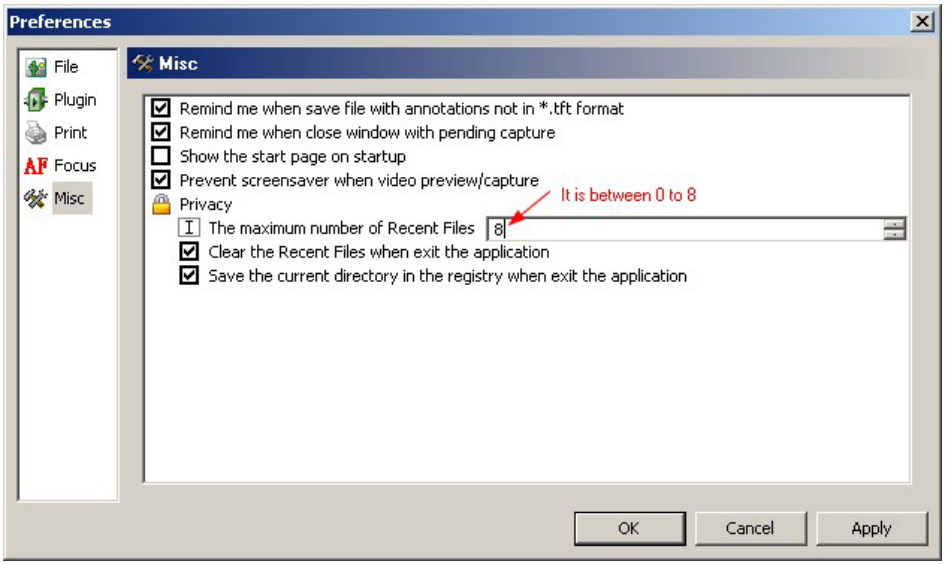
Remind me when close the window with pending capture.

Show the start page on the startup (Checked).

Set "**The maximum number of Recent Files: 4**" to another number or

Clear the Recent files when exit the application", or

Save the current directory in the registry when exit the application.



1.10.2 Annotation•••

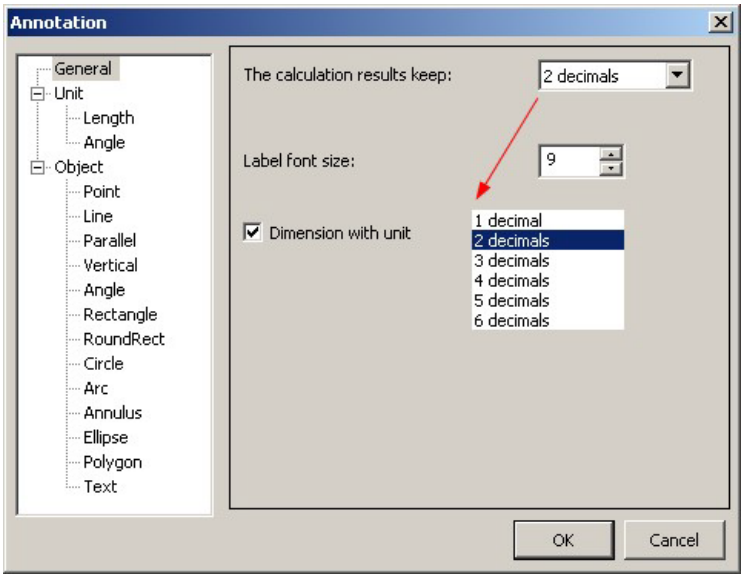
This dialog has many subsections. They are:

General

The **General** tab allows one to select **The calculation results keep: X decimals**, **X** is between 1 to 6.

One can also select the **Label font size** (between 5 and 15).

Check or uncheck **Dimension with unit**. If it is checked, the **Dimension** will be displayed together with the units. If unchecked, only the **Dimension** will be displayed.



Unit->Length

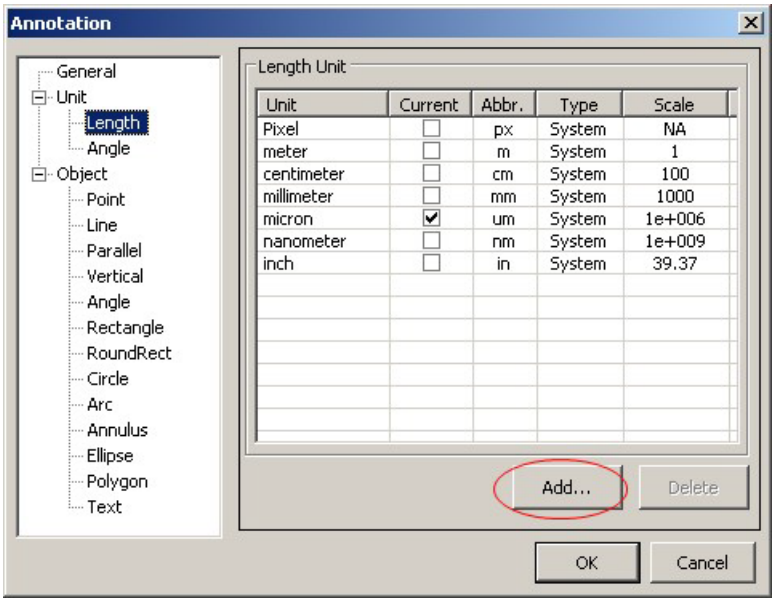
Length tab: One can select the length unit for the **Annotation** menu on the layer annotation operation.

Unit: The system unit defined by the application. It cannot be deleted.

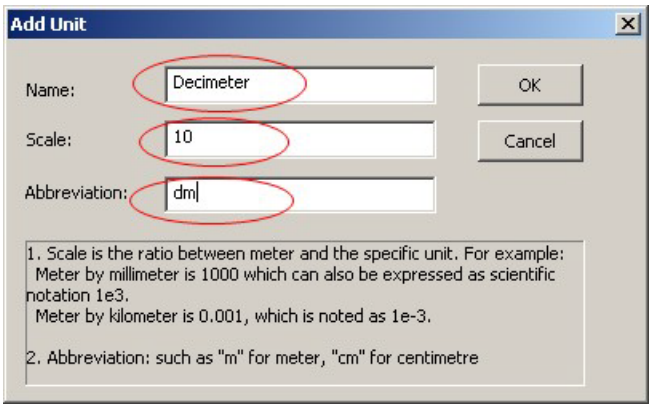
Current: The unit selected.

Type: Type of unit. It can be **System** or **User** defined.

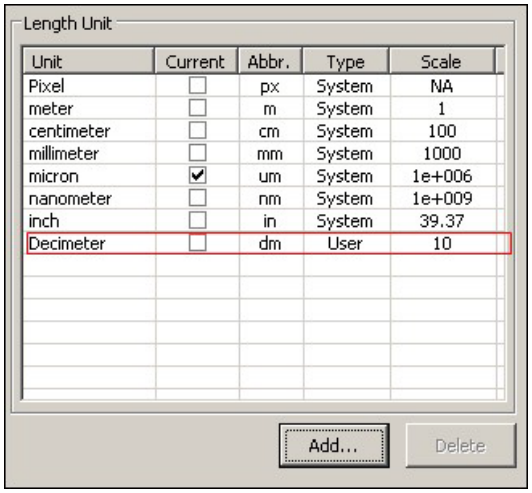
Scale: Represents the ratio of "Meter by unit". For example, if the unit is μm, then "Meter by μm" should be 1000000, the **Scale** should be e+6;



One can also define his own **Unit**. Click the **Add•••** button and the **Add Unit** dialog will be shown. Here, one can enter the unit **Name** and its **Abbreviation**. In the example below, we named it **Decimeter** and its **Abbreviation** is **dm**, its **Scale** for **Meter** by **Decimeter** is 10. Click **OK** to end the **Add** operation.

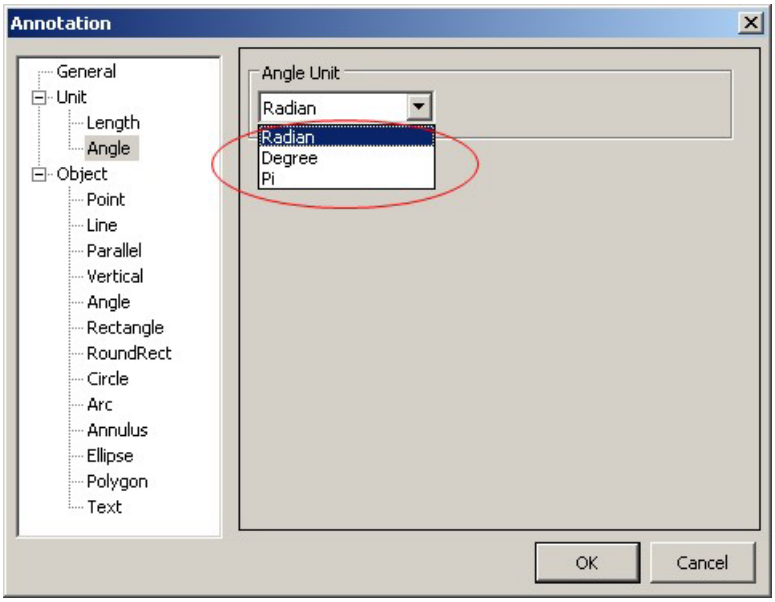


The final **Length Unit** list looks like the figure below:



Unit->Angle

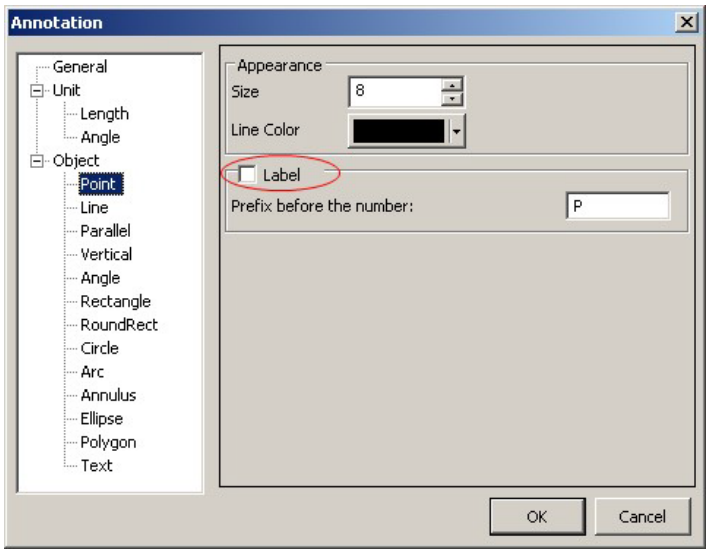
On the **Angle** tab, one can select **Radian**, **Degree**, or **PI** as the angle unit.



Point

Appearance describes the point **Size** and point **Color**. The **Size** is between 2 and 16. Click the **Color** button's drop down arrow can select the point **Color**.

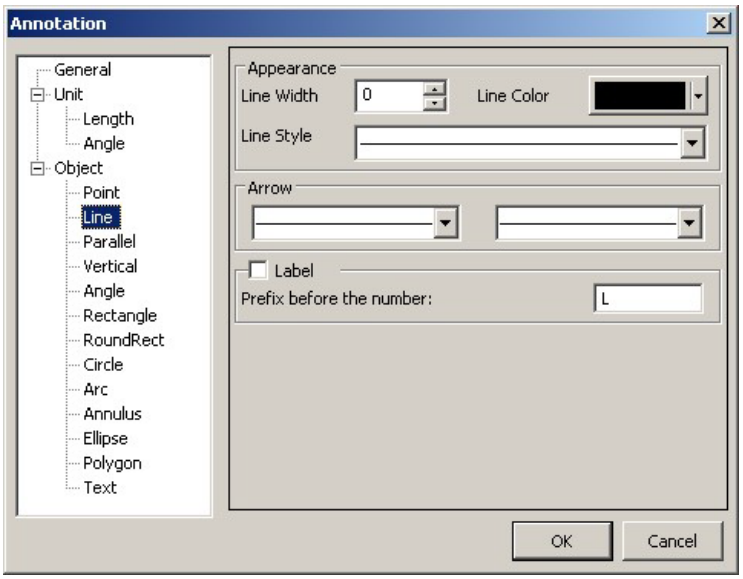
The **Label** is for all the layer's **Points**. Check it here or on the **Layer->Property•••** dialog, the **Label** will be displayed near the **Point** for reference. Uncheck it, the **Label** will never be displayed on any layer, even if the **Label** button on the **Layer->Property•••** dialog is checked.



Line

The **Line** tab can set the **Line Width**, **Line Color**, **Line Style**, **Arrow** shape, and determine whether the objects are being labeled or not.

The **Label** is for all of the layer's **Lines**. Check it or checks it on the **Layer->Property•••** dialog, the **Label** will be displayed near the **Line** for reference. Uncheck this button, the **Label** will never be displayed on any layer, even if the **Label** button on the **Layer->Property•••** dialog is checked.

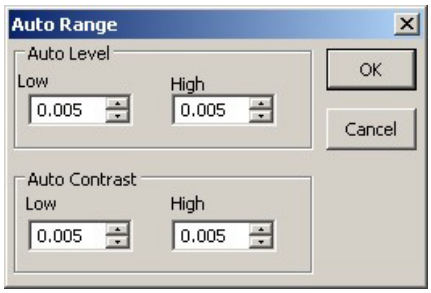


Other objects

The **Other items'** setups are just like the **Line** object setup, (for simplicity, they will not be discussed further). One can learn how to set the other objects from ToupView in this menu.

1.10.3 Auto Correction•••

Set the low and high ranges for **Auto Level** and **Auto Contrast**. The default value is **0.5%** for both, but ToupView suggests this value be smaller than **1%**.



See **Image->Adjust->Auto Level** and **Image->Adjust->Auto Contrast** for details.

1.11 Window

1.11.1 Cascade

The windows menu commands controls the display of images in ToupView. One can arrange the display of multiple images in ToupView's workspace.

Choose **Cascade** command to arrange the open image windows so that they are layered and roughly equal in size, leaving only their title bar and left border visible. The **Cascade** command rearranges only the opened images, **Live Capture** window, and **Browser** windows.

1.11.2 Tile

The window menu commands control how the images are displayed in ToupView. One can arrange the display of multiple images in the ToupView workspace.

Choose **Tile** command to arrange the open image windows so that all windows are visible and roughly equally sized across the screen. **Tile** images rearranges only the opened image, **Live Capture** video, and **Browser** windows.

1.11.3 Arrange Icons

The window menu commands control how the images are displayed in ToupView. One can arrange the display of multiple images in the ToupView workspace.

If one has some image windows as icons, this command will arrange them into a row at the bottom left corner of the ToupView workspace.

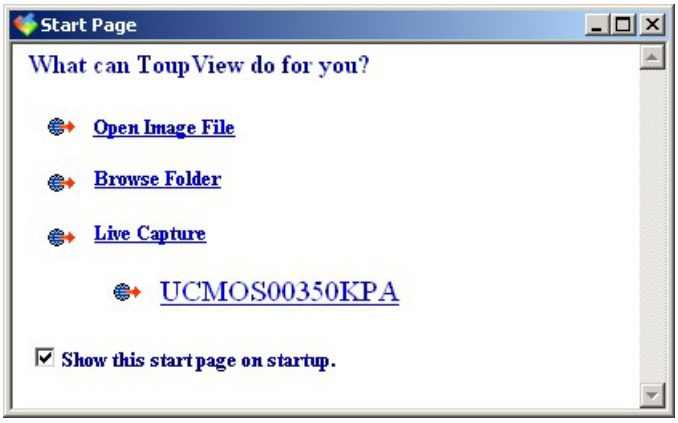
1.12 Help

1.12.1 Help Contents F1

Choose this menu to load ToupView help files

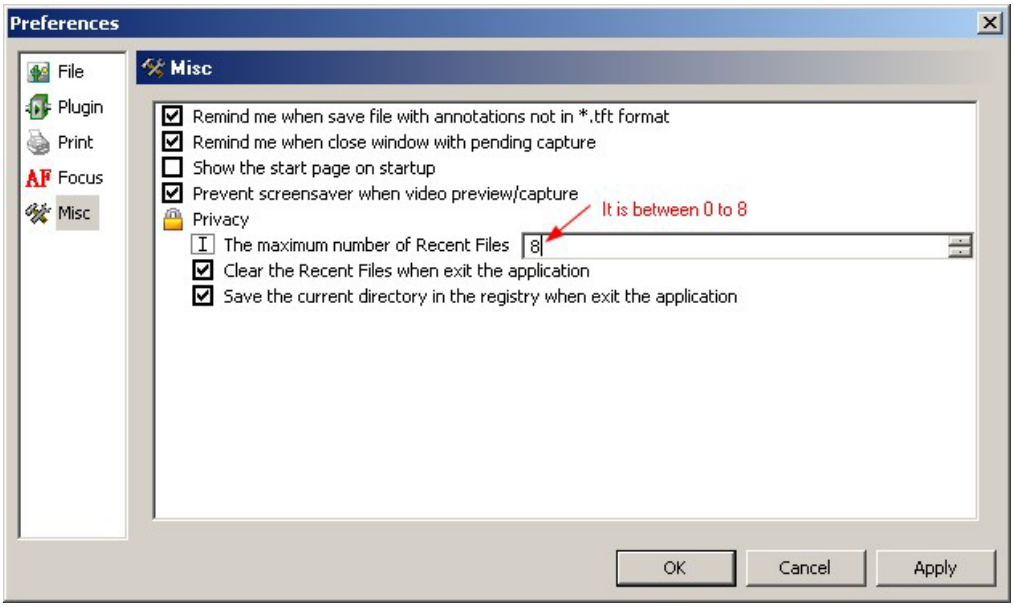
1.12.2 Show Start Page

Choose this menu to display ToupView **Start Page** as shown below. Here one can directly click on an item to perform operations such as **Open Image File**, **Browser Folder** for to preview images, and open the device to start the **Live Capture** window. Check **Show this start page on startup** to open this window when ToupView starts.



One can also check **Show the start page on startup** to make the ToupView show the start page the next time when ToupView is opened. The 2 check buttons (one on the **Start Page**, the other on the **Options->Preferences••• Misc** tab), are connected.

Check either of them will check both of them next time.



1.12.3 Check to Update

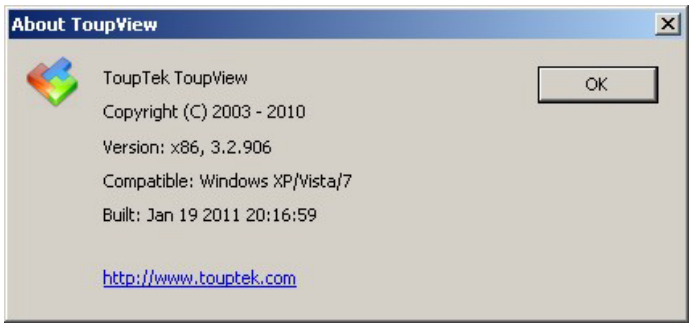
This will invoke the **Internet Explore** and connect to the ToupView update page.

1.12.4 About•••

Display the related information about ToupView, including **Version**, **Compatible**, **Built** date and its link etc.

Clicking on WWW will direct one to the www address of the supplier of the cameras. In this application, it is http://www.touptek.com. If one has any

problem with the camera, please feel free to contact us at toupteksales@gmail.com.



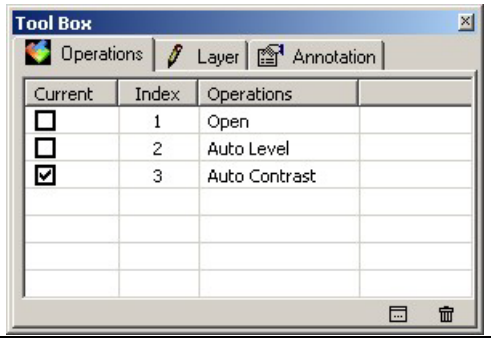
1.13 Tool Box

1.13.1 Tool Box Operations Page

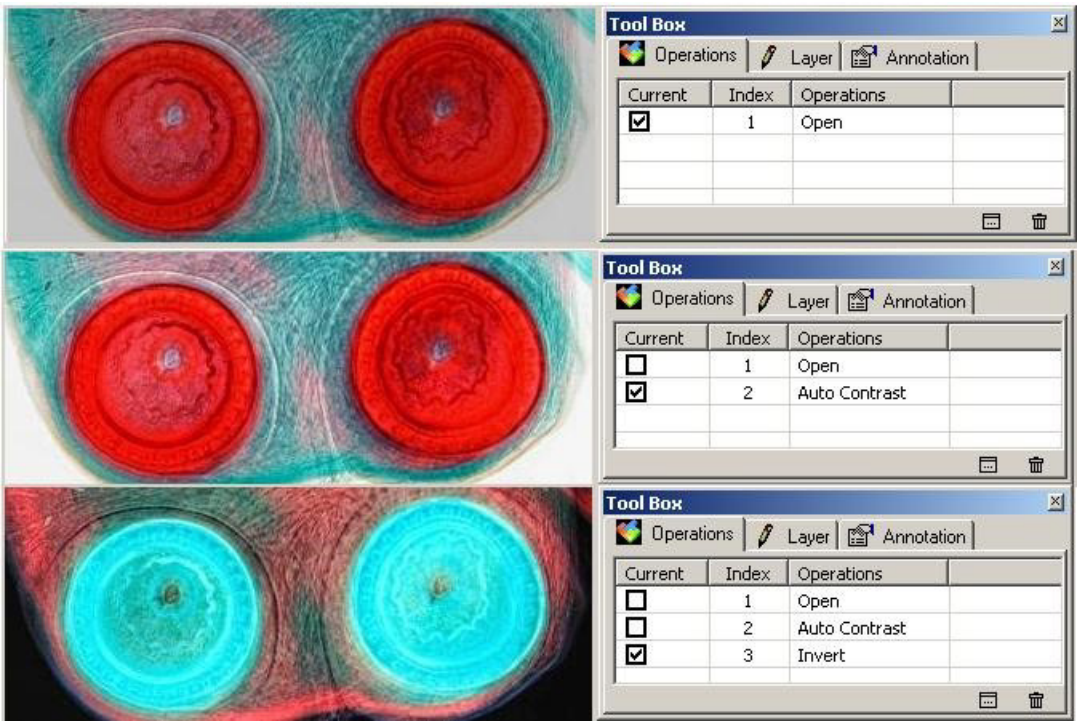
The **Tool Box Operations Page** is integrated with the **Tool Box Layer Page** and the **Tool Box Annotation Page**.

Command: choose **View->Tool Box**. Click the **Operations** page. If it is not active, click **Operations** to activate it.

There are three items on the **Tool Box Operations Page**, they are



Current	The checked is the **Current** operating step
Index	The index of the steps.
Operations	The operation name of each step.



Tool Box Operations Page has the following functions:

1. Save the **Image** and **Process** menu operations in stacks.

For example, if one open an image and perform the following operations: a) **Open Image•••**

b) **Image->Adjust->Auto Contrast**

c) **Image->Invert**

The three steps operations will be listed on the operations' list view as the above figure.

2. **Backward** will go back to the previous step. Choose **Edit->Backward** will restore the image to the previous step. The **Current** check box can also move backward to the previous step, but the final step is still there.

3. **Forward** will go to the next step. Choose **Edit->Forward** will change the image to the next step. The **Current** check box can also move to the next step, but the 2nd step is still there.

4. **Select Current**: Use the mouse button to check the checkbox in the **Current** item.

5. **Extract Button**  : **Extract** any of the images in the **Tool Box Operations Page**'s list view as a new image in a new window (Use the mouse button to highlight any single step and click the  button).

6. **Delete Button**  : Click the mouse button on the row item will highlight any single step. Press down **Ctrl+Left mouse** button will highlight the clicked rows or **SHIFT+Left mouse** button will highlight the continuous rows between the two clicked rows. Click the  button will delete the hightlighted items from the **Tool Box Operations Page**.

7. Choose **Edit->Undo** will undo the last step.

1.13.2 Tool Box Layer Page

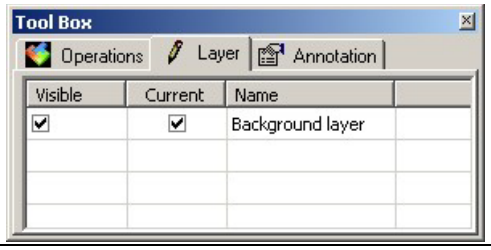
The **Tool Box Layer Page** is integrated with the **Tool Box Operations Page** and the **Tool Box Annotation Page**.

Command: Choose **View->Tool Box** to display the **Tool Box Layer Page**. If it is not active, click **Layer** to activate it.

Use this command to manage layers above the **Background layer** (image layer).

There are three items in the **Tool Box Layer Page**: **Visible**, **Current**, and **Name**

When an image is opened, a default layer called **Background layer** is displayed in the list view's first row with **Visible** and **Current** checked. The **Background layer** cannot be edited. It just tells one that this layer is the basic layer for the following **Annotation** operations.

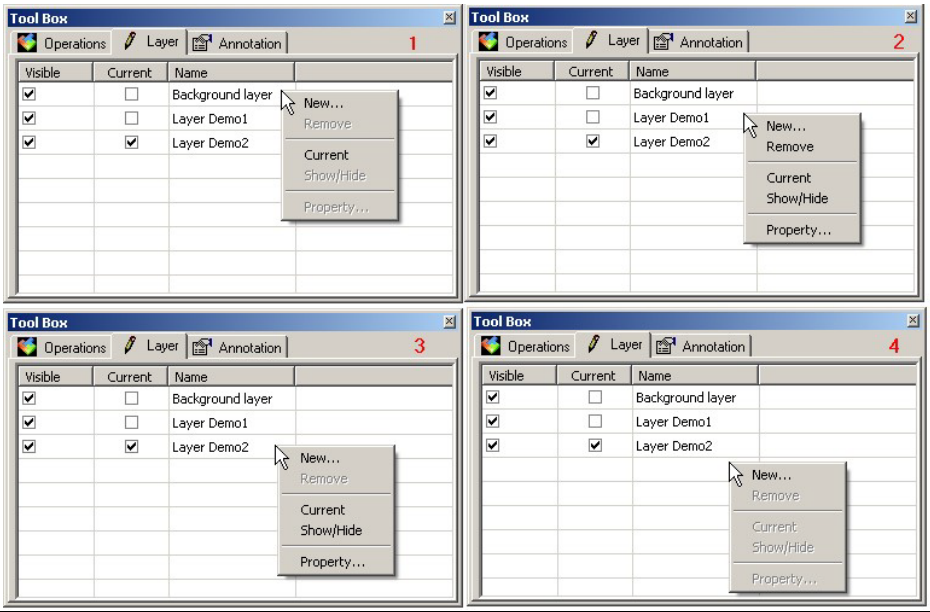


Visible	Check this checkbox to **Show/Hide•••** the specified layer. Note: when the **Current** is checked, the **Visible** checkbox cannot be unchecked, meaning the **Current** layer must be **Visible**.

Current	Check this checkbox to make the **Current** layer active. When the **Current** is checked, the **Visible** checkbox will be checked automatically.
Name	Display the layer name, the name cannot be edited. It is specified in the **Layer->New•••** dialog's edit box.

The basic operations of the **Tool Box Layer Page** are shown as follows:

If there is an extra layer above the **Background layer**, when click the right mouse button on the **Tool Box Layer Page**, a context menu will pop-up. Different positions will have different enabled menu items. This enables one to find their meanings with ease.



New	Create a **New** layer. When creating a **New** layer, one should input a layer name and set the layer **Property** (The default one is provided). For simplicity, blank name is accepted.
Remove	**Remove** the selected layer (not the **Current** one, if the check box is checked on the **Current** row, **Background layer** or **blank** area, this item will be disabled).
Current	Check the selected row as the active one. When the mouse button is on the **blank** area, this item will be disabled.

Show/Hide	**Show /Hide** the layer which is not active (not the **Current** layer). When the mouse button is on the **Background layer** or **blank** area, this item will be disabled.
Property•••	Set this layer object's property such as **Label**, **Size** and **Color**. When the mouse button is on the **Background layer** or **blank** area, this item will be disabled.

1.13.3 Tool Box Annotation Page

The **Tool Box Annotation Page** is integrated with the **Tool Box Operations Page** and the **Tool Box Layer Page**.

Command: Choose **View->Tool Box** (shortcut **Ctrl+T**), if it is not active, click the **Annotation** tab to activate it.

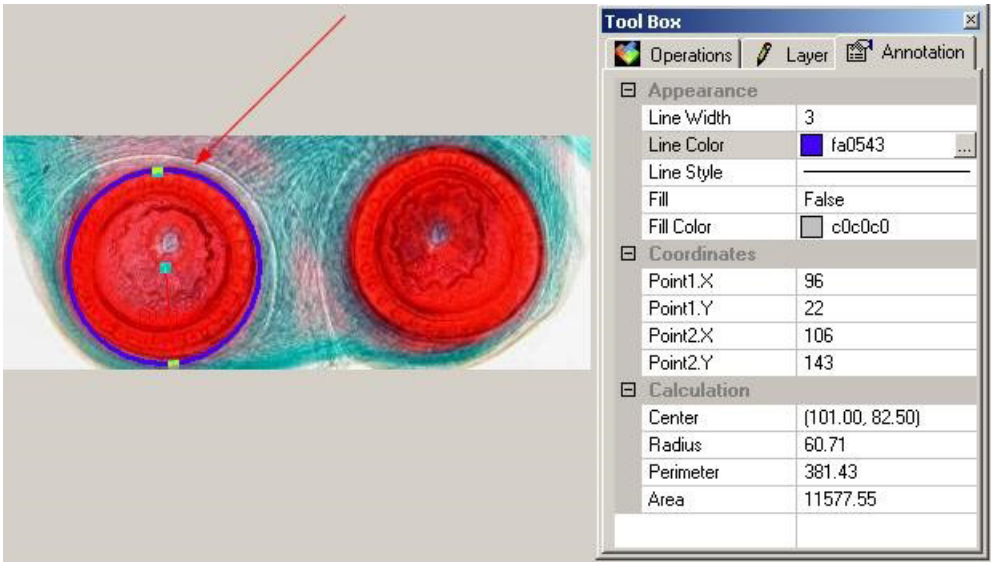
The **Tool Box Annotation Page** is used to display and modify the **Layer** object's **Appearance**, **Coordinates**, and **Calculation**. An object should be selected first to activate the corresponding items.

Note: One can only check a single object at a time.

Appearance	Used to display and modify the layer object's style, including **Line Width**, **Line Color**, and **Line Style**. It will also display **Arrow1** and **Arrow2** for a **Line** object. By clicking the mouse button, one can select or change the object's **Appearance**.
Coordinates	Display and modify the selected object's **Coordinates**. When the object is a complex object, the **Coordinates** can be displayed according to the drawing order. The main complex objects are **Angle**, **Parallel Line**, **Vertical Line**, and **Circles** with the same **Center**.
Calculation	**Calculation** will give the object's geometric dimensions. For example, a **Line** object will have the following information: **Start** and **End** point coordinates, **Length**, **Slope**, and **Angle**.

An annotation example is given below:

1. Choose **Open Image** to open an image.
2. Choose **Layer->New•••** to make a new layer.
3. Choose **Annotation->Circle->Two Points** and draw a **Circle** on the image. **Select** the **Annotation** object. Open the **Tool Box Annotation Page**, **View->Tool Box** (shortcut **Ctrl+T**). The **Tool Box Annotation Page** should look like this:



One can change or modify any items with ease here.

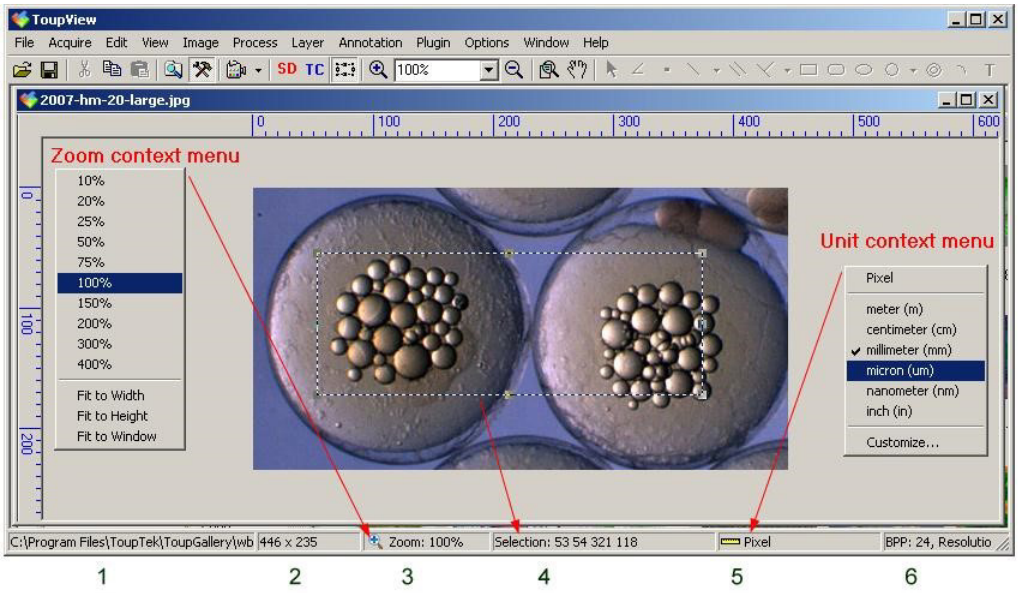
1.14 Annotation Toolbar

Please check the **Annotation** menu for more details.

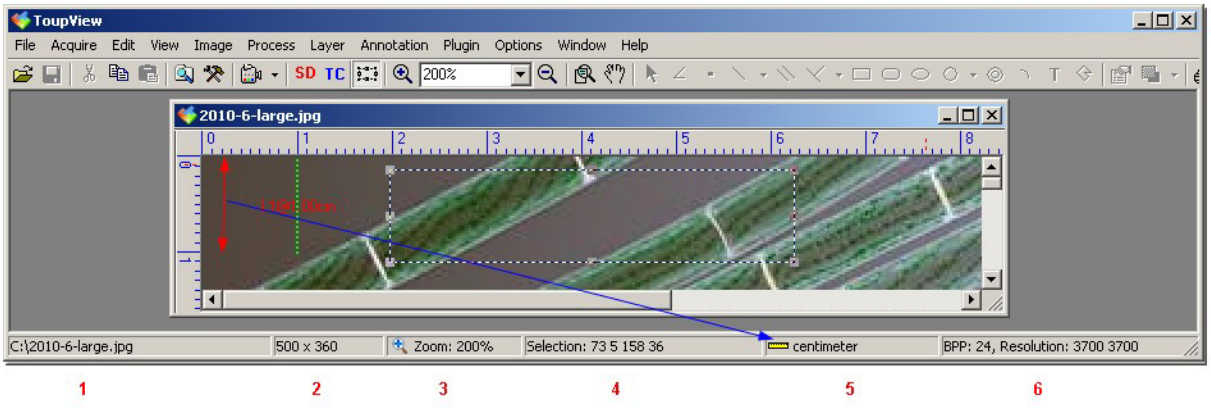
1. **Image Select:** See **Process Frame: Annotation->Image Select.**
2. **Zoom In(Ctrl++):** Click this button to **Zoom In** the image.
3. **Zoom:** See **Process Frame: Annotation->Zoom.**
4. **Zoom Out(Ctrl+-):** Click this button to **Zoom Out** the image.
5. **Zoom Tool:** See **Process Frame: View->Zoom Tool.**
6. **Track:** See **Process Frame: View->->Track.**
7. **Object Select:** See **Process Frame: Annotation->Object Select.**
8. **Angle:** See **Process Frame: Annotation->Angle.**
9. **Point:** See **Process Frame: Annotation->Point.**
10. **Line:** See **Process Frame: Annotation->Line.**
11. **Parallel:** See **Process Frame: Annotation->Parallel.**
12. **Vertical:** See **Process Frame: Annotation->Vertical.**
13. **Rectangle:** See **Process Frame: Annotation->Rectangle.**
14. **RoundRect:** See **Process Frame: Annotation->RoundRect.**
15. **Ellipse:** See **Process Frame: Annotation->Ellipse.**
16. **Circle:** See **Process Frame: Annotation->Circle.**
17. **Annulus:** See **Process Frame: Annotation->Annulus.**
18. **Arc:** See **Process Frame: Annotation->Arc.**
19. **Text:** See **Process Frame: Annotation->Text.**
20. **Polygon:** See **Process Frame: Annotation->Polygon.**
21. **Property:** See **Process Frame: Annotation->Property•••**
22. **Z Order:** See **Process Frame: Annotation->Z Order.**
23. **Print:** See **Process Frame: File->Print•••.**

1.15 Process Frame Statusbar

The **Process Frame Statusbar** is shown below. It has 6 items and they are:



1. File name and its directory.
2. Image width and height of the opened image.
3. Current **Zoom** ratio. Clicking on the icon with the right mouse button will cause a **Zoom** Context Menu to pop-up. Here, the **Zoom** ratio can be selected with ease.
4. The selected area on the image, which includes the start point in the upper left corner and the area width and height.
5. The current horizontal or vertical ruler's length between two numbers in the image window. See the annotation in the figure below.



Double click this icon will invoke a **Process Frame: Options->Annotation••• ->Length** tab and one can check the **Unit** or define the new **Unit.**

Click the **Unit** with the right mouse button will pop-up the **Unit** context menu. Here, the different **Unit** can be selected with ease. One can also **Customize** the
Unit by choose **Customize•••**menu, this will be the same as double clicks operation.

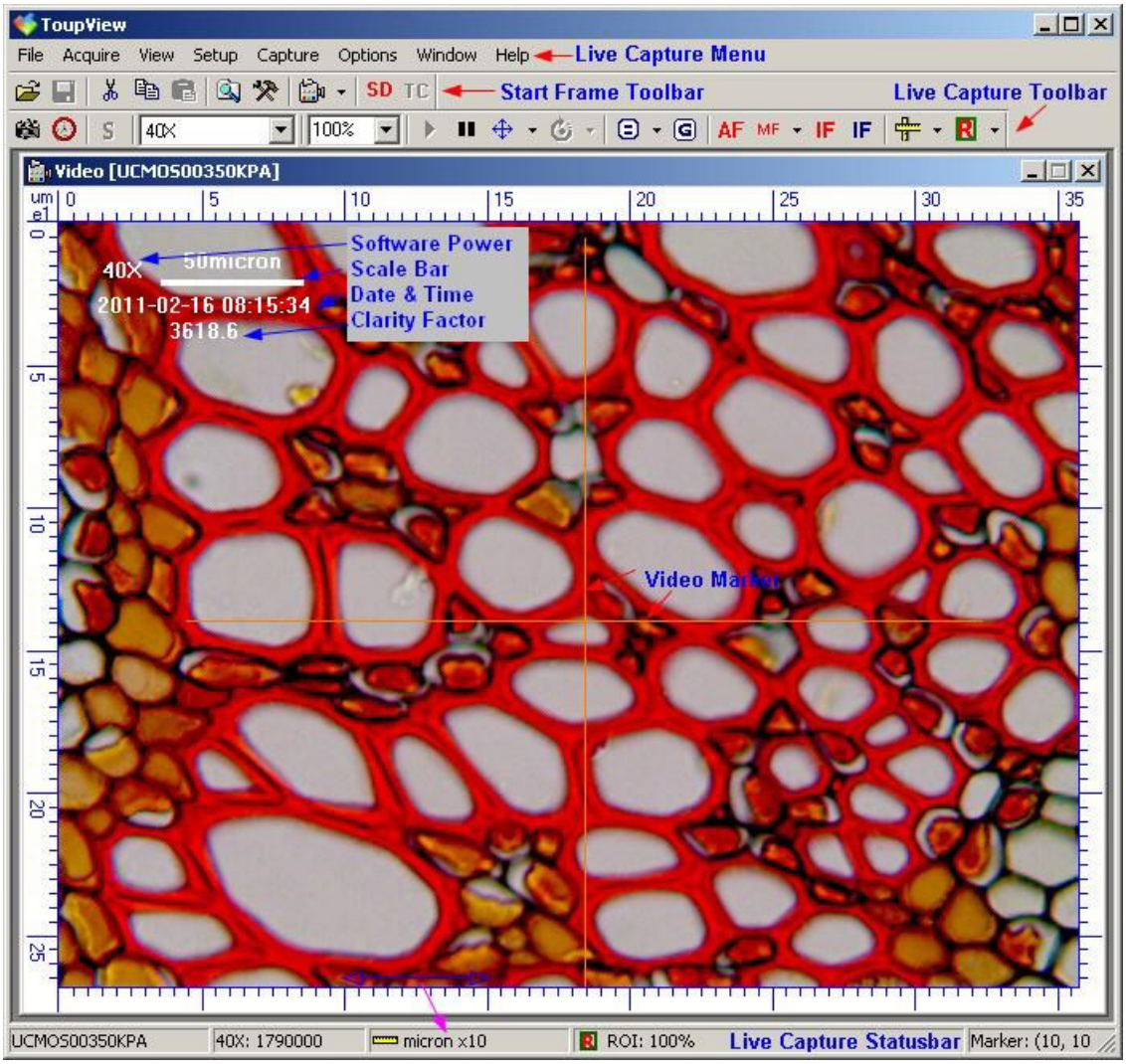
6. Current image's **Color Bits** and **Resolution** in the width and height directions.

2 Live Capture Frame

2.1 Live Capture Frame Introduction

The **Live Capture Frame** is specially designed for camera video. It includes:

1. **Live Capture menu**
2. **Start Frame Toolbar:** See **Start Frame: Start Frame Toolbar**
3. **Live Capture Toolbar:** See **Live Capture Frame: Live Capture Toolbar**
4. **Live Capture Window:** See **Live Capture Frame: Acquire** menu
5. **Live Capture Statusbar:** See **Live Capture Frame: Live Capture Statusbar** These features are shown in the figure below:


ToupView
File Acquire View Setup Capture Options Window Help
Live Capture Menu
SD TC
Start Frame Toolbar
Live Capture Toolbar
40X
100%
AF MF IF IF
Video [UCMOS00350KPA]
40X
50micron
2011-02-16 08:15:34
3618.6
Software Power
Scale Bar
Date & Time
Clarity Factor
Video Marker
UCMOS00350KPA
40X: 1790000
micron x10
ROI: 100%
Live Capture Statusbar
Marker: (10, 10

2.2 File

2.2.1Open Image••• Ctrl+O

See **Process Frame: File->Open Image•••.**

2.2.2 Open Video•••

See **Process Frame: File->Open Video•••.**

2.2.3 Paste as New File•••

See **Process Frame: File->Paste as New File•••.**

2.2.4 Print Setup•••

See **Process Frame: File->Print Setup•••.**

2.2.5 Recent File

See **Process Frame: File->Recent File.**

2.2.6 Exit

See **Process Frame: File->Exit.**

2.3 Acquire

2.3.1Live Capture

See **Process Frame: Acquire->Live Capture.**

2.3.2 Software Power

See **Process Frame: Acquire->Software Power.**

2.3.3 Manage Software Power••• Ctrl+M

See **Process Frame: Acquire->Manage Software Power•••.**

2.3.4 Video Marker•••

See **Process Frame: Acquire->Video Marker•••.**

2.3.5 Video Overlay Text••• Ctrl+D

See **Process Frame: Acquire->Video Overlay Text•••.**

2.3.6 Video Watermark••• Ctrl+W

See **Process Frame: Acquire->Video Watermark•••.**

2.3.7 Auto Maximum Size••• Ctrl+U

See **Process Frame: Acquire->Auto Maximum Size•••.**

2.3.8 Capture with Marker and Watermark Ctrl+F

See **Process Frame: Acquire->Capture with Marker and Watermark.**

2.3.9 Twain:Select Device•••

See **Process Frame: Acquire->Twain:Select Device•••.**

2.3.10 Twain:Acquire•••

See **Process Frame: Acquire->Twain:Acquire•••.**

2.4 View

2.4.1Browser Ctrl+B

See **Process Frame: View->Browser.**

2.4.2 Tool Box Ctrl+T

See **Process Frame: View->Tool Box.**

2.4.3 Annotation Manager

See **Process Frame: View->Annotation Manager.**

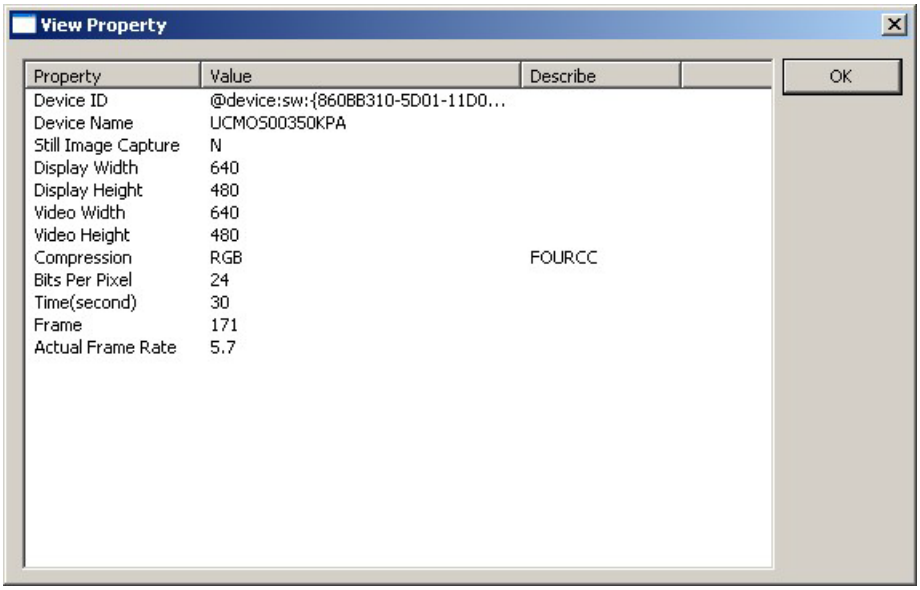
2.5 Setup

2.5.1Full Screen Esc

Choose the **Full Screen** to display the **Live Capture** window in full screen style. Press **ESC** to enter **Full Screen** mode. Press **ESC** again will return to the default **Live Capture** window.

2.5.2 View Property•••

View Property will help to understand the camera statistical properties. Choose **Setup->View Property•••** to invoke the **View Property** dialog:



The items in the dialog are described in the following table:

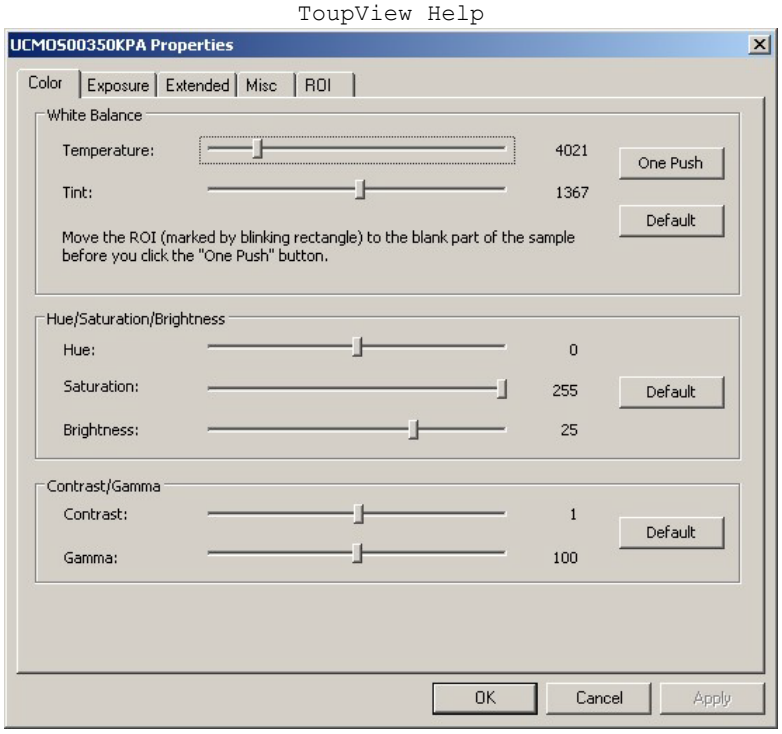
Item	Description
Device ID	Unique ID to identify the camera device.
Device Name	Human readable string to identify the model of the camera device.

Still Image Capture	Whether or not the camera supports **Still Image Capture**. **Still Image Capture** is used for high resolution camera to capture an image with a different resolution from the video. This feature is mainly used to capture high resolution image under low resolution video to compromise the frame speed and the image resolution.
Display Width	The **Live Capture** window width.
Display Height	The **Live Capture** window height.
Video Width	The actual **Live Capture** window video width.
Video Height	The actual **Live Capture** window video height.
Compression	The compression format of the video stream.
Bits Per Pixel	Indicate how many bits are used to store on pixel.
Time (second)	Seconds elapsed since the **Live Capture** has been started.
Frame	Frames acquired since the **Live Capture** has been started.
Actual Frame Rate	**Actual frame Rate** of the **Live Capture** stream.

Note: The **Actual Frame Rate** is listed for reference. It varies depending on the computer's configuration. Different hardware configurations may have different **Actual Frame Rates**.

2.5.3 Video Source Property•••

Choose **Setup->Video Source Property•••** to invoke the **Video Source Property** dialog:

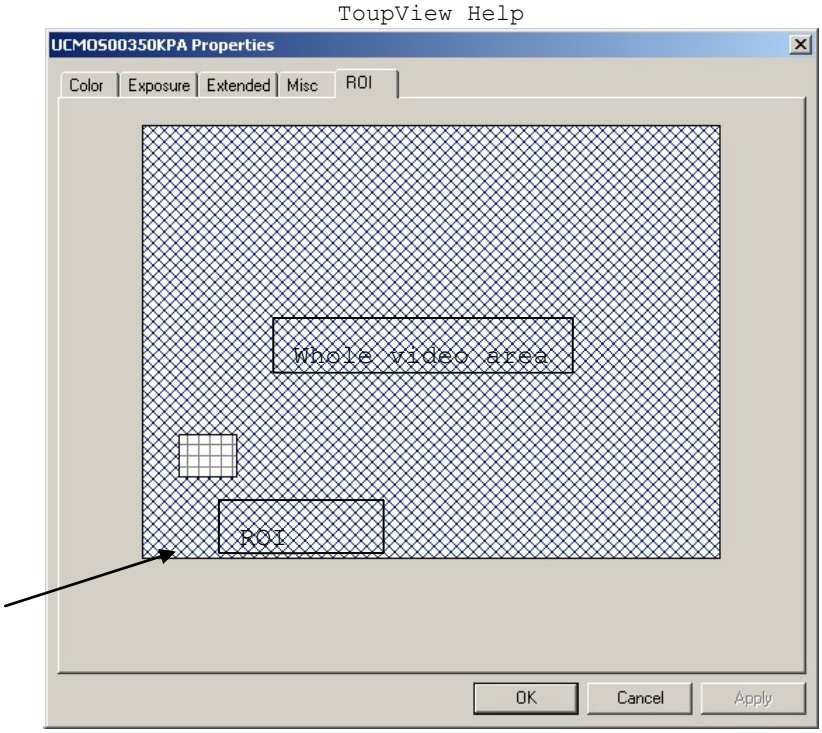


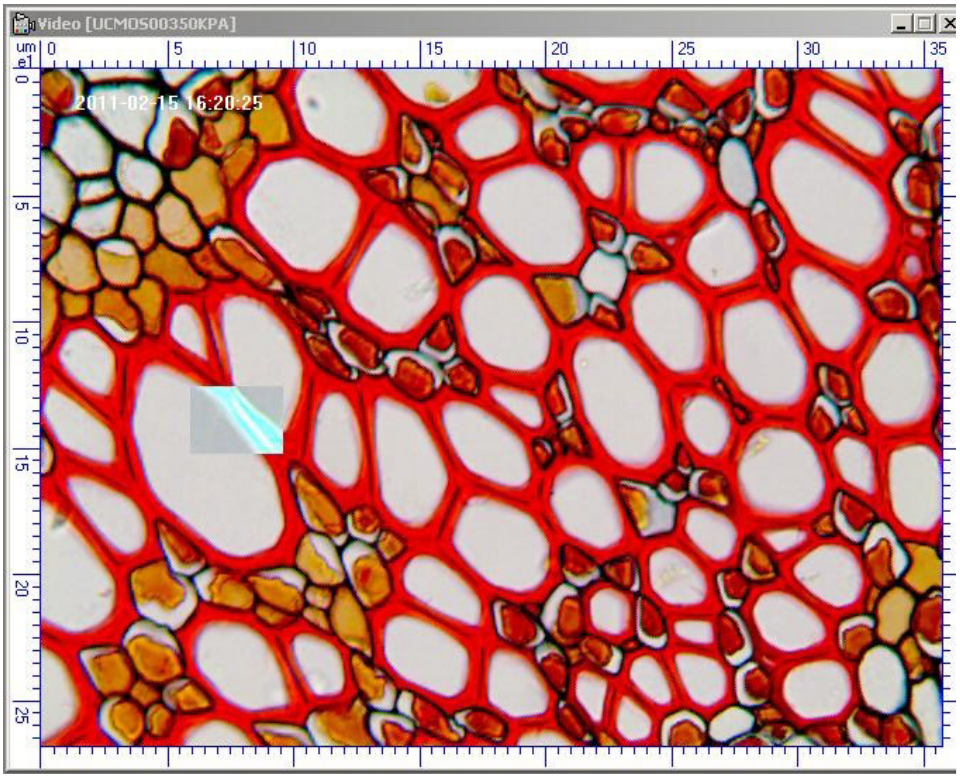
The **Video Source Property** includes several categories: **Color**, **Exposure**, **Extended**, **Misc** and **ROI**.

2.5.3.1 ROI:

White Balance and **Auto Exposure** are performed within the ROI, which require a correctly defined region of interest (**ROI**), so **ROI** is described first.

The region with the slanted grid background represents the whole video region. The region with the normal grid background represents the **ROI**. The **ROI** can be manipulated according to its relative position with the mouse.





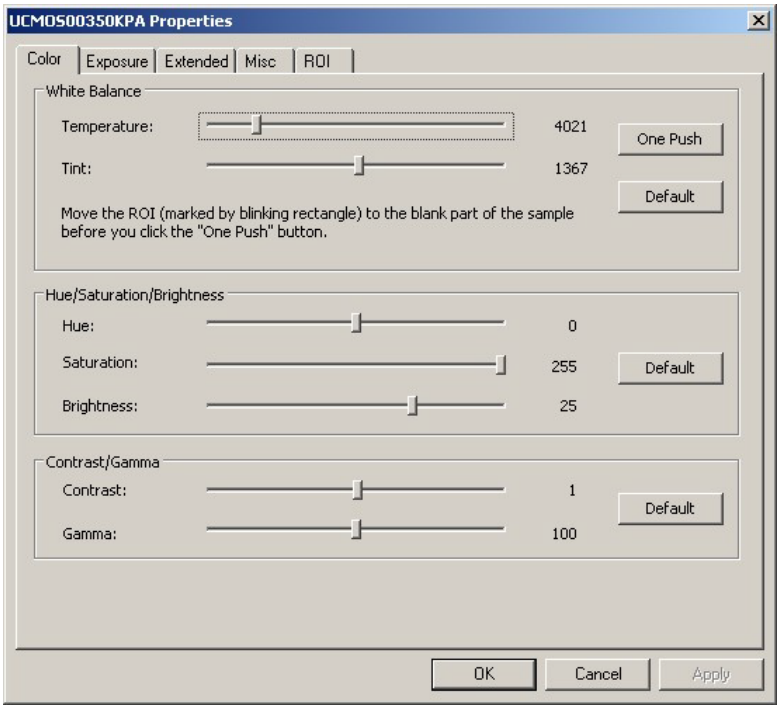
Mouse Cursor	Operation
↕	Mouse cursor becomes this when the mouse is near the up or down edge of the **ROI**. Click the mouse and drag, the **ROI** can be extended or reduced along the vertical direction.
↔	Mouse cursor becomes this when the mouse is near the left or right edge of the **ROI**. Click the mouse and drag, the **ROI** can be extended

	or reduced along the horizontal direction.
+	Mouse cursor becomes this when the mouse is in the whole video region but not in or near the **ROI**. Click the mouse and drag, a new **ROI** will appear.

When the **Video Source Property** dialog is opened, a region will blink on the video window if the **ROI** is correctly defined. The blinking region is used to help one to adjust the **ROI**.

2.5.3.2 Color

Although all ToupTek digital cameras are colorimetrically characterized to produce the most pleasing video and image, some environmental and personal preference related tunings are left for the customer to obtain the most natural scenario and make full use of the system capability. On the **Color** property page, there are 3 groups of parameters to adjust: **White Balance**, **Hue/Saturation/Brightness** and **Contrast/Gamma**. These parameters mainly control the color representation of the acquired video and captured image.



White Balance:

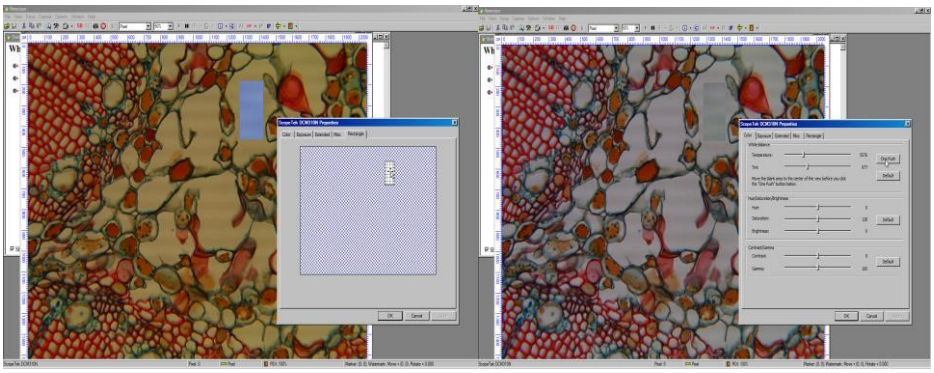
Human eyes have the ability of color constancy, so white objects under illuminations with different color temperatures also appear white when observed with human eye. Digital cameras don't have this ability. They only loyally record the optical information of the incident light. This circumstance leads to the mismatch of the observation between human eyes and digital cameras. White balance is used to solve this problem. ToupView offers two ways to adjust the white balance: manual and automatic.

To adjust the white balance manually, drag the **Temperature** and **Tint** sliders until a satisfactory result is obtained. There are two tips to perform manual white balance:

1. Drag the **Temperature** slider to the left side will make the video appear blue while drag the **Temperature** slider to the right side will make the video appear red;

2. Drag the **Tint** slider to the left side will make the video appear magenta while drag the **Tint** slider to the right side will make the video appear green.

To adjust the white balance automatically, one should define the **ROI** first. Switch to the **ROI** page and drag the **ROI** rectangle to a white region of the object and switch back to **Color** page. Click the **One Push** button in the **White Balance** group. **ToupView** will analyze the image in the **ROI** and adjust the **Temperature** and **Tint** automatically. If one wants to view the original representation of the object, click **Default** button in the **White Balance** group. The effect of the automatic white balance is shown below:



Hue/Saturation/Brightness:

Hue/Saturation/Brightness tuning is performed in the HSB color space.

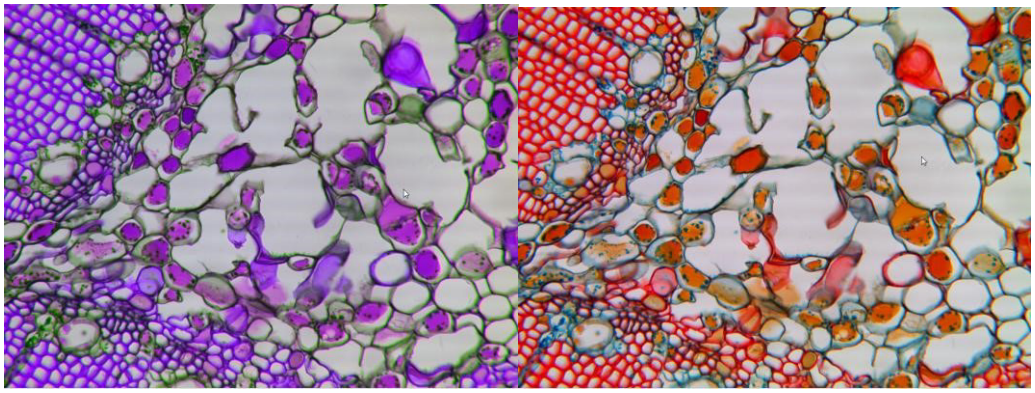
Change the hue will change the color map between the real color of the image and the displayed color. The following picture will illustrate this:

The upper color bar represents the real color and the lower color bar represents the displayed color. Before performing hue tuning, the map between is shown above.
After hue tuning, the map is shown below:

Apparently the map is changed. An image applied hue tuning and its original version are listed below:

Colorimetric characterization only makes the image look as close to the real scenario as possible. To obtain a more pleasing image, saturation can be

tuned. Drag the **Saturation** slider to the left will make the image look less vivid while to the right more vivid. **ToupTek** color scientists already assigned a default value for this before shipping; however, one can change this value arbitrarily.



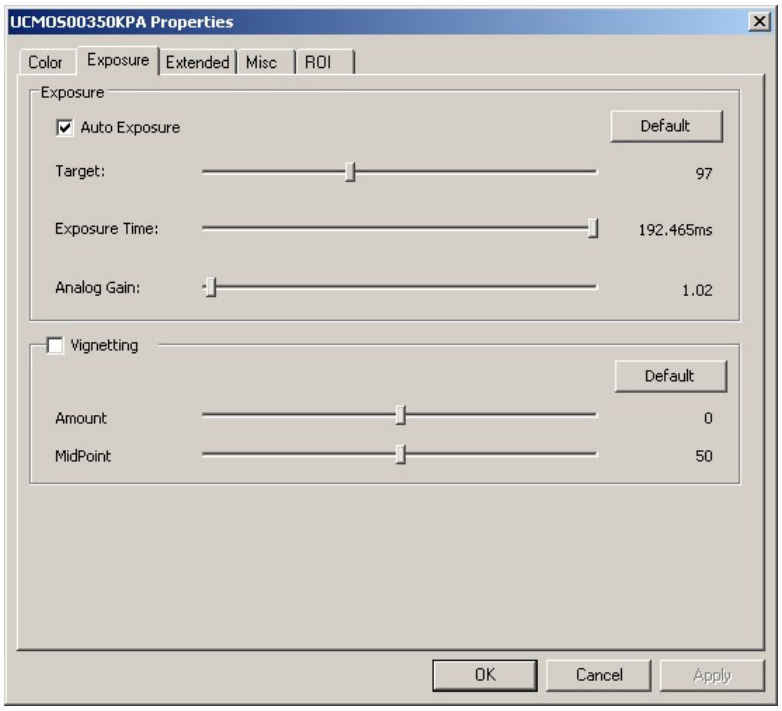
Brightness tuning is not recommended for two reasons: this operation will introduce digitization error and the tuning effect can be accomplished via exposure tuning. Instead, **Exposure Time** and **Analog Gain** are recommended. However, one can still change it.

Contrast/Gamma:

Some old or uncalibrated CRTs and LCDs need this tuning to compensate the disabilities of the computer monitor. One can change them according to the monitor.

Tips: 1. Drag the **Contrast** slider to the left side will decrease the contrast and vice versa; 2. Drag the **Gamma** slider to the left will make the image look brighter and vice versa.

2.5.3.3 Exposure



On the **Exposure** property page, there are two groups of parameters to adjust: **Exposure** and **Vignetting**. The parameters in the **Exposure** group are used to control the hardware of the digital camera to obtain the properly exposured video and image, while the parameters in the **Vignetting** group are used to compensate the different exposures caused by the vignet of the camera lens.

Exposure:

Two parameters can be adjusted for **Exposure** tuning: **Exposure Time** and **Analog Gain**. **Exposure Time** is the time slice during which the sensor collects the incident light. The longer the **Exposure Time**, the brighter the video and image appears. **Analog Gain** is the factor used to multiply the image signal in the analog domain of the camera hardware, which will introduce less noise than digital gain. **ToupView** offers two ways to tune the exposure: automatic and manual.

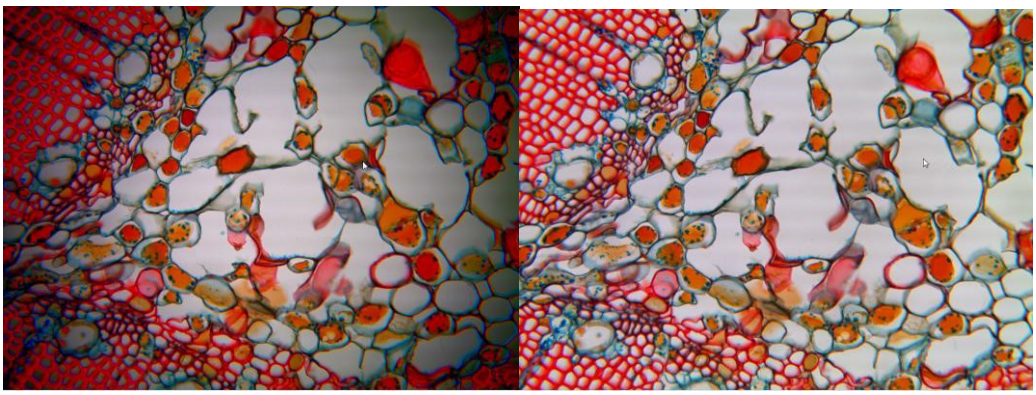
To adjust the exposure automatically, check the **Auto Exposure** check box and drag the **Target** slider to the desired intensity value. **Exposure Time** and **Analog Gain** are adjusted automatically according to the image contents in the **ROI** until the average intensity of the **ROI** reaches the **Target** value. When the **Auto Exposure** check box is checked, one can move the **ROI** to any region of the image to make that region expose correctly.

To adjust the exposure manually, uncheck the **Auto Exposure** check box. Drag the **Exposure Time** or the **Analog Gain** slider to the left side if the video appears too bright and vice versa.

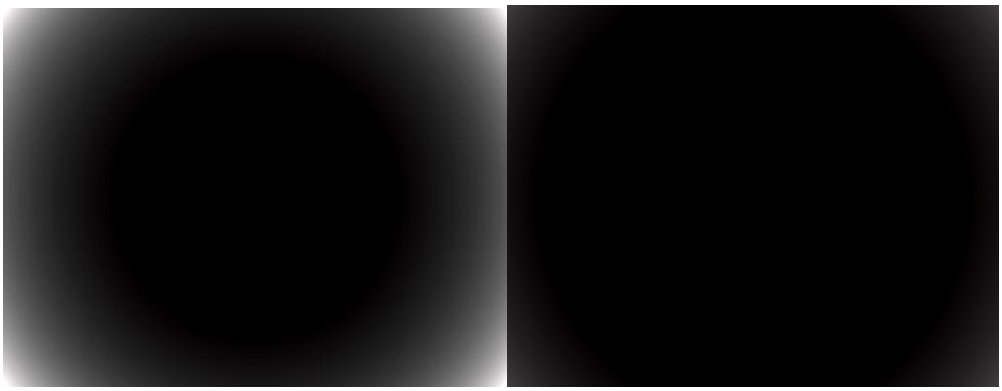
Tip: Whenever possible, keep the **Analog Gain** as low as possible. Higher **Analog Gain** will introduce more noise.

Vignetting:

Image **Vignetting** is a phenomenon observed in photography which introduces some photon energy loss on the periphery of a video or captured image. This is translated into a lower color intensity of the pixels of the area where the phenomenon appears. Typical vignetted image and its **Vignetting** corrected version are shown below:



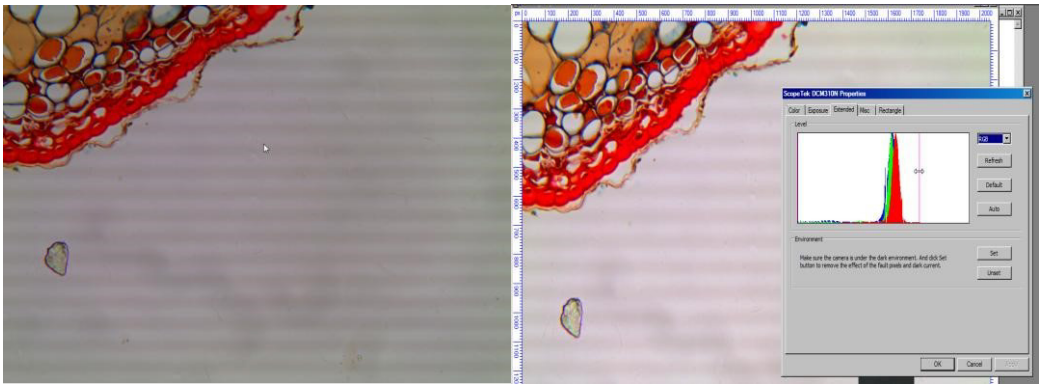
The **Amount** parameter represent the compensation amount, a negative value means brighter corner (than the center area) will be compensated as bright as the center area while a positive value means darker corner (than the center area) will be compensated as bright as the center area. The **MidPoint** parameter is used to control the compensation radius. A smaller value means larger corner areas outside of this radius are compensated while a larger value means smaller corner areas outside of this radius are compensated. In the following images, the **Amount** of left image is 100, the **MidPoint** is 0; the **Amount** of right image is 100, the **MidPoint** is 100:



2.5.3.4 Extended

Level stretching function is provided for red, green, blue, gray and RGB channels separately in the **Extended** property page. Experienced photographer can easily obtain the pleasing effect according to the histogram. The operation is easy, dragging the vertical magenta line across the histogram and dropping it at the desired location. The level between the two vertical lines will be stretched. **Note**: No matter which channel is selected, auto level stretching will analyze the RGB channel of the histogram and calculate

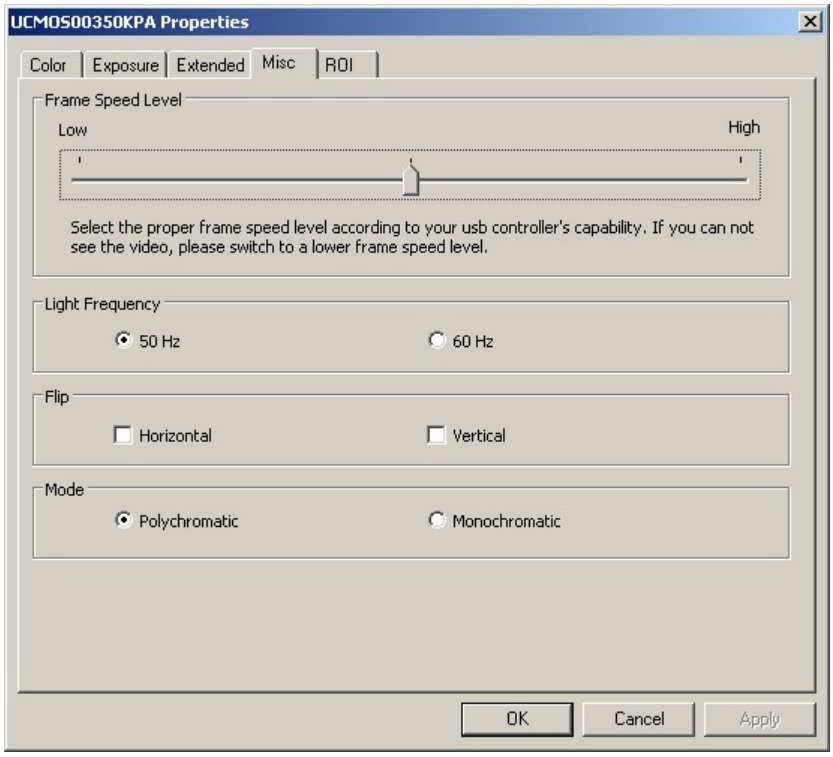
the desired level. One point should be kept in mind: Click the **Refresh** button each time the sample is moved, changed the objective or did some parameters tuning. Images before and after level stretching are shown below:



2.5.3.5 Misc

On the **Misc** property page, there are four groups of parameters can be adjusted: **Frame Speed Level**, **Light Frequency**, **Flip** and **Mode**.

Frame Speed Level is used to adjust the frame speed of the video. The higher the **Frame Speed Level**, the higher the frame speed and vice versa. ToupView will automatically detect the proper **Frame Speed Level** the first time the digital camera runs on the computer. However, if one changes the **Frame Speed Level** manually, **ToupView** assumes the best **Frame Speed Level** for the computer is selected and will **NEVER** detect the proper **Frame Speed Level** automatically.



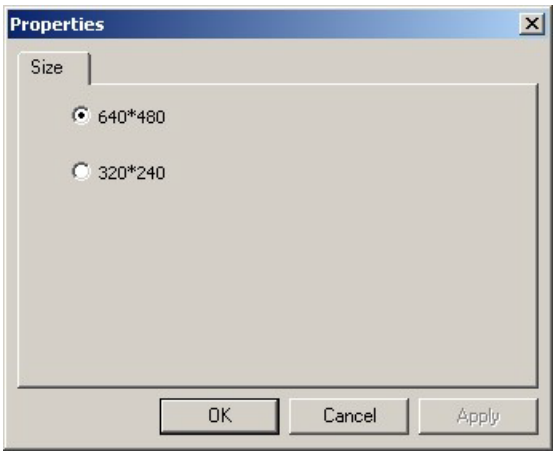
If the illumination light uses alternative current power supply, horizontal stripes may appear on the video for **CMOS** sensor digital cameras, because **CMOS**

sensor uses electronic rolling shutter. **Light Frequency** parameter is used to prevent this phenomenon.

Flip can easily mirror the video either vertically or horizontally. **Mode** can switch the video between **Polychromatic** and **Monochromatic**.

2.5.4 Video Stream Format•••

The ToupView **Video Stream Format•••** configuration dialog is shown below:



One can change the video format mode, frame rate, color space, compression options and so on. Here, we only have the **Video Size** to check. Check the desired one and click **OK**. This will give one the selected **Live Capture Video Size**. Click **Cancel** and the selection will be ignored and the dialog will close. Clicking **Apply** will apply the current selection to the **Live Capture Video** but the dialog will remain opened.

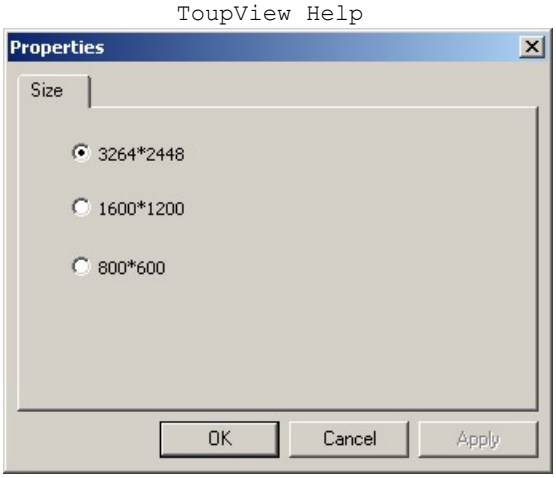
Note: Different devices may have different user interfaces and items. Contact the camera supplier for details.

2.5.5 Still Image Options•••

Some cameras can produce a still image separate from the capture stream. Often the still image is of higher quality or larger size than the images produced by the capture stream (**Live Capture**). The camera may have a button that acts as a hardware trigger, or it may support software triggering. A camera that supports still images will expose a still image pin.

To capture a still image, one should first set the size of the image to capture. The size is determined by the camera hardware. Here we show an example with the **UCMOS08000KPA** camera.

Choose **Setup->Still Image Options•••** will show the following **Properties** dialog:

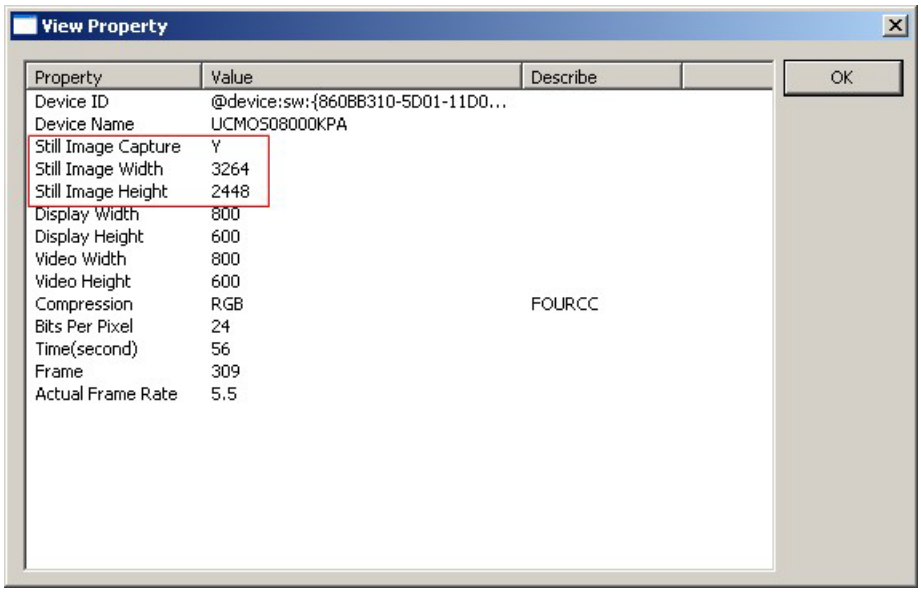


It has **3264*2448, 1600*1200,** and **800*600** resolutions. Check the desired one and press **OK** to accept the selection or **Cancel** to ignore the current selection. Click **Apply** to apply the selection.

One can check if the device supports **Still Image Capture** or not by choose **Setup->View Property•••.**

If the **Still Image Capture**'s **Value** is **Y** in the **View Property** dialog, this means that **UCMOS08000KPA** supports the **Still Image Capture** operation. The **Y** will enable the menu **Setup->Still Image Options•••** and the  button on the **Live Capture Toolbar.** The **N** will disable both of them.

The other items describe the current **Live Capture** window size, the size of the still image that will be captured. The **Live Capture** video size can be set in **Setup->Video Stream Format•••.**



2.6 Capture

2.6.1 Capture a Frame Ctrl+V

Capture a Frame (shortcut: **Ctrl+V** or click ) will capture a frame from the **Live Capture** video stream and open it in a new window.

2.6.2 Capture to Clipboard Ctrl+C

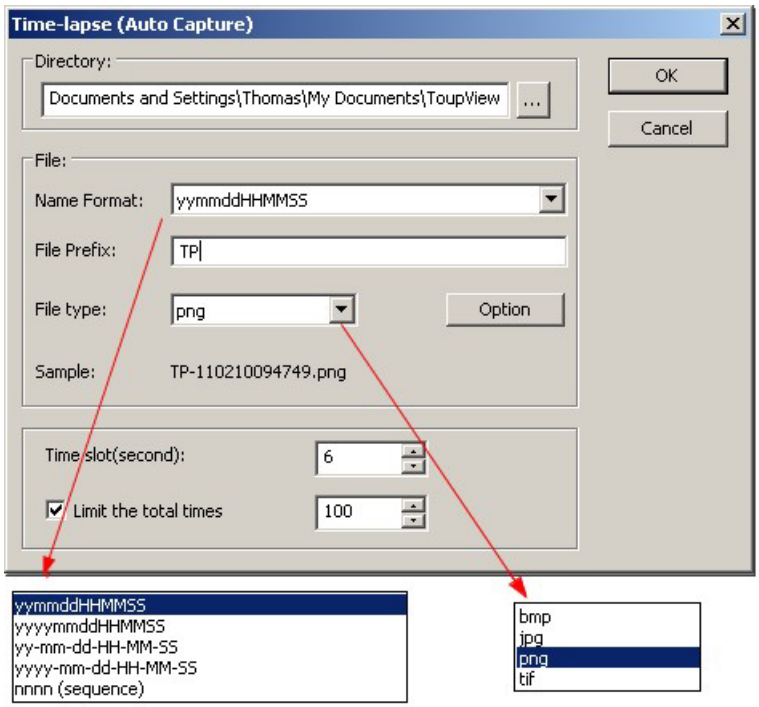
Capture to Clipboard (shortcut: **Ctrl+C**) will copy a frame from the **Live Capture** video stream to the clipboard for further application.

2.6.3 Time-lapse(Auto Capture)•••

The **Time-lapse (Auto Capture)**  command enables the use of the **Time-lapse (Auto Capture)** function together with an appropriate time interval. This function triggers the images capture at adjustable, regular intervals.

Auto Capture Procedure

1. Choose **Capture->Time-lapse (Auto Capture)•••** or click  button. The **Time-lapse (Auto Capture)•••** dialog is shown below:



Input the **Directory** where one will save all of image files. One can use  to locate the **Directory**.

In the **File** section, one can choose **Name Format**. There are 4 formats, they are: **yymmddHHMMSS**, **yyyymmHHMMSS**, **yy-mm-dd-hh-mm-ss**, and **yyyy-mm-dd-HH-MM-SS**. The **File Prefix** will be attached in front of the **Name Format**. One can also choose **File Type** in **bmp**, **jpg**, **png**, or **tif** format. The **File Type** will be used as the file extension. The file extensions **jpg**, **png**, and **tif** have their own file **Option**. The final name in this **Time-lapse (Auto Capture)** will be **TP-yyyymmHHMMSS.png**. This mechanism ensures that the previous image will not be overwritten when capturing a new one.

Click the **Option** button and the **Option** dialog corresponding with file extension will pop-up for adjustment. For **jpg**, the **Option** dialog is:

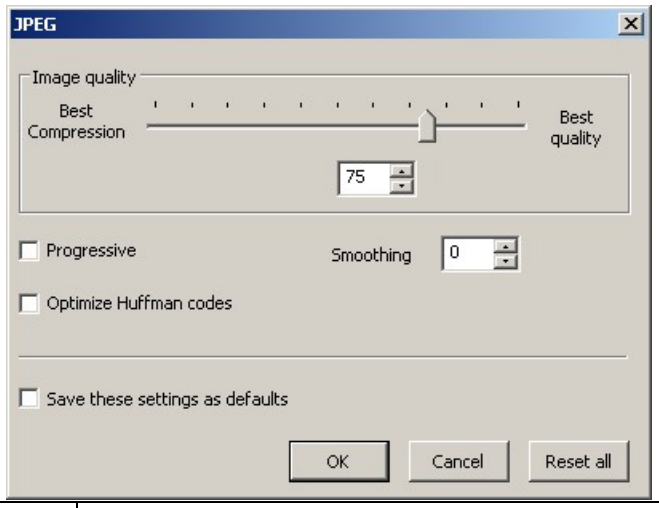
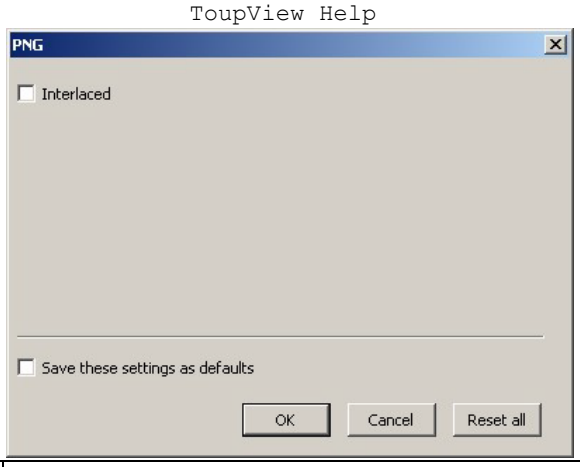


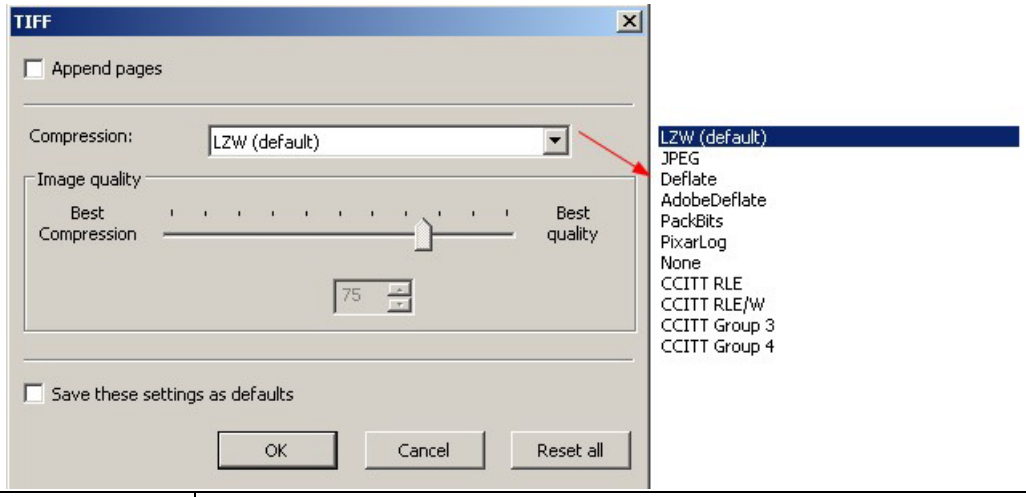
Image quality	If one save an image in **JPEG format (*.jpg)**, one may adjust image quality in the edit box. The values range from **0** to **100**. Default value: **75**.
Progressive	The default is unchecked.
Optimize Huffman codes	The default is unchecked.
Smoothing	The values range between **0** and **100**. Default value: **0**.
Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

For **png**, the **Option** dialog is:



Interlaced	The default is unchecked.
Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

For **Tag Image File Format(*.tif, *.tiff)**, the **Option** has the following items:



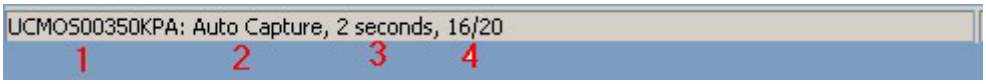
Appended pages	Determine whether the current image will be saved in multiple pages style or not.
Compressions	Specifies a method for compressing the composite image data. For saving a 32-bit TIFF file, one can specify that the file be saved with predictor compression, but have no option to use JPEG compression. Predictor compression offers improved compression by rearranging floating point values, and works with both LZW and ZIP compression.
Image quality	If choose **Compressions as "JPEG"**, the **Image quality** can be adjusted by the slider bar. The values range between **0** and **100**. Default value: **75**.
Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

The **Time slot (seconds)** is used to set the interval of the **Auto Capture** between 2 frames. The minimum is **2s** and the maximum is **3600s**. Any time beyond this range will invoke a warning dialog indicating the correct time interval range.

Check **Limit the total times** will restrict the total times that the **Time-lapse (Auto Capture)** process occurs. It should be between **1** and **999**. Uncheck this button, the frame will be captured continuously until one clicks **Time-lapse (Auto Capture)** again to cancel the last **Time-lapse (Auto Capture)** process.

If everything is ok, press the **OK** to begin **Time-lapse (Auto Capture)**.

2. In the **Time-lapse (Auto Capture)** process, the dynamic information will be shown on the **Statusbar**. They are:



1) **Live Capture** camera name;
2) Process name;
3) Time slot;
4) Frames captured and the total frames;

3. When **Time-lapse (Auto Capture)•••** is started, the **Capture->Time-lapse (Auto Capture)•••** menu will be checked. One can unchecked it if one want to stop the **Time-lapse (Auto Capture)•••** process. After the **Time-lapse (Auto Capture)•••** process is finished, it will be unchecked to start a new **Time-lapse (Auto Capture)•••** process.

2.6.4 Capture Still Image••• Ctrl+Z

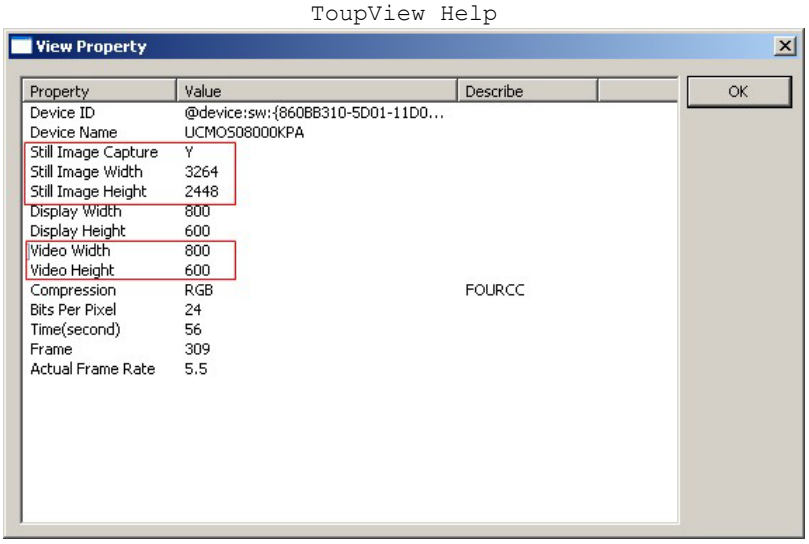
Choose **Capture->Capture Still Image** (shortcut: **Ctrl+Z**) or click  on the **Live Capture Toolbar**.)

Some cameras can produce a still image separate from the capture stream, and often this still image is of higher quality or larger in size than the images produced by the capture stream (**Live Capture** video). The camera may have a button that acts as a hardware trigger, or it may support software triggering. A camera that supports still images will expose a still image pin.

To support the still image capture, ToupView can enumerate the device's capability and make **Capture Still Image** button  enable on the **Live Capture Toolbar**.

Choose **Setup->View Property•••** to check if the camera supports still images or not.

In the example below, since the **Still Image Capture**'s value in **View Property** dialog is **Y**, this means **UCMOS080000KPA** supports the **Still Image Capture**.



The **Still Image** size can be set in **Setup->Still Image Options •••**.

2.6.5 Capture Still Image to Clipboard Ctrl+Y

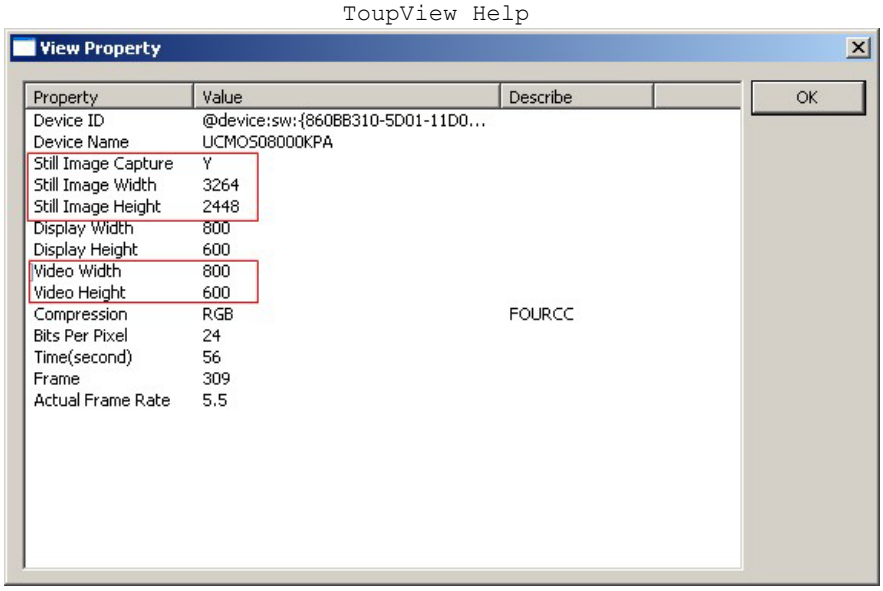
Choose **Capture->Capture Still Image to Clipboard** (shortcut: **Ctrl+Y**).

Some cameras can produce a still image separate from the capture stream, and often this still image is of higher quality or larger in size than the images produced by the capture stream (**Live Capture** video). The camera may have a button that acts as a hardware trigger, or it may support software triggering. A camera that supports still images will expose a still image pin.

To support the still image capture, ToupView can enumerate the device's capability and make **Capture Still Image** button  enable on the **Live Capture Toolbar**.

Choose **Setup->View Property•••** to check if the camera supports still images capture or not

In the example below, since the **Still Image Capture**'s value in **View Property** dialog is **Y**, this means **UCMOS080000KPA** supports the **Still Image Capture** operation.

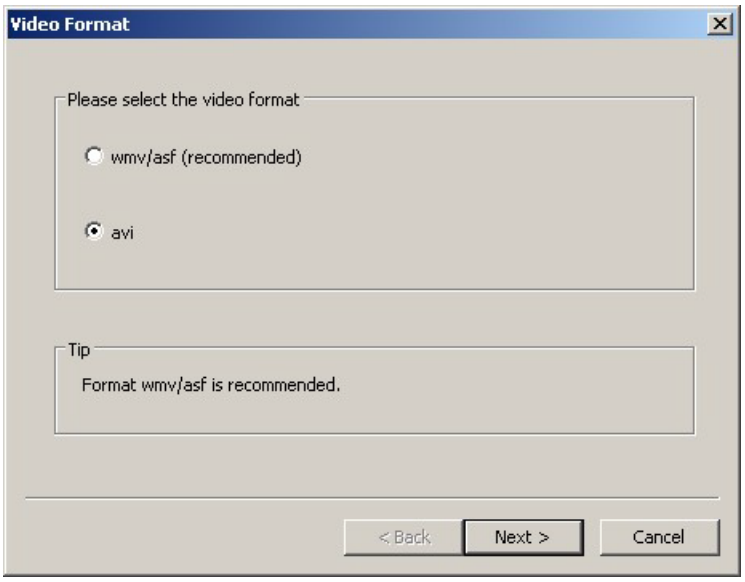


2.6.6 Start Capture Video•••

This command will start capturing a video. When one chooses the **Start Capture Video•••** command, a wizard will pop-up for one to configure it step by step.

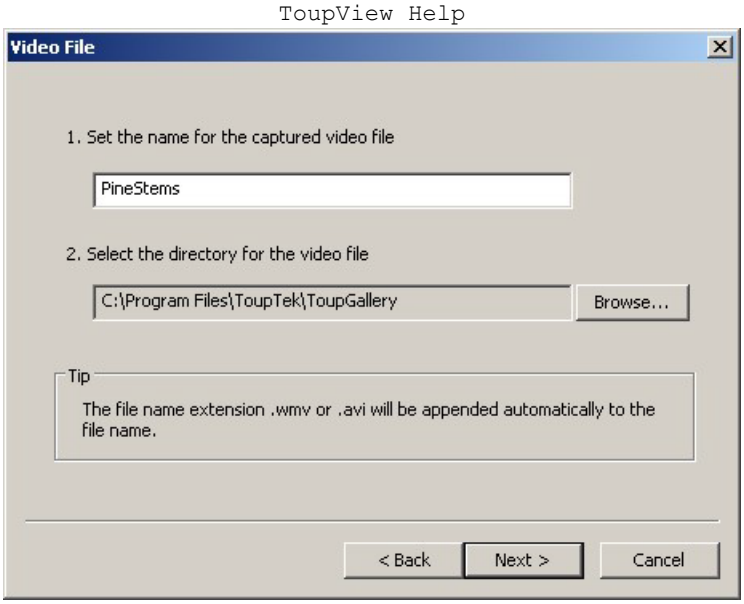
1. Select the video format, either **wmv/asf** or **avi**. We recommend using **wmv/asf**.

Once one make selection, click **Next >** to proceed. Click **< Back** to return to the previous setup dialog or click **Cancel** to cancel the **Start Capture Video•••** command.



2. Set the file name and file directory; use **Browser•••** to locate the directory.

If everything is ok, click **Next>** to proceed. Click **<Back** to return to the previous setup dialog or click **Cancel** to cancel the **Start Capture Video•••** command.

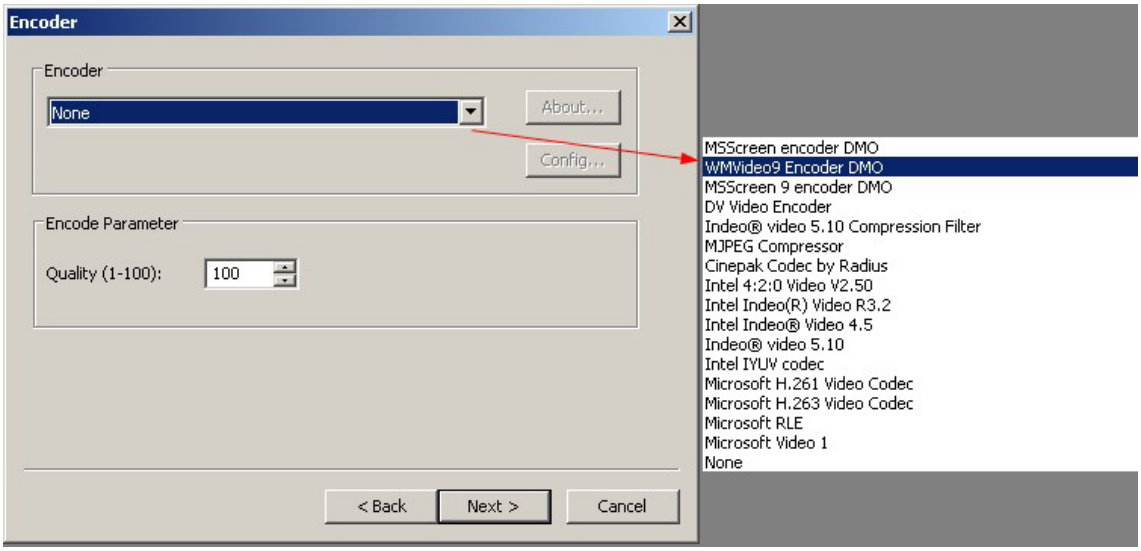


3. Set the **Encoder** and **Encoder Parameter**. The **Encoder** is the algorithm used to compress the video. ToupView can enumerate all of the **Encoders** installed and put them into the list box as shown.

Select this by click the dropdown arrow and choose it with the mouse button.

Also, one can modify **Quality** (1-100) value in the edit box.

If everything is ok, click **Next >** to proceed, click **< Back** to return to the previous setup dialog or click **Cancel** to cancel the **Start Capture Video** command.



4. Set the desired **Display Information** as show in the following dialog. They are

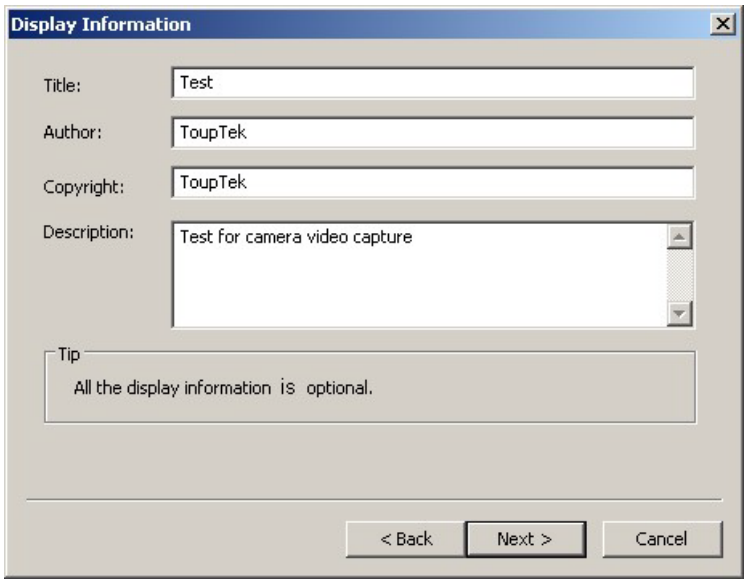
Title: The Title of the capture video.

Author: Who is the author of this video?

Copyright: The Copyright of this video.

Description: The other information the author may wish to save in the video.

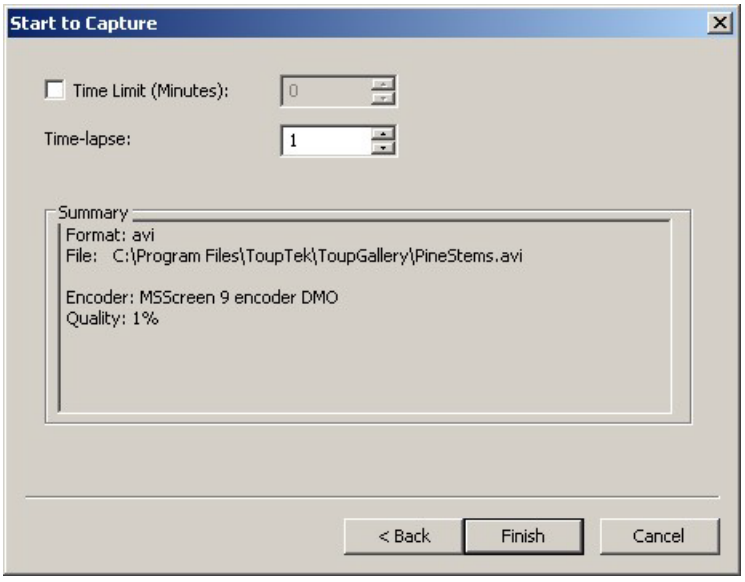
All the display information is optional.



5. The final dialog will be as follow. The only parameter one needs to set is **Time Limit (Minutes)**. Check this item need to input the total time. Uncheck it means the time is unlimited.

The **Summary** shows all the items selected or set.

If everything is ok, click **Finish** to begin the video capture. Click **<Back** to return to the previous setup dialog or click **Cancel** to cancel the **Start Capture Video•••** command.



6. When video capture is started, the **Capture->Start Capture Video•••** will be grayed and **Capture->Stop Capture Video** will be enabled. Choose the latter one if one wishes to end the video capture.

2.6.7 Stop Capture Video

This menu will be enabled when choose **Capture->Start Capture Video•••** command and begin the video capture

To stop capturing the video stream, Choose **Capture->Stop Capture Video.**

2.7 Options

2.7.1Preference••• Shift+P

See **Process Frame: Options->Preference•••.**

2.7.2 Annotation•••

See **Process Frame: Options->Annotation•••.**

2.7.3 Auto Correction•••

See **Process Frame: Options->Auto Correction•••.**

2.8 Window

2.8.1Cascade

See **Process Frame: Window->Cascade.**

2.8.2 Tile

See **Process Frame: Window->Tile.**

2.8.3 Arrange Icons

See **Process Frame: Window->Arrange Icons.**

2.9 Help

2.9.1Help Contents F1

See **Process Frame: Help->Help Contents.**

2.9.2 Show Start Page

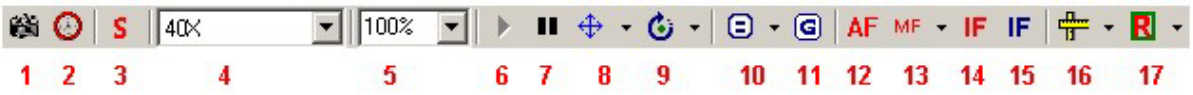
See **Process Frame: Help->Show Start Page.**

2.9.3 Check to Update

See **Process Frame: Help->Check to Update.**

2.9.4 About••• See **Process Frame: Help->About.**

2.10 Live Capture Toolbar



The **Live Capture Toolbar** is specially designed for **Live Capture** window by ToupView.

Its main functions are very useful to perform processes on the **Live Capture** window.

They are:

2.10.1 Capture a Frame

See **Live Capture Frame: Capture->Capture a Frame** menu.

2.10.2 Capture Still Image

See **Live Capture Frame: Capture->Capture Still Image** menu.

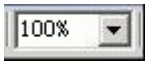
2.10.3 Time Lapse(Auto Capture)

See **Live Capture Frame: Capture->Time-Lapse(Auto Capture)•••** menu.

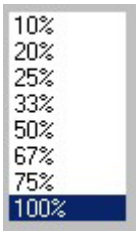
2.10.4 Software Power

See **Process Frame: Acquire->Software Power** menu.

2.10.5 Zoom

Toolbar button 

. The **Live Capture** window can sometimes be too large to see the whole video for a high resolution camera. In this case, one can click arrow button on the right of this **Zoom** button and select one of the items to set the **Live Capture** window to the proper size. Its dropdown list box looks like:



2.10.6 Start

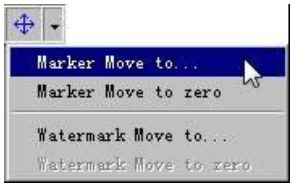
If the **Live Capture** window is paused, one can continue the **Live Capture** process by check this button and the **Pause** button will be enabled.

2.10.7 Pause

If the **Live Capture** window is running, one can **Pause** the **Live Capture** process by check this button and the **Start** button will be enabled.

2.10.8 Arrow key to move marker or watermark

Arrow key to move marker or watermark toolbar button  .The **Live Capture** window can display the **Video Marker** and **Video Watermark;** one can move them with the keyboard arrow keys or its submenus. The **Arrow key to move marker or watermark**'s submenus are



There are two methods to move the **Video Marker** and **Video Watermark**

1. Move the **Video Marker** and **Video Watermark** using keyboard arrow keys.

When this button is checked, one can move the **Video Marker** and **Video Watermark** to the desired position with the **up**, **down**, **left** and **right** arrow keys.

2. Move the **Video Marker** and **Video Watermark** using submenus.

Marker Move to•••

Choose this menu will display a **Move** dialog, where one can enter the **X** and **Y** coordinates of the desired coordinates.

Marker Move to zero

If the **Video Marker** was moved, choose this menu will return the **Video Marker** to its original coordinates **(0,0).**

Watermark Move to•••

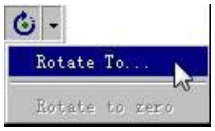
If the **Video Watermark** is displayed, this menu will be enabled. Choose this menu will display a **Move** dialog, where one can enter the **X** and **Y** coordinates of the desired location.

Watermark Move to zero

If the **Video Watermark** was moved, choose this menu will return it to its original coordinates **(0,0)**.

2.10.9 Arrow key to rotate watermark

Arrow key to rotate watermark toolbar button  .The **Live Capture** window can display the **Video Watermark** and allow one to rotate it with the keyboard arrow keys or submenus. The **Arrow key to rotate watermark** button's submenus are shown as below:



There are two methods to move the **Video Watermark**:

1. Rotate **Video Watermark** using keyboard arrow keys:

When this button is checked, one can rotate the **Video Watermark** to the desired angle with the **left** and **right** keyboard arrow keys.

2. Rotate the **Video Watermark** with submenus:

Rotate to•••

Choose this menu will display a **Rotate** dialog, where one can enter the **angle** to **Rotate** the **Video Watermark** to the desired angle.

Rotate to zero

If the **Video Watermark** was rotated, **Rotate to zero** will be enabled. Choose this menu will return the **Video Watermark** to zero degree.

2.10.10 Define Software Power Why

Software Power?

Toolbar button  . Microscopes with **4X, 10X, 40X,** and **100X** objectives means that it has four different optical powers.

However, if this microscope is combined with different digital cameras to capture the images, the magnification of the captured images is no longer the same as the magnification of the objective. Instead, it is represented by the **Resolution**, which is determined by the **Software Power** of the entire system (microscope plus digital camera).

How to define the Software Power?

For consistency, a menu called **Software Power** with some submenus named **4X, 10X, 40X,** and **100X** is designed to denote the **Resolution**. Therefore, these **Software Powers** are actually the system powers (microscope plus digital camera), corresponding to the image **Resolution**.

When the **Software Powers** are defined, the **Software Powers** can be selected in ToupView according to the actual microscope objective. After the image has been captured, the **Resolution** can be saved together with the image data.

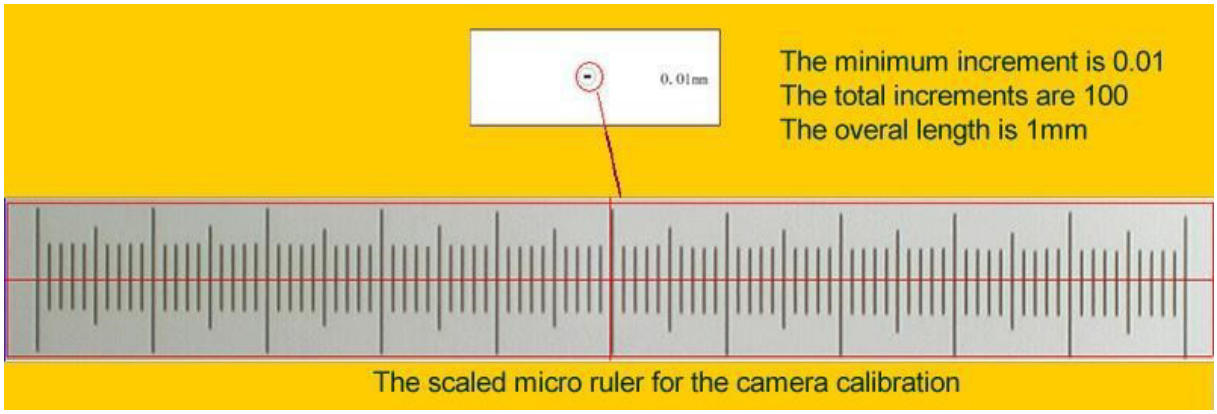
If one wants to measure the object's size on the image, ToupView will automatically calculate the object's size according to the **Resolution** and the selected **Units** for further analysis.

So the first step is to define the **Software Power**. Different microscope and digital camera combinations need to define a set of **Software Powers** first.

About the Micro Ruler

(Note: One need to have a **micro ruler** with minimum increment of 0.01mm or 10μm to **Define Software Power**. Its overall length is 1mm. It is recommended that the stage micrometer or scale used in the calibration should be traceable to the National Institute of Standards and Technology (NIST) or a similar organization.).

The steps to **Define Software Power** are as follows:



Define Software Power

Step 1: Start the ToupView

1. Plug the camera (UCMOS or UHCCD camera for microscope) into the trinocular or C-Mount interface of a microscope.

2. Plug the USB connector to the computer USB port (For USB2.0 cameras, be sure to plug it into the correct port, some computers only have a single USB2.0 port). 3. Run ToupView.

4. Put the **micro ruler** on the microscope's stage, move the ruler to the field center and focus it to see it clearly.

Step2: Invoke Live Capture and select the default Software Power "Pixel"

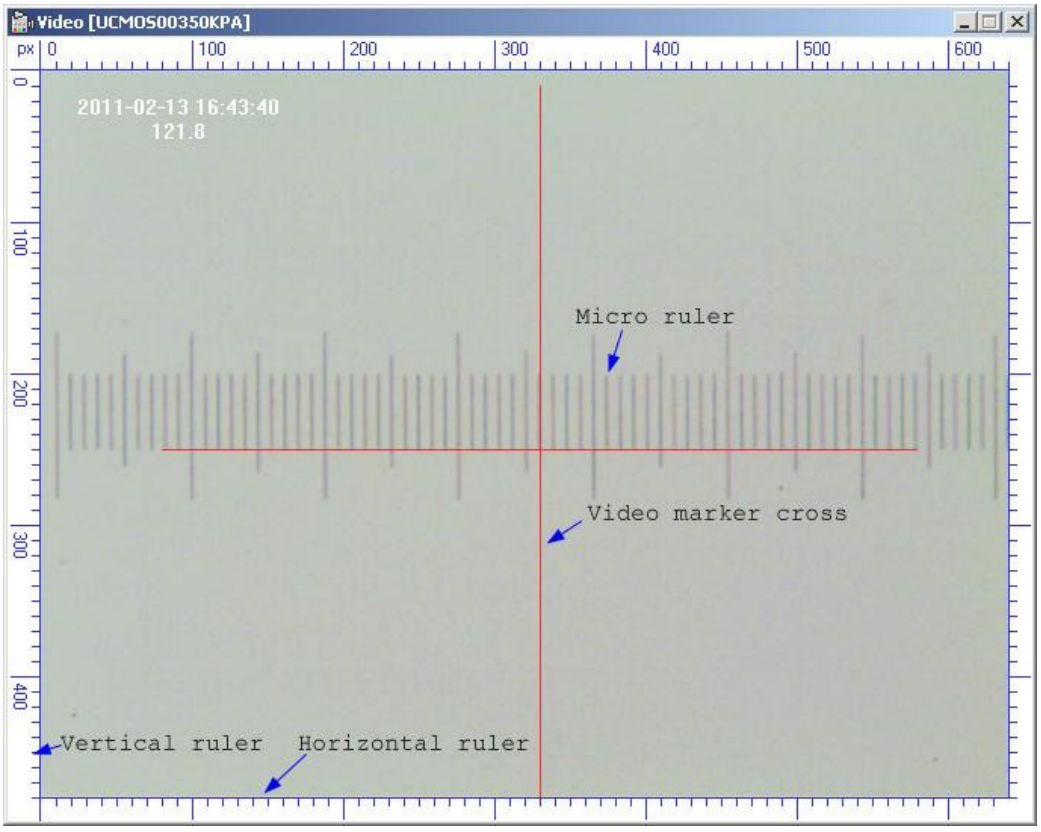
1. Start the **Live Capture**: One has 3 methods to start **Live Capture**:

   a). Select **Acquire->Live Capture•••**.

   b). Click the **Live Capture** button  on the **Live Capture Toolbar** and select the right camera.

   c). Click on the camera name on the **Start Page (Process Frame: Help->Show Start Page)**.

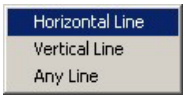
2. Click the dropdown arrow on the **Software Power** button  on the **Live Capture Toolbar** to list the **Software Power**. If no **Software Power** was defined before, there is only the default **Pixel** item. Select Pixel as the Software Power at this time.



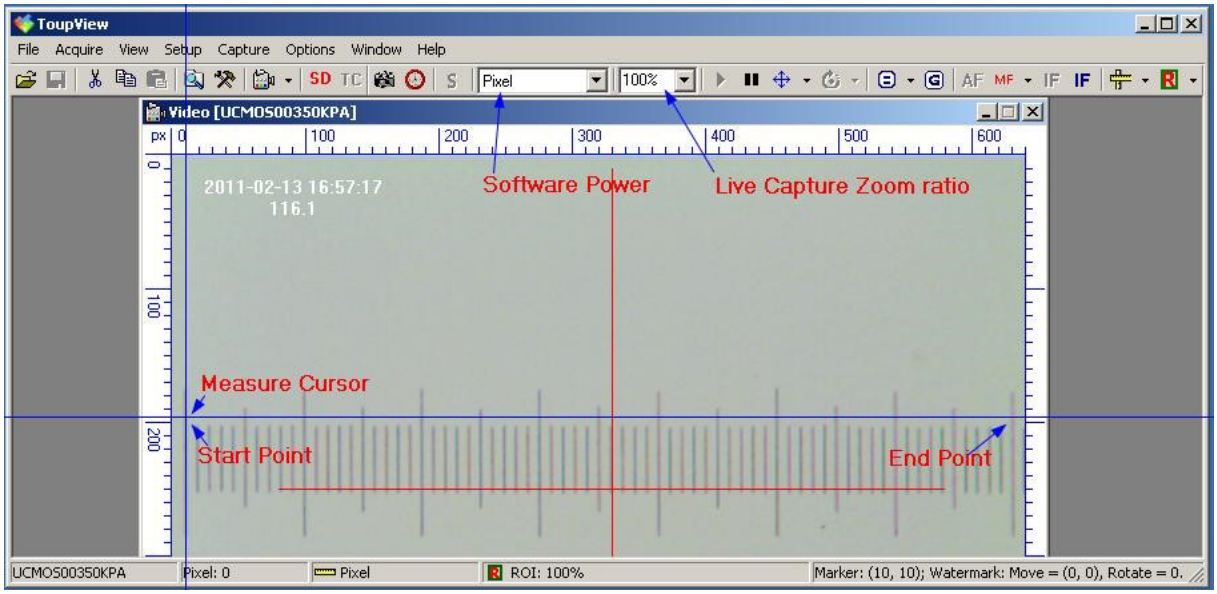
Step 3: Define Software Power

1. Switch the microscope's objective to the one that wish to define(for example **10X** at first, or the other **4X**, **40X**,**100X**), focus the **micro ruler** to get a clear image, move the ruler to the **Live Capture** window center, and let it align horizontally with the cross cursor. The **Live Capture** window should look like above:

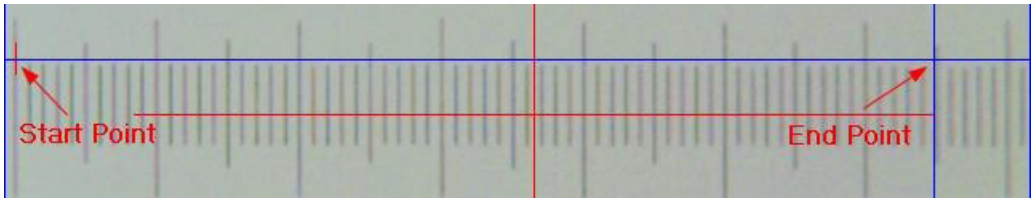
2. Click the **Define Software Power** button  and choose **Horizontal Line**. (The other two modes can be also chosen according to the direction of the **micro ruler**)



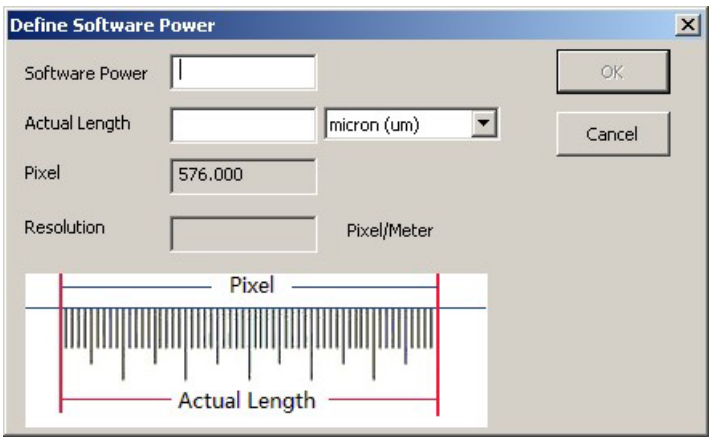
The **Live Capture** window should look like this:



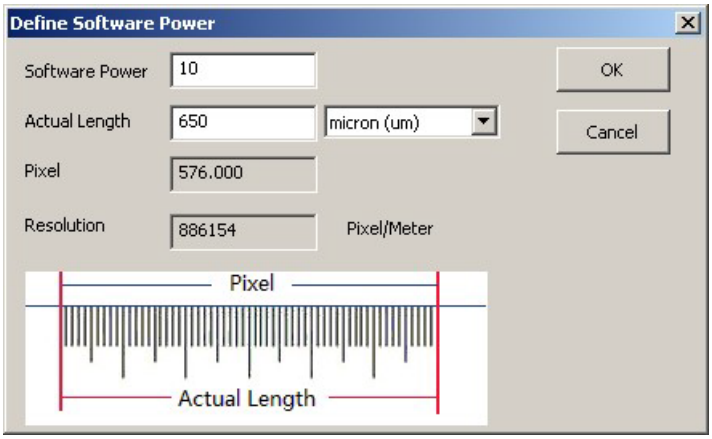
3. Put the cursor at the **Start Point** (align the cursor vertical line with the **micro ruler** vertical line) and click the mouse button. The point will be marked with a small cross. Move the mouse and let align the cursor vertical line with the micro ruler vertical line, click the mouse button again, and the **End Point** will be marked. The final screen should look like the following:



4. When the mouse button is released in the above **End Point**, a **Define Software Power** dialog will be shown below.



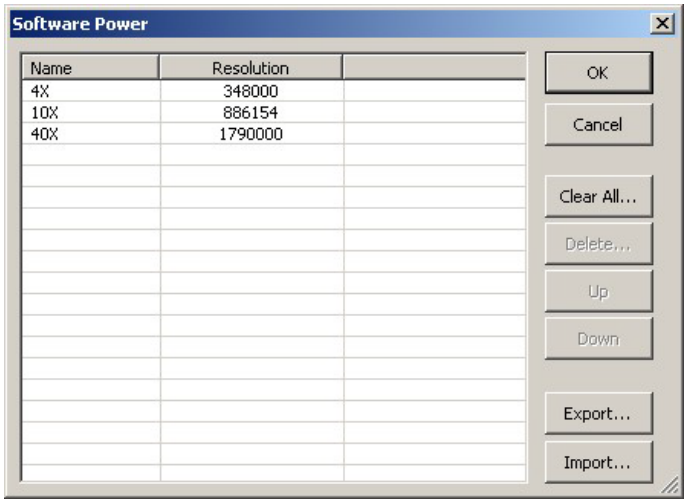
Here, type **10** in the **Software Power** edit box. The **Actual Length** between the **Start** and **End** point is **650um.** After the **Actual Length** edit box is filled, the **Resolution** will be filled automatically according to the calculation. Now the **Define Software Power** dialog should be



Click **OK** to end the **10X Software Power** definition.

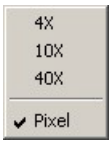
Step 4: Repeat Step 3 to define the other Software Powers.

Switch the microscope's objective to the undefined one, repeat **Step 3** to define the other **Software Power.** The final **Software Power** dialog for the microscope and camera system should look like below:

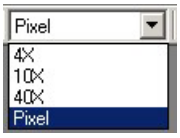


Here one can **Delete•••** (After the item is selected, click the **Delete•••** button.) and change the **Software Powers** list order to the desired one (Select the item and click either the **Up** or the **Down** button).

Now the **Acquire->Software Power** submenus should look like this

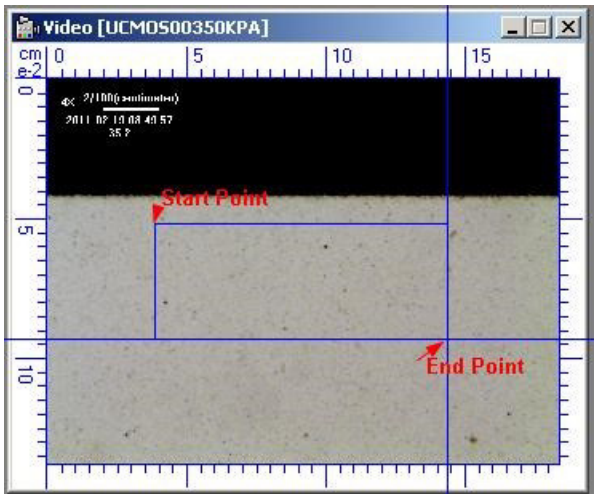


The **Software Power** button on the **Live Capture Toolbar** should look like this

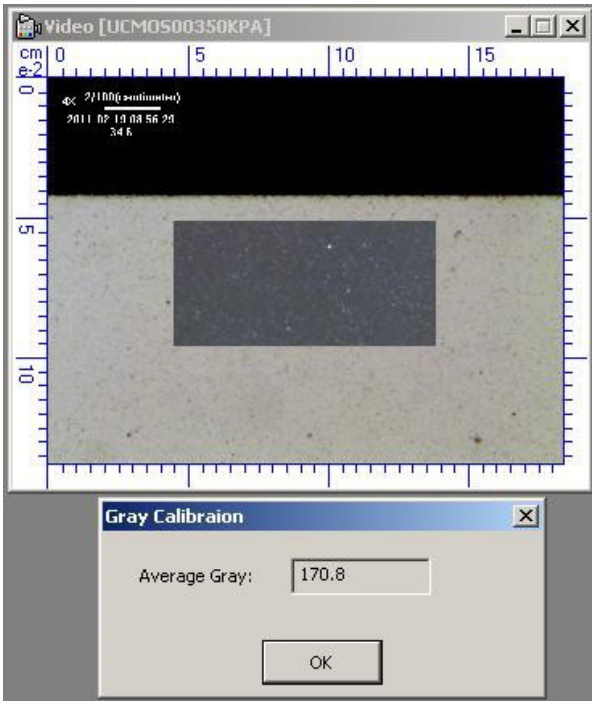


2.10.11 Gray Calibration

Toolbar Icon: . **Gray Calibration** is a useful function to help one to get **the average gray value of the selected region. Click the toolbar icon, the mouse cursor will become a blue cross. Click at the interested rectangle area Start Point and then move the mouse cursor to the End Point of the interested rectangle area as below:**



Click at the End Point, a dialog will open and the rectangle area will be blinking.



The average gray value of the selected area is shown in the dialog. This average gray value can be adjusted by adjust the light intensity or adjust the **Exposure** time or the other camera parameters on the **Setup->Video Source Property•••** menu.

2.10.12 Auto Focus

Auto Focus toolbar button AF

Auto Focus Prerequisites

1. Make sure that the ToupView packages and drivers of step motor and **UCMOS** or **UHCCD** camera is installed correctly.

2. Plug in all of the devices' cables and turn on the step motor controller and microscope light.

Auto Focus Procedure

Step 1. Select **Acquire->Live Capture** or click and then choose the digital camera to open the **Live Capture** window. One can also open the **Live Capture** window from the **Start Page**.

Step 2. Select the proper **Software Power** from the list Pixel on the **Live Capture Toolbar** and let this **Software Power** equal to the real microscope's objective power to realize the auto-focus function.

Step 3. Click the button AF to start the auto-focus process. During the process,

one can click the  button again to stop it.

Step 4. If one switch objective, repeat step 2 and to start the **Auto Focus** again for the new objective.

Some Important Information about the Auto Focus Process

1. If **Auto focus when start device** is checked in the **Options->Preference->Focus** tab, the auto-focus function will be executed after step 1 in the Auto Focus Procedure is done.

2. If **Auto focus when switch the software power** is checked in the **Options->Preference->Focus** tab, the auto-focus function will be executed after step 2 in the Auto Focus Procedure is done.

3. If one wants to do the auto-focus function without changing the real microscope's objective, one can run step 3 in the Auto Focus Procedure directly to perform the **Auto Focus** operation.

2.10.13 Manual Focus **Manual**

Focus toolbar button  Manual

Focus Prerequisites

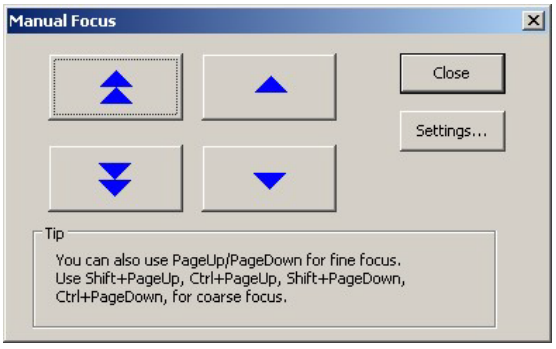
1. Make sure that the ToupView packages, step motor driver and **UCMOS** or **UHCCD** camera is correctly installed.

2. Plug in all of the devices' cables and Turn on the step motor controller and microscope power.

Manual Focus Procedure

1. Select **Acquire->Live Capture** or click  and then choose the digital camera to open the **Live Capture** window. One can also open the **Live Capture** window from the **Start Page**.

2. Click the button  to start the manual focus dialog as shown below:



The two left buttons  and  in this dialog represent **coarse focus** (keyboard shortcuts: **Ctrl/Shift +PageUp, Ctrl/Shift +PageDown)**, and the two right buttons   represent **fine focus** (keyboard shortcuts: **PageUp**, **PageDown**). Click **Settings…** button will open **Options->Preference->Focus** tab.

3. To stop the manual focus process, please click 

(keyboard shortcut: **Delete**).

2.10.14 Auto Fusion

Image Fusion toolbar button: 

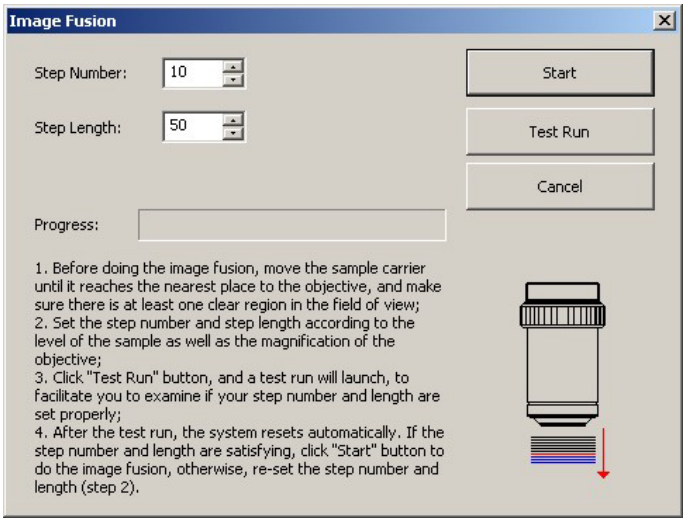
Function Prerequisites

1. Make sure the ToupView packages, drivers of step motor, and **UCMOS** or **UHCCD** cameras are correctly installed.

2. Plug in all of the devices' cables and turn on the step motor controller and microscope light.

Image Fusion Procedure

Step 1. Click the **Live Capture Toolbar** button  and the following dialog will be shown:



The **Step Number** and **Step Length** are set according to the sample's thickness and richness in detail as well as the object's magnification.

Step 2. Click the **Start** button and the application will capture images to do the fusion according to the **Step Number** and **Step Length**. When the capture is finished, the object stage will reset to its original z position.

Step 3. Click the **Test Run** button and the system will do a dummy run to see if the **Step Number** and **Step Length** are correct. During this process, the image capture and fusion will not be processed. When the operation is finished, the object stage will reset to its original position.

Step 4. During the **Fusion** calculation and **Test Run** process, the **Cancel** button can be clicked at any time to cancel this operation. However, the object stage will not be able to return to its original position under this circumstance.

Step 5. The progress bar will run two times after clicking the **Start** button: the first time for image capture, and the second for image fusion. However, in the **Test Run**, it will run only once.

Step 6. The whole image fusion process is illustrated as the movie in the bottom right corner of the dialog.

Image Fusion Key Points for Reference

1. Before doing the **Image Fusion**, move the object stage until it reaches the place closest to the objective, and make sure there is at least one clear region in the field of view.

2. Set the **Step Number** and **Step Length** according to the sample focal depth as well as the objective power.

3. Click the **Test Run** button, and a test run will launch for one to examine if the **Step Number** and **Step Length** are proper.

4. After the **Test Run**, the system will return to its original position automatically. If the **Step Number** and **Step Length** are satisfactory, click the **Start** button to do the **Image Fusion**; otherwise, re-set the **Step Number** and **Step Length** (step 2) in Image Fusion Procedure.

2.10.15 Manual Fusion

Manual Fusion toolbar button 

Function Prerequisites: use step motor to move the stage

1. Make sure that the ToupView packages, step motor drivers, and **UCMOS** or **UHCCD** camera are correctly installed.

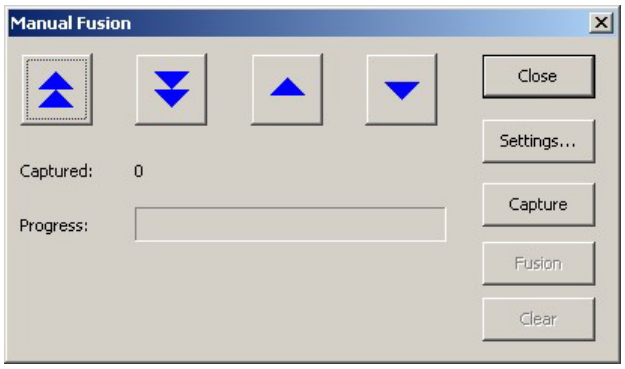
2. Plug in all of the devices' cables and turn on the step motor controller and the microscope's light.

Function Prerequisites: to move the stage manually

No prerequisites.

Image Fusion Procedure without Autofocus Controller (default)

Step 1. Click the **Live Capture Toolbar** button  and the following dialog will pop-up:



Step 2. Use the **coarse** and **fine** focus knobs to move the sample stage up and down, in order to find the different positions where the clearest regions of the whole sample can be seen.

Step 3. Click the **Capture** button to capture an image into the image list which will be used to do the fusion.

Step 4. Unless there is more than one image being captured, the **Fusion** and **Clear** buttons will not be enabled.

Step 5. If enough images are captured, click the **Fusion** button to do the image fusion. If the captured images are not satisfactory, one can click the **Clear** button to clear the captured images, and capture new images.

Step 6. If **Fusion** is clicked, please wait for some time to get the fusion result.

Manual Fusion Key Points for Reference

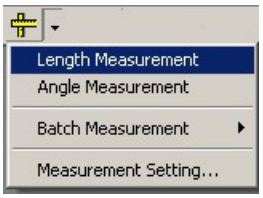
1. Use the **coarse** and **fine** focus knobs to move the sample stage up and down.
2. Clicking the **Capture** button will capture the current image into the image fusion list.
3. Repeat steps 1-3 until there are enough images.
4. Click the **Fusion** button will start image fusion. Wait for some time and a fantastic fusion result will be displayed in a new window.

2.10.16 Measure

If one wish to perform the measure in units other than **Pixels**, the corresponding **Software Power** must be defined (if not defined) or chosen (if defined). See the **Live Capture Toolbar: Define Software Power** button for details.

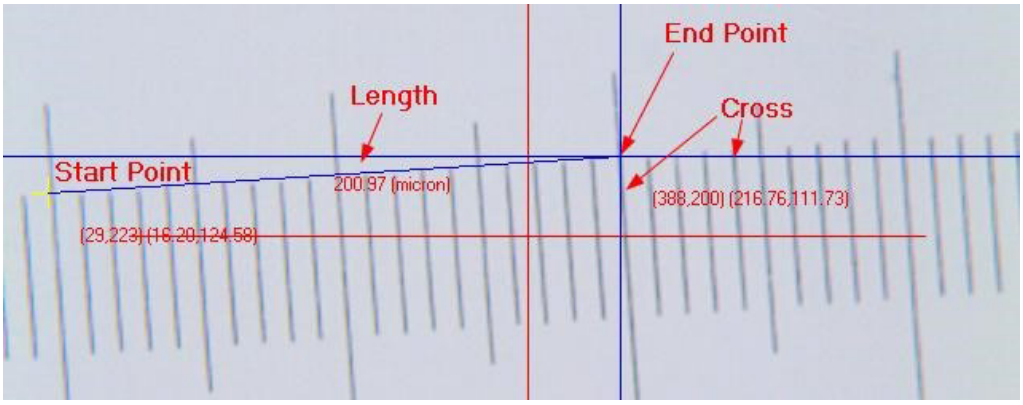
Step 1. If the used microscope's objective is **40X**, then adjust **Software Power** from the **Software Power** combo box  to **40X**.

Step 2. Click the **Measure** button  and select **Length Measurement** from the drop-down menu as shown below:

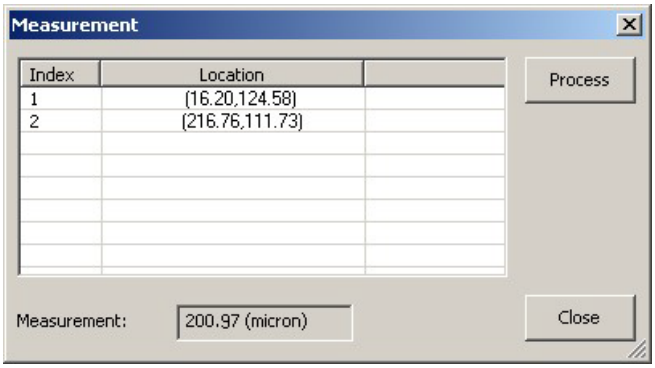


There should be a big and a small alignment cursor as shown below (one can set their properties in the **Measurement Setting•••** menu shown above).

Step 3. Click the **Start Point**, move the mouse, and click the **End Point**.

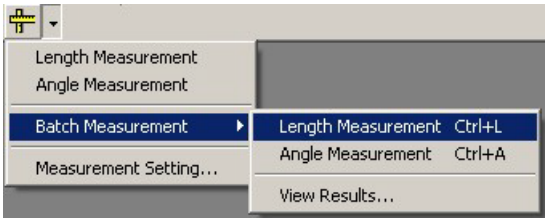


After the mouse button is released, a dialog listing the measurement results will automatically pop-up as shown below:



Step 4. The **Angle Measurement** is the same as the **Length** measurement, but need to click three points.

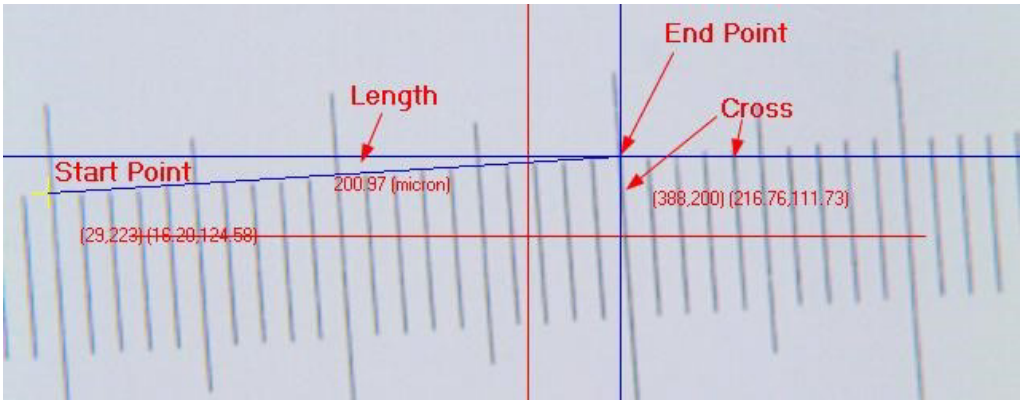
Step 5. One can also perform **Batch Measurement** on the **Live Capture** window. The **Batch Measurement** menu is shown below, it includes **Length Measurement**, **Angle Measurement** and **View Result•••**.



Take Length Measurement for example

a).Choose the **Batch Measurement->Length Measurement**

b).Click the **Start Point**, move the mouse, and click the second point (**End Point**).

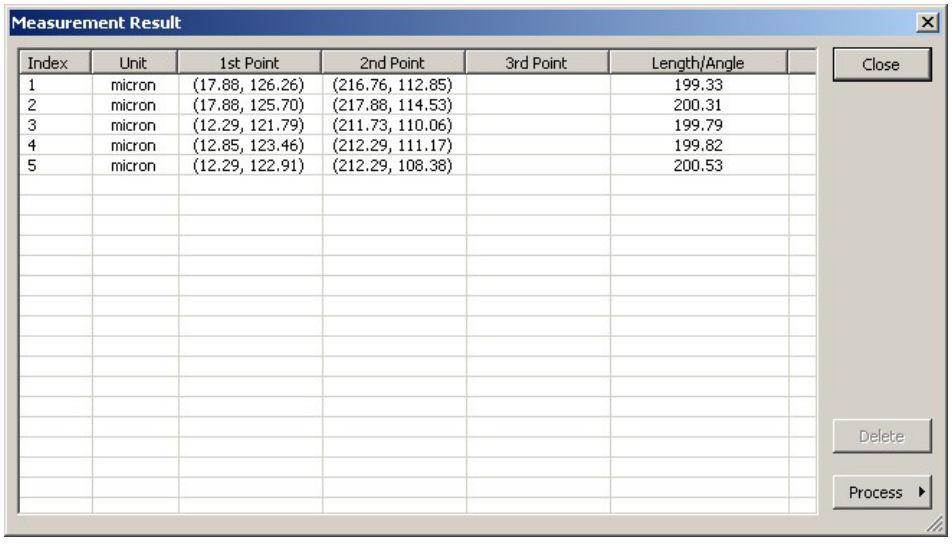


After the mouse button is released, the first **Length Measurement** is finished

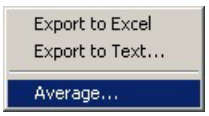
c).Repeat a) and b) again will end another **Length Measurement**.

…

d)Choose **Batch Measurement->View Results•••**, a dialog called **Measurement Result** shown below:

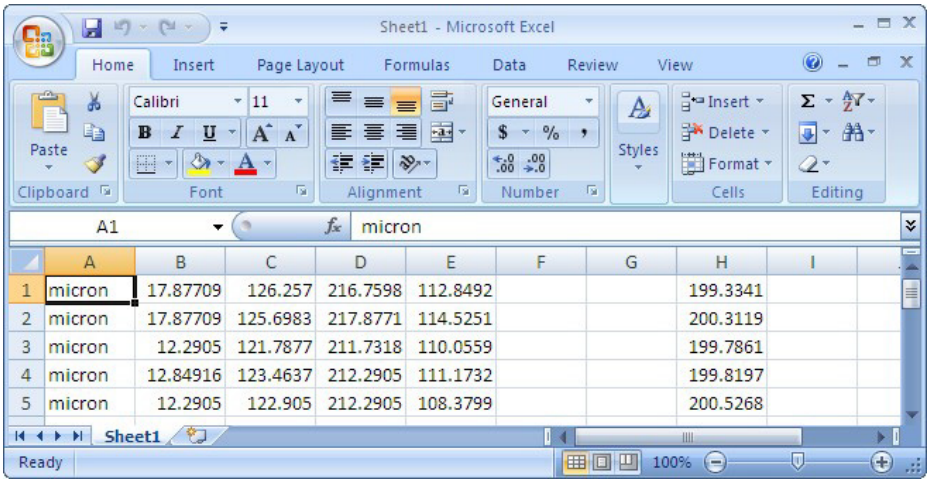


Click **Process>**, 3 submenus will be shown as



Export to Excel

Choose this menu will export the **Batch Measurement** to an **Excel** sheet.

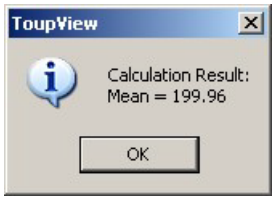


Export to Text•••

Choose this menu will export the **Batch Measurement** to a **Text** file.

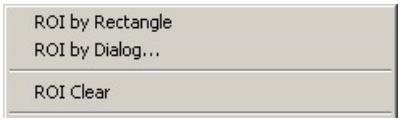
Average•••

Choose this menu will give the average result of the **Batch Measurement** as below

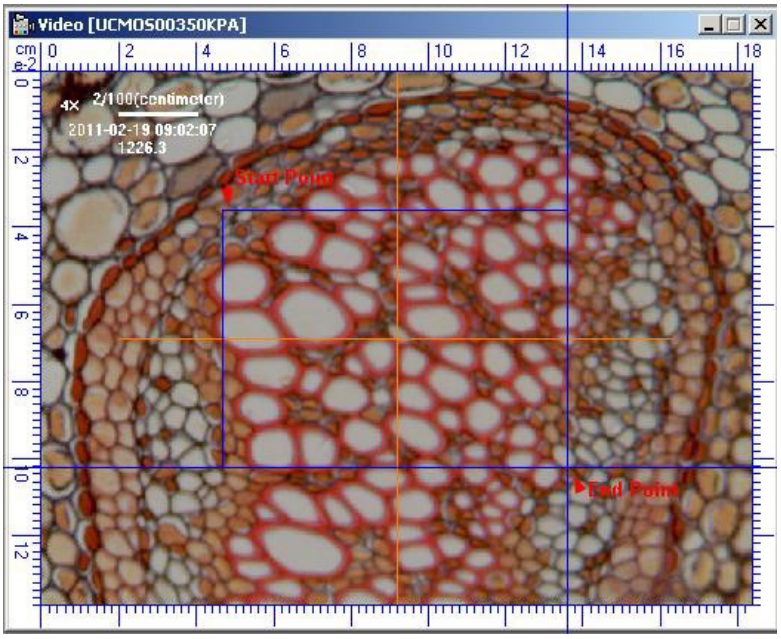


2.10.17 ROI (Region of Interest)

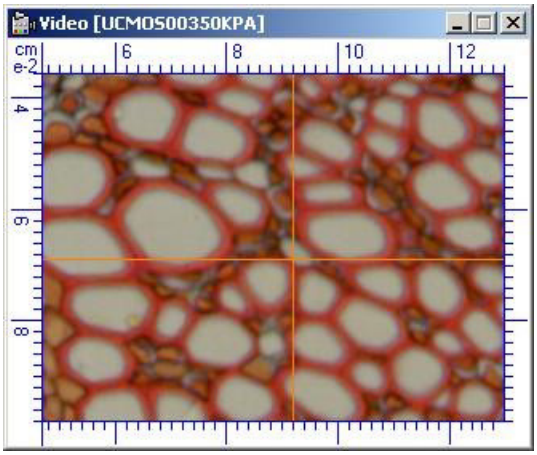
Toolbar Icon:  **ROI** means region of interest. This utility function is used to help focus on the region of interest by shrinking the **Live Capture** window to the defined **ROI** size. Click this icon will pop-up a menu as below:



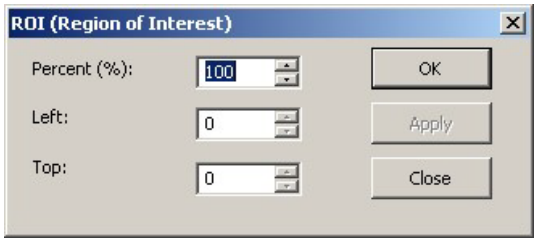
ROI by Rectangle：Choose this menu, the mouse cursor will become a blue cross. Click on the **Start Point** of **ROI**, and then move the mouse cursor to the **End Point** of **ROI** as below:



Click the mouse again, the **Live Capture** window will shrink to the selected **ROI** as below:



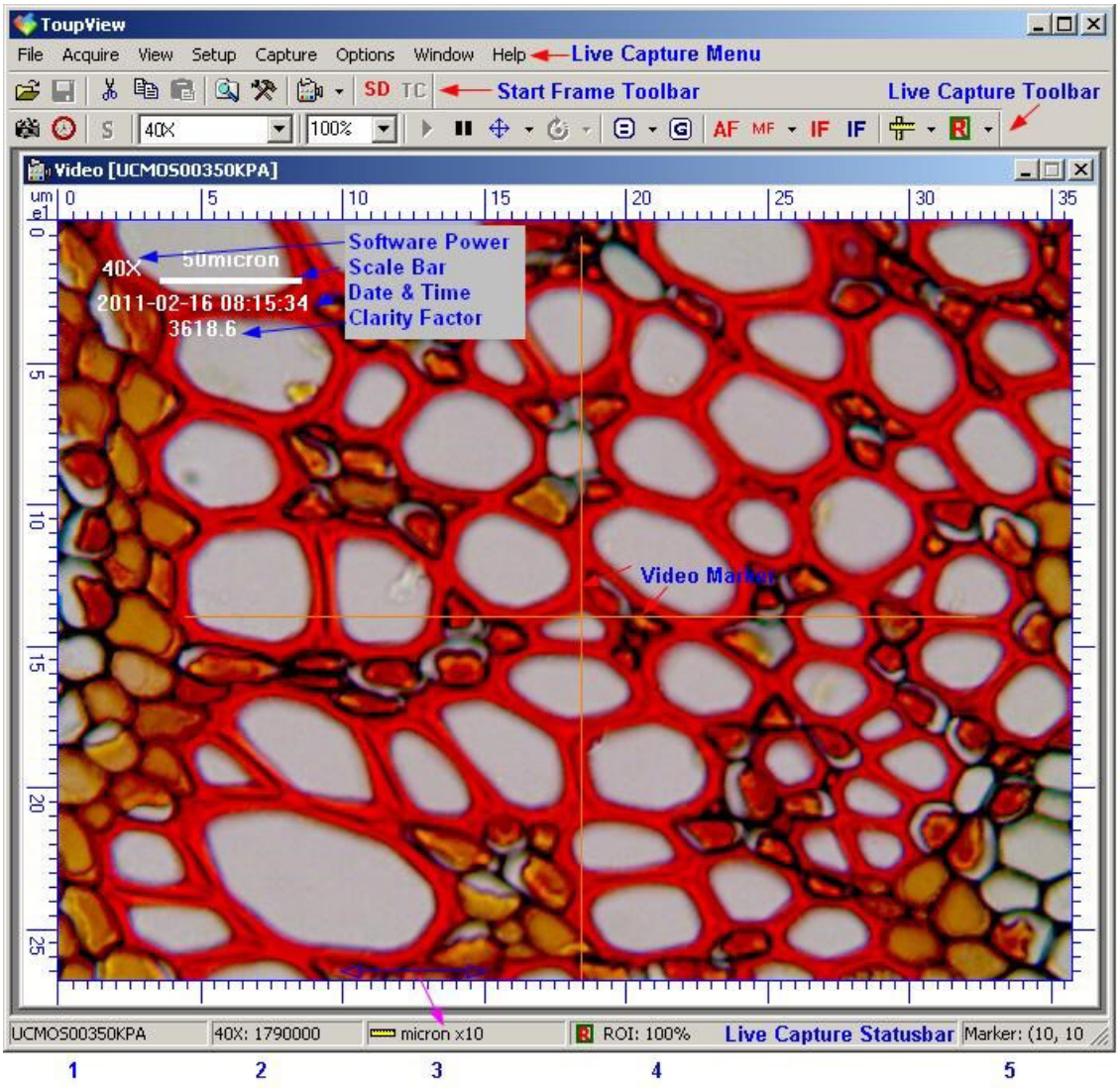
ROI by Dialog••• Choose this menu, a dialog will pop-up as below:



In this dialog, the shrink ratio and the coordinates of the start point (upper left point) of the **ROI** can be manually input to help to define the **ROI** precisely.

ROI Clear: Choose this menu will clear all previously defined **ROI** and reset the **Live Capture** window to its original size.

2.11 Live Capture Statusbar



1. The camera name.
2. The **Software Power** and its **resolution.**
3. The current horizontal or vertical ruler's length between two numbers in the **Live Capture** window.

Double click this icon will invoke a **Process Frame: Options->Annotation••• ->Length** tab and one can check the **Unit** or define the new **Unit.**

Click this icon with the right mouse button will pop-up the **Unit** Context Menu. Here, the different **Unit** can be selected with ease. One can also **Customize** the **Unit** by choose **Customize•••**menu, this will be the same as the double clicks operation.

4. **ROI**: Region of interest. 100% means the whole video is displayed. See **Live Capture Frame: Live Capture Toolbar->ROI** for details.

5. **Marker**'s position and **Water Marker** position and rotations.

See **Process Frame: Acquire->Video Marker•••**,

Acquire->Video Watermark•••,

Live Capture Frame: Live Capture Toolbar-> Arrow key to move marker or watermark,

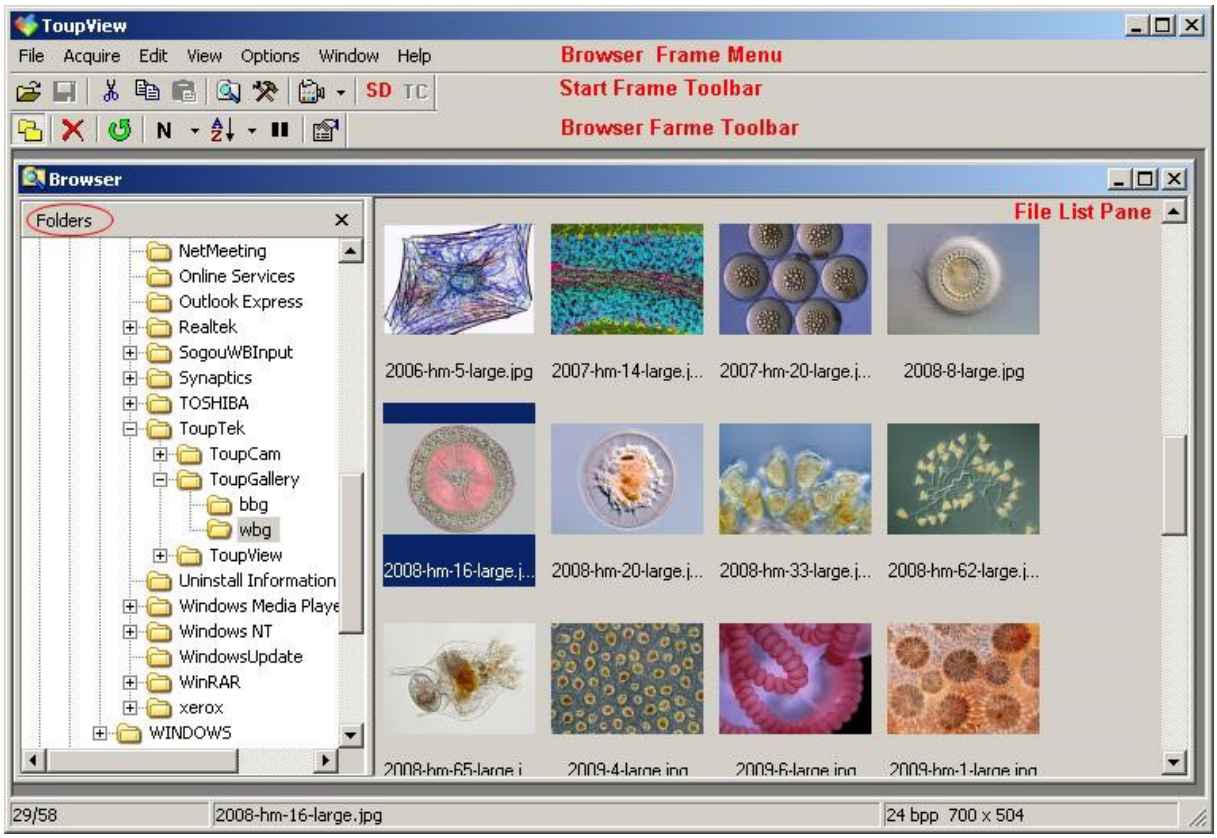
Live Capture Frame: Live Capture Toolbar->Arrow key to rotate watermark for details.

3 Browser Frame

3.1 Browser Frame Introduction

With ToupView's **Browser Frame**, files and images can be browsed, sorted, managed, manipulated, and shared. Different tools and panes can be combined to perform sophisticated searching and filtering operations, and view thumbnail previews of the images.

The **Browser Frame** is fully customizable. It can be moved, resized, hidden, docked, or closed. One can also stack the panes together for easy reference and accessibility, and to maximize screen space.



ToupView's **Browser Frame** consists of the following panes:

1. **Browser Frame Menu.**
2. **Start Frame Toolbar:** See **Start Frame: Start Frame Toolbar.**
3. **Browse Frame Toolbar:** See **Browser Frame: Browser Frame Toolbar.**
4. **Folder:** This pane displays the computer directory structure, much like the directory tree in Windows Explorer. One can use the **Folder** pane to browse through the folders and display their contents in the **File List pane.** One can also display the contents of multiple folders in the **File List Pane** by

clicking the Easy Select box opposite each folder on the left side of the pane.

5. **File List Pane: File List Pane:** This pane displays the images in the selected folder. The **File List Pane** is always visible, and cannot be hidden or closed. One can customize the **File List Pane** by changing either the way the files are displayed or the size of the thumbnails.

3.2 File

3.2.1Open Image••• Ctrl+O

See **Process Frame: File->Open Image•••**

3.2.2 Open Video•••

See **Process Frame: File->Open Video•••.**

3.2.3 Paste as New File•••

See **Process Frame: File->Paste as New File•••.**

3.2.4 Print Setup•••

See **Process Frame: File->Print Setup•••.**

3.2.5 Recent File

See **Process Frame: File->Recent File.**

3.2.6 Exit

See **Process Frame: File->Exit.**

3.3 Acquire

3.3.1 Live Capture

See **Process Frame: Acquire->Live Capture.**

3.3.2 Software Power

See **Process Frame: Acquire->Software Power.**

3.3.3 Manage Software Power••• Ctrl+M

See **Process Frame: Acquire->Manage Software Power•••.**

3.3.4 Video Marker•••

See **Process Frame: Acquire->Video Marker•••.**

3.3.5 Video Overlay Text••• Ctrl+D

See **Process Frame: Acquire->Video Overlay Text•••.**

3.3.6 Video Watermark••• Ctrl+W

See **Process Frame: Acquire->Video Watermark•••.**

3.3.7 Auto Maximum Size••• Ctrl+U

See **Process Frame: Acquire->Auto Maximum Size•••.**

3.3.8 Capture with Marker and Watermark Ctrl+F

See **Process Frame: Acquire->Capture with Marker and Watermark.**

3.3.9 Twain:Select Device•••

See **Process Frame: Acquire->Twain:Select Device•••.**

3.3.10 Twain:Acquire•••

See **Process Frame: Acquire->Twain:Acquire•••.**

3.4 Edit

3.4.1Cut Ctrl+X

Toolbar button  . One can **Cut** files and **Paste** them into another folder in the

Browser's File List Pane using ToupView. To **Cut** files, do the following:

Select one or more files and choose **Edit ->Cut** (shortcut: **Ctrl+X**).

3.4.2 Copy Ctrl+C

One can **Copy** files and **Paste** them into another folder using ToupView. To **Copy** files:

In the **Browser's File List Pane**, select one or more files and choose **Edit->Copy** or click  (shortcut: **Ctrl+C**).

3.4.3 Paste Ctrl+V

After copying or cutting file(s), one can **Paste**  them into a folder using ToupView. To **Paste** a file(s) in ToupView:

Select the file(s) in the **Browser's File List Pane** and navigate to the proper folder in the **Folders** pane. Then select **Edit->Paste** (shortcut: **Ctrl+V**).

3.4.4 Paste Shortcut

After copying or cutting files, one can **Paste Shortcut** into a folder using ToupView.
To **Paste the Shortcut** of a file in ToupView:

Select the file(s) in the **Browser's File List Pane** and navigate to the proper folder in the **Folders** pane. Then select **Edit->Paste Shortcut**.

3.4.5 Select All Ctrl+A

When organizing files and folders, one can select all of the files.

To **Select All** files in the current directory, click **Edit->Select All** (shortcut:
Ctrl+A).

3.4.6 Inverse Selection

When organizing files, one can invert a selection in order to select all of the files that were not previously selected.

To perform this operation, click **Edit->Invert Selection**.

3.4.7 Delete File Delete

Delete File toolbar button  . One can also **Delete** one or more files or folders from the **Browser** Window. To remove a file or folder from the **Browser** Window:

Select one or more files or folders.

Choose **Edit->Delete File** or click  (shortcut: **Delete** button). A **Confirm File**

Delete dialog will pop-up. In the **Confirm File Delete** dialog, click **Yes** to move the file to the desktop recycle bin, or click **No** to cancel.

3.4.8 Pause Pause

Pause toolbar button  . When **Browser** is shown or when the directory in the **Folders** is changed, ToupView will automatically begin to cache image thumbnails in the database. When thumbnails are cached, they are recalled from the database instead of generated from the file each time start ToupView and choose the **Browser** menu. This can improve system performance.

Click this button  and ToupView will **Pause** caching image thumbnails in the **File List Pane**.

Click this button again to continue caching image thumbnails in the **File List Pane**.

3.5 View

3.5.1File Bar

The **Folders Pane** includes a folder tree of all of the folders in the computer, similar to Windows Explorer. One can view the contents of the folders in the **File List Pane** on the right side of the **Browser** interface.

One can add, delete, or rename files and folders in the **Folders Pane**. One can also drag files and folders to new locations in the pane.

To show/hide the **File Bar**  : Check **View->File Bar** or click  icon on the **Browser Frame Toolbar**.

3.5.2 Tool Box Ctrl+T See

Process Frame: View->Tool Box

3.5.3 Annotation Manager

See **Process Frame: View->Annotation Manager**

3.5.4 Sort

Sort toolbar button  . In the **Browser** window, one can sort files according to different file properties in order to quickly organize images, find specific files, and create a range of files with similar attributes for easy selection.

To **Sort** items in the **File List**:

3.5.4.1 Sort->Sort by Names

Sort the image files in order of names.

3.5.4.2 Sort->Sort by Type

Sort the image files in order of type.

3.5.4.3 Sort->Sort by Size

Sort the image files in order of size.

3.5.4.4 Sort->Sort by Width

Sort the image files in order of width.

3.5.4.5 Sort->Sort by Height

Sort the image files in order of height.

3.5.4.6 Sort->Forward

Sort the image files in order of the **Forward** mode (i.e. 1,2,3,4).

3.5.4.7 Sort->Reverse

Sort the image files in order of the **Reverse** mode (i.e. 4,3,2,1).

The **Sort** settings are saved until they are changed. For example, if one sort images in the **File List Pane** according to the **Type**, the images will remain sorted according to **Type** until the **Sort** settings are changed.

3.5.5 Icons

Icons toolbar button  . One can select different view modes in the **File List**

Pane. The **Thumbnail** view mode displays small images previews.

Then select one of the following:

3.5.5.1 Icon->Large Icons

Show the image files in **Large Icon** format.

3.5.5.2 Icon->Small Icons

Show the image files in **Small Icon** format.

3.5.6 Refresh

Refresh toolbar button:  If the files in the **Folders** are altered outside of

ToupView, after switch back to ToupView, one can **Refresh** the image files in the current directory to update the **Thumbnails**.

Press  (shortcut: **F5**) on the **Browser Frame Toolbar** to **Refresh** the image files.

3.6 Options

3.6.1Preference••• Shift+P

See **Process Frame: Options->Preference•••.**

3.6.2 Annotation•••

See **Process Frame: Options->Annotation•••.**

3.6.3 Auto Correction•••

See **Process Frame: Options->Auto Correction•••.**

3.7 Window

3.7.1Cascade

See **Process Frame: Window->Cascade.**

3.7.2 Tile

See **Process Frame: Window->Tile.**

3.7.3 Arrange Icons

See **Process Frame: Window->Arrange Icons.**

3.8 Help

3.8.1Help Contents F1

See **Process Frame: Help->Help Contents.**

3.8.2 Show Start Page

See **Process Frame: Help->Show Start Page.**

3.8.3 Check to Update

See **Process Frame: Help->Check to Update.**

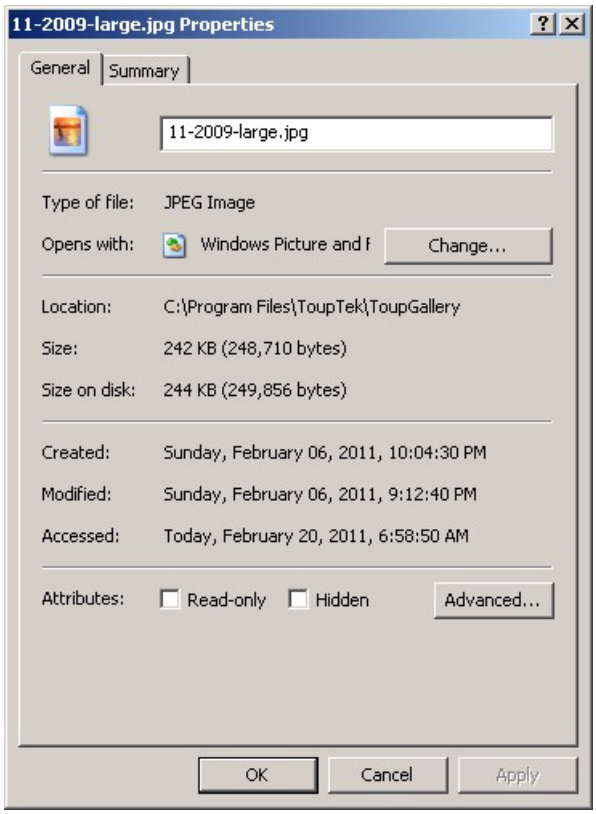
3.8.4 About••• See **Process Frame: Help->About.**

3.9 Browser Frame Toolbar

ToupView's **Browser Frame Toolbar** is shown below. To invoke the **Browser**, choose **View->Browser** (shortcut **Ctrl+B**).

Each icon's function is described below:

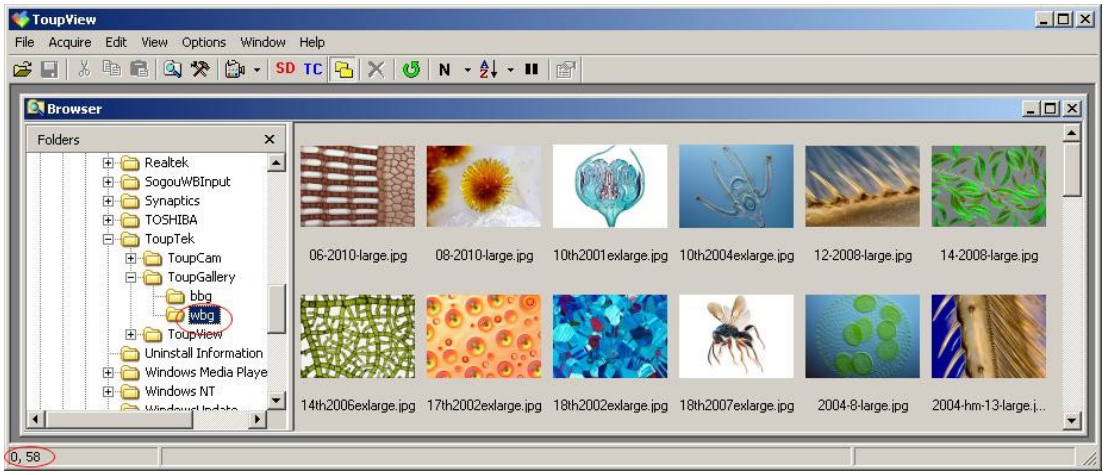
1. **File Bar:** Show/Hide the **Browser Folders**. See **Browser Frame: View->File Bar** for details.
2. **Delete File:** Send the selected file(s) to the **Recycle Bin**. See **Browser Frame: Edit->Delete File** for details.
3. **Refresh:** Reload images. See **Browser Frame: View->Refresh** for details.
4. **Icons:** Select thumbnail mode. See **Browser Frame: View->Icons** for details. **5. Sort:** Arrange images by name, type, size, width, height, or by alphabetical order. See **Browser Frame: View->Sort** for details. **6. Pause:** Pause loading the images from the current directory. . See **Browser Frame: Edit->Pause** for details.
7. **Property:** Display the selected image properties. When a file is selected, this button will be enable.Click it will pop-up XXX Properties dialog as below. Here, XXX is the selected file name.



3.10 Browser Frame Statusbar

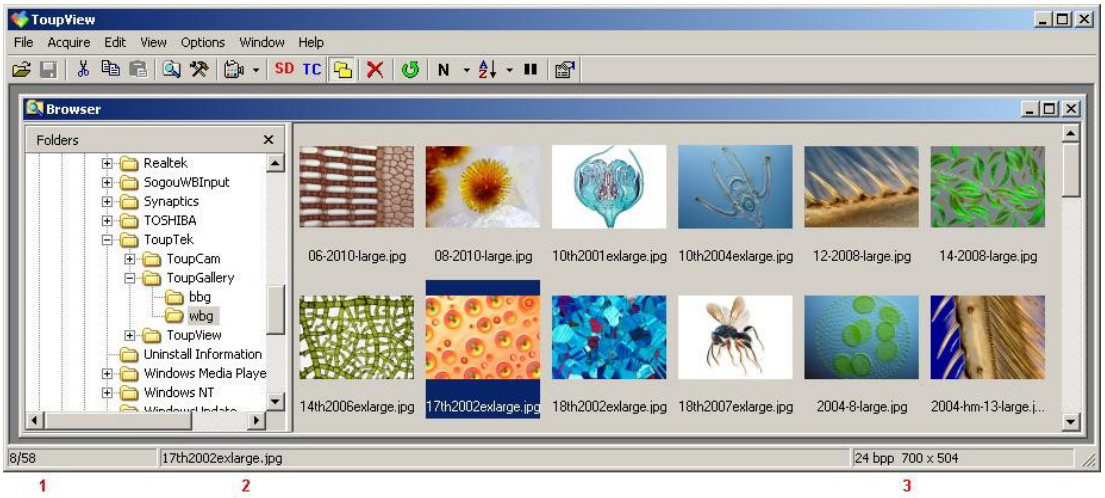
3.10.1 Selection No

When no file is selected in the **File List Pane** in the current directory, the **Statusbar** will display the information about the selected file location and the whole image files in the current directory as shown below:



3.10.2 Single Selection

When a single file is selected in the **File List Pane** in the current directory, the **Statusbar** will display the selected file information as shown below:



1. The selected file location in number and the total file number listed in the current selected directory, here, they are 8 and 58 respectively.

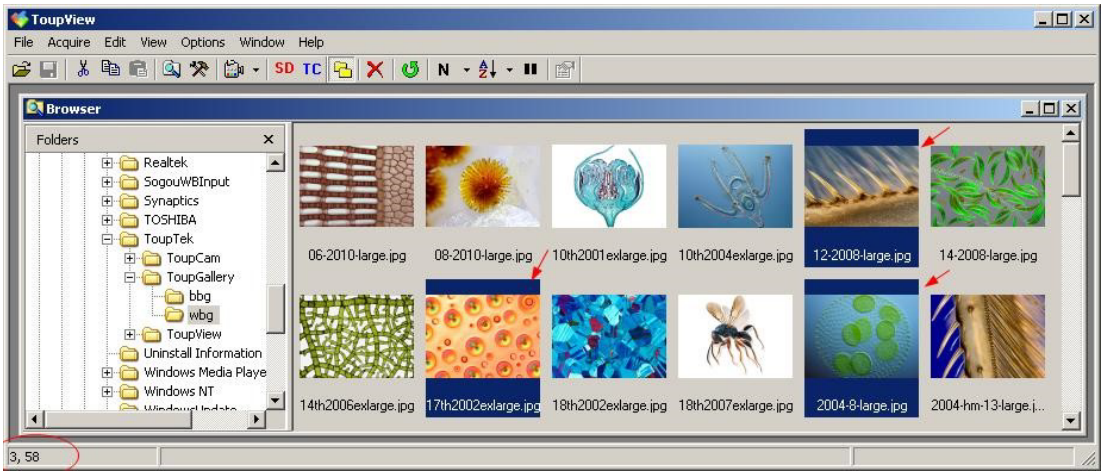
2. The selected file name.

3. The selected file color bits and its width and height.

Drag the selected file out of thr **Browser** will open it in a Image window

3.10.3 Multiple Selections

When multiple files are selected in the **File List Pane** in the current directory, the **Statusbar** will display the information of the multiple selected file properties as shown below:



1. The number of selected files and the total number of files in the current directory.

2. If the selected files' color bits and dimensions are the same, they will be displayed; otherwise, nothing will be displayed.

Use

4 Start Frame

4.1 Start Frame Introduction

The **Start Frame** includes:

1. **Start Frame Menu.**

2. **Start Frame Toolbar:** See **Start Frame: Start Frame Toolbar.**

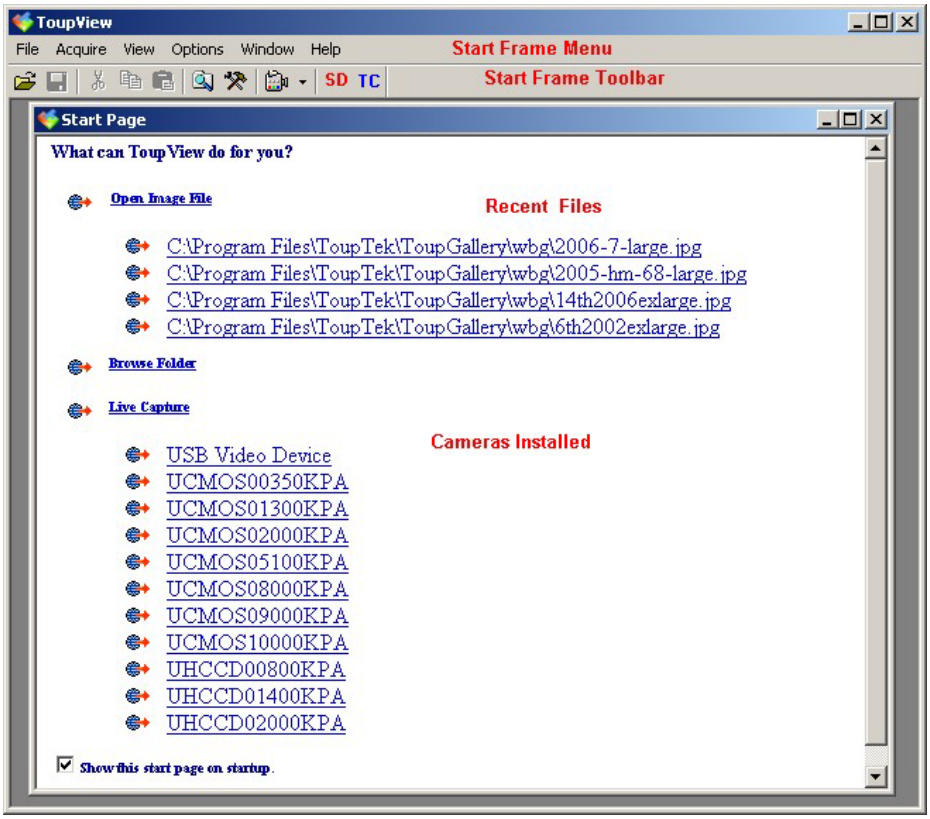
3. **Start Page:** Here, the user can launch the:

Open Image File: Click on the **Recent Files** list can open it in an **Image Window.** See **Process Frame: File->Recent Files, Options->Preference->Misc->Privacy** for more information.

Browser Frame: Click on the **Browser Folder** to browse the images in the selected directory.

Live Capture: Click on the **Camera** name to start the **Live Capture** very quickly.

See **Process Frame: Help->Show Start Page** for details.



4.2 File

4.2.1Open Image••• Ctrl+O

See **Process Frame: File->Open Image•••.**

4.2.2 Open Video•••

See **Process Frame: File->Open Video•••.**

4.2.3 Paste as New File•••

See **Process Frame: File->Paste as New File•••.**

4.2.4 Print Setup•••

See **Process Frame: File->Print Setup•••.**

4.2.5 Recent File

See **Process Frame: File->Recent File.**

4.2.6 Exit

See **Process Frame: File->Exit.**

4.3 Acquire

4.3.1Live Capture

See **Process Frame: Acquire->Live Capture.**

4.3.2 Software Power

See **Process Frame: Acquire->Software Power.**

4.3.3 Manage Software Power••• Ctrl+M

See **Process Frame: Acquire->Manage Software Power•••.**

4.3.4 Video Marker•••

See **Process Frame: Acquire->Video Marker•••.**

4.3.5 Video Overlay Text••• Ctrl+D

See **Process Frame: Acquire->Video Overlay Text•••.**

4.3.6 Video Watermark••• Ctrl+W

See **Process Frame: Acquire->Video Watermark•••.**

4.3.7 Auto Maximum Size••• Ctrl+U

See **Process Frame: Acquire->Auto Maximum Size•••.**

4.3.8 Capture with Marker and Watermark Ctrl+F

See **Process Frame: Acquire->Capture with Marker and Watermark.**

4.3.9 Twain:Select Device•••

See **Process Frame: Acquire->Twain:Select Device•••.**

4.3.10 Twain:Acquire•••

See **Process Frame: Acquire->Twain:Acquire•••.**

4.4 View

4.4.1Browser Ctrl+B

See **Process Frame: View->Browser.**

4.4.2 Tool Box Ctrl+T

See **Process Frame: View->Tool Box.**

4.4.3 Annotation Manager See Process Frame: View->Annotation Manager.

4.5 Options

4.5.1Preference••• Shift+P

See **Process Frame: Options->Preference•••.**

4.5.2 Annotation•••

See **Process Frame: Options->Annotation•••.**

4.5.3 Auto Correction•••

See **Process Frame: Options->Auto Correction•••.**

4.6 Window

4.6.1Cascade

See **Process Frame: Window->Cascade**

4.6.2 Tile

See **Process Frame: Window->Tile**

4.6.3 Arrange Icons

See **Process Frame: Window->Arrange Icons**

4.7 Help

4.7.1Help Contents F1

See **Process Frame: Help->Help Contents**

4.7.2 Show Start Page

See **Process Frame: Help->Show Start Page**

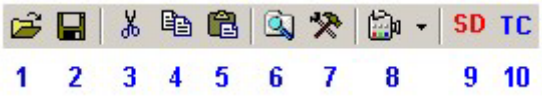
4.7.3 Check to Update

See **Process Frame: Help->Check to Update**

4.7.4 About•••

See **Process Frame: Help->About**

4.8 Start Frame Toolbar



1. **Open:** Open an image file. See **Process Frame: File->Open Image•••.**
2. **Save:** Save image file. See **Process Frame: File->Save.**
3. **Cut:** Cut the selected **Annotation** objects. See **Process Frame: Edit->Cut.**
4. **Copy:** Copy the selected **Annotation** objects or rectangular area image to clipboard. See **Process Frame: Edit->Copy.**
5. **Paste: Paste** the **Annotation** objects above the **Background layer.** See **Process Frame: Edit->Paste.**
6. **Browser:** Show/Hide **Browser** window, see **Process Frame: View->Browser** for details.
7. **Tool Box:** Show/Hide **Tool Box.** See **Process Frame: Edit->Tool Box.**
8. **Live Capture:** Start **Live Capture.** See **Process Frame: Acquire->Live Capture.**
9. **Twain:Select Device:** See **Acquire->Twain: Select Device•••.**
10. **Twain:Acquire:** See **Process Frame: Acquire->Twain: Acquire•••.**