





























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**Chapter 1 Introduction to PhotoLib3.0****1.1 Base Characteristic**

- 1 Support Twain interface and VFT interface frame grabber;**
- 3 Support WIN95, WIN98, WIN2000 and WINXP operation systems;**
- 5 Support color adjustment, image transform , Morphological processing , image enhancement.**
- 6 Support 24 bit true color image capture. Support RGB、CMY、HSV、YUV color models processing and analysis;**
- 7 Support Undo, Redo;**
- 8 Support geometry parameters measurements;**
- 9 The analysis results can output to html files or Clipboard. Print can be performed using specified format or report. The image can be printed with photo quality .**

## Chapter 2 PhotoLib3.0 Installation

### 2.1 System Requirements

#### 2.1.1 Hardware requirements

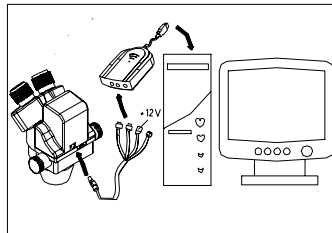
<i>CPU</i>	<i>PII200 above</i>
<i>Memory</i>	<i>64M above</i>
<i>Hard disk</i>	<i>200Mabove</i>
<i>Others</i>	<i>CDROM、USB Port or Frame Grabber</i>
<i>Selectable hardware</i>	<i>The digital microscope (Sunny Group recommended) or the related products from other companies</i>

#### 2.1.2 Software requirements

**Microsoft Windows operation  
systems(Win95,Win98,Win2000, Win XP)**

### 2.2 Hardware Installations

Please install the hardware according to their specific instruction manual.



**Fig.2.2-1: The connection of the digital microscope (SAM) with personnel computer**

**Installation of the digital microscope on a personnel computer is as follows:**

- 1 Insert the PAV cable's S end into the video head.**
- 2 Insert any of the C-VIDEO or S-VIDEO BNC connector plugs into A/D board.**

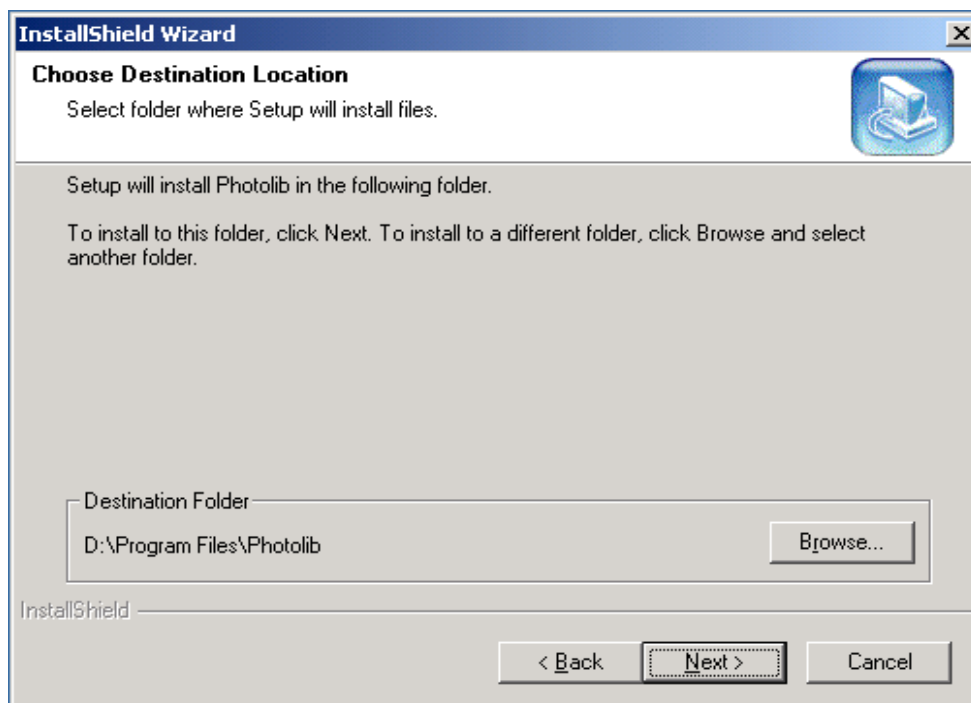
**3** Insert the USB end of the A/D board into the PC's USB port.

**4** If the computer has frame grabber(support video for windows) , the user can connect C-VIDEO or S-VIDEO plugs with the frame grabber .

Connect 12VDC power plugs with PAV cable's power socket as shown in Fig2.2-1

### **2.3 Software Installation**

Insert PhotoLib<sup>®</sup> CDROM into CDROM driver, the installation program will then install the application automatically, as shown in Fig.2.3-1. If you have selected the hardware from us, please specify the application program and the driver. Select "next", the system will finish the next installation procedure automatically.(If you have selected the hardware from other companies, please just select our application program, after the installation of the application, please install the hardware driver or the hardware supplier).



**Fig 2.3-1 Software Installation**

## 2.4 Software Registration

After the installation, double click the PhotoLib® icon on the desktop in the Run->Program->PhotoLib, a dialog will be shown as in Fig.2.4-1. Please copy your hardware serial number in the edit box and send it to your software vendor to get the registration code. Your vendor will send you a key.dat file according to your registration code. After receive this file, please import this file or copy this file into your application program directory by hand. Run the application again, the program will run as normal and you can run the PhotoLib® application. Make sure to keep a copy of key.dat in a safe place or make a backup of this file before you want to delete the application.

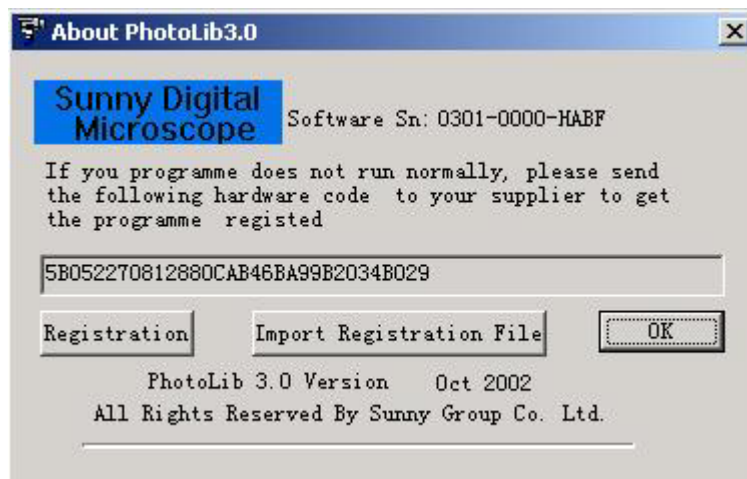


图 2.4-1 The hardware serial number of the user's software

### Fig.2.4-2 Software Registration

## 2.5 Execute PhotoLib®

Double click the PhotoLib® Icon, the program should work normally now.

**Chapter 3 PhotoLib3.0 GUI****3.1 Description of the PhotoLib3.0 GUI**

Double click PhotoLib icon, a user friendly interface will be shown as in Fig.3.1-1. The GUI mainly includes ToolBar, StatusBar, Layer Manager, Measurement Window, PaletteBox and Image Window. Detailed menu function will be introduced in Chapter 4. The Toolbar item functions are shown in Fig.3.1-3,

The image information is displayed in the StatusBar. As an example, we now open an image with cells and constitute a new layer, make a label (circle or ellipse) on a single cell. The GUI at this time should be look like Fig.3.1.2. Now we found there are three layer in the layer manager, i.e. background (Image layer), the second layer(made by the system itself), the third layer which is made by ourselves. When we need to label the image, we must let the current layer selection on the other layer, not the background layer (Detailed description will be given in Chapter 4). In the measurement window, some basic information are shown, this include e.g. No, Name, Center Pos, Radius, Area, Perimeter, Angle, Start Pos, End Pos).

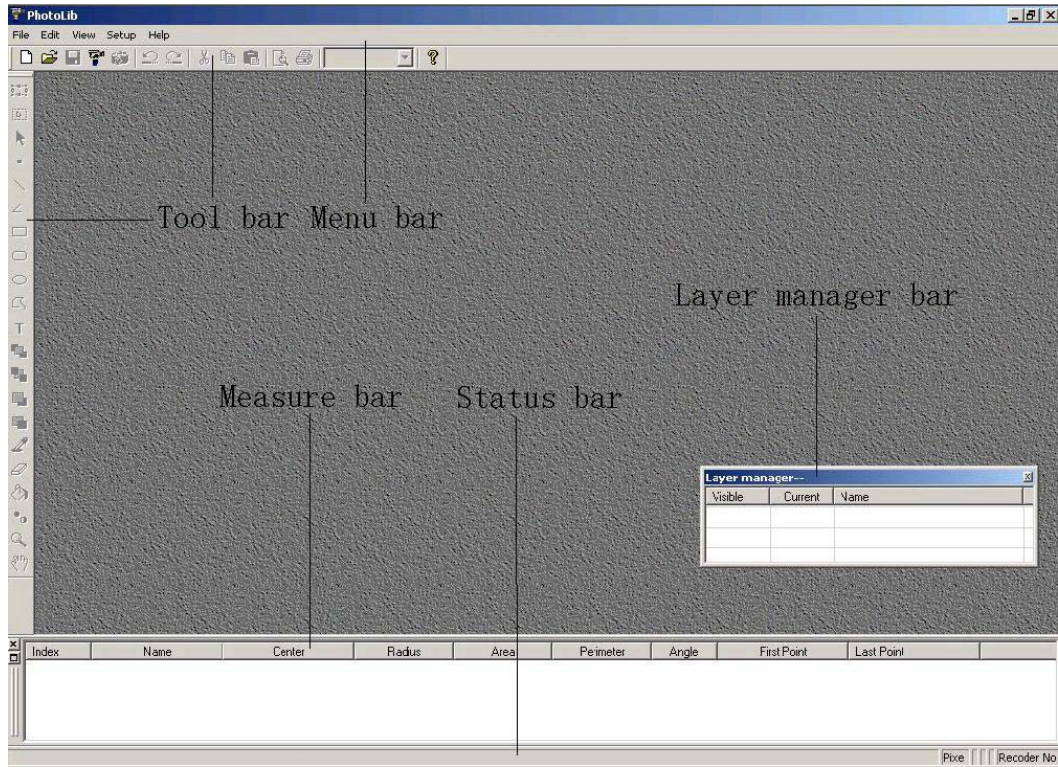


Fig.3.1-1 The Application GUI

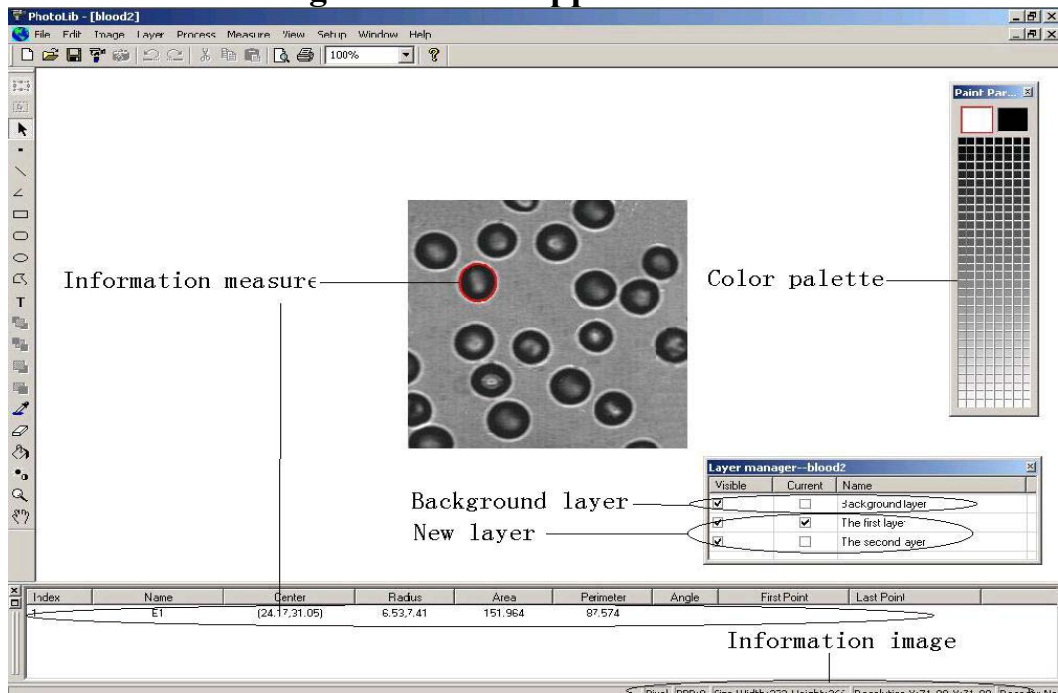


Fig.3.1-2 The Application GUI after open an image

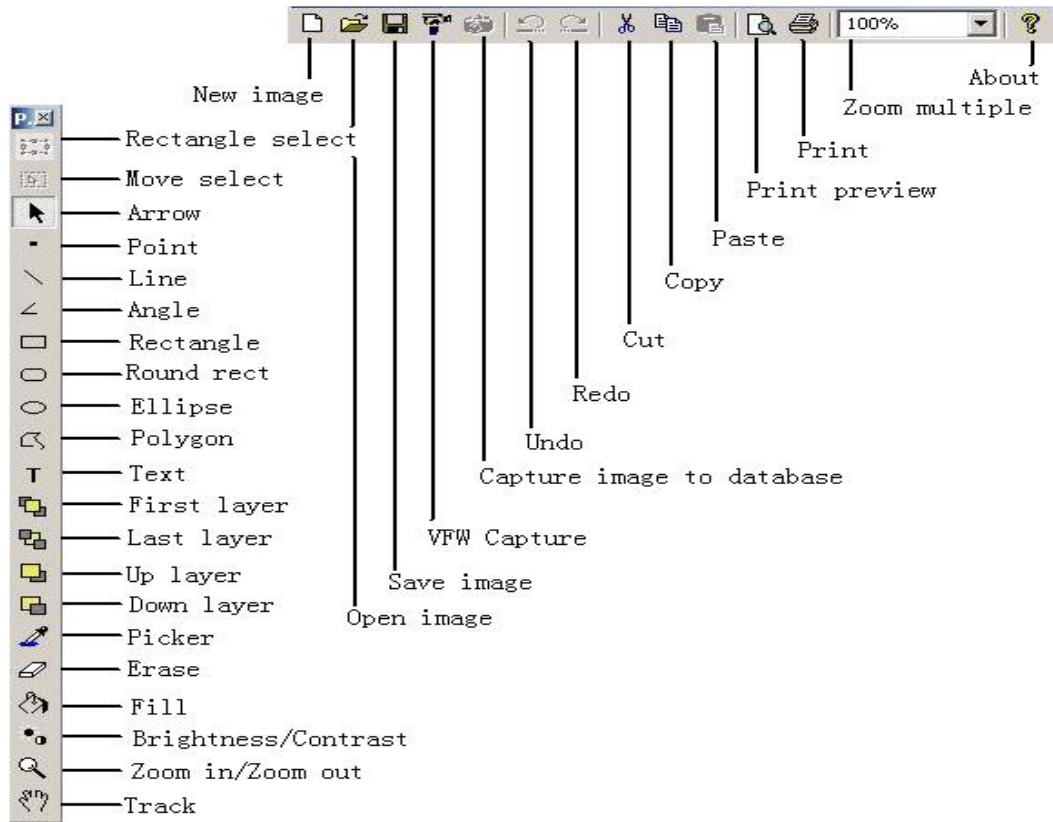



Fig.3.1-3 ToolBar and Its Item Function

Chapter 4 The Main Functions of the PhotoLib3.0®

4.1 File Menu

4.1.1 New(N)...Ctrl+N 

Use the New command to create an empty 24 bit image window of the specified dimensions and class. The image width and height can be specified in the pop up dialog as shown in Fig 4.1-1

When an empty window is created, all pixels are initialized with the lowest intensity value for its type (e.g. 0).

Width	Enter image width in pixels if the Unit field is set to Pixel. The width value establishes the number of pixels the new image window will contain in the horizontal direction. Default value is 320
Height	Enter image height in pixels if the Unit field is set to Pixel. The height value establishes the number of pixels the new

	image window will contain in the vertical direction. Default value is 240.
--	--

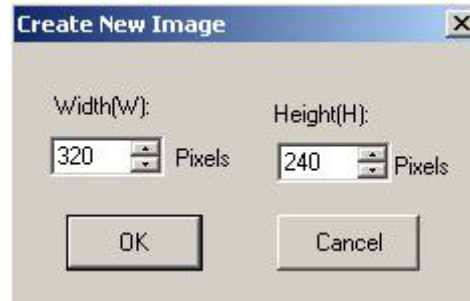


Fig.4.1-1 Constitute New Image Window

#### 4.1.2 Open(O)... Ctrl+O

Use the *Open* command to open an existing image file(see Fig.4.1-2) *Open* can also be used to preview a miniature of the image, or to view its statistics and information without actually having to open the image itself. These capabilities can be used to locate a particular image quickly.

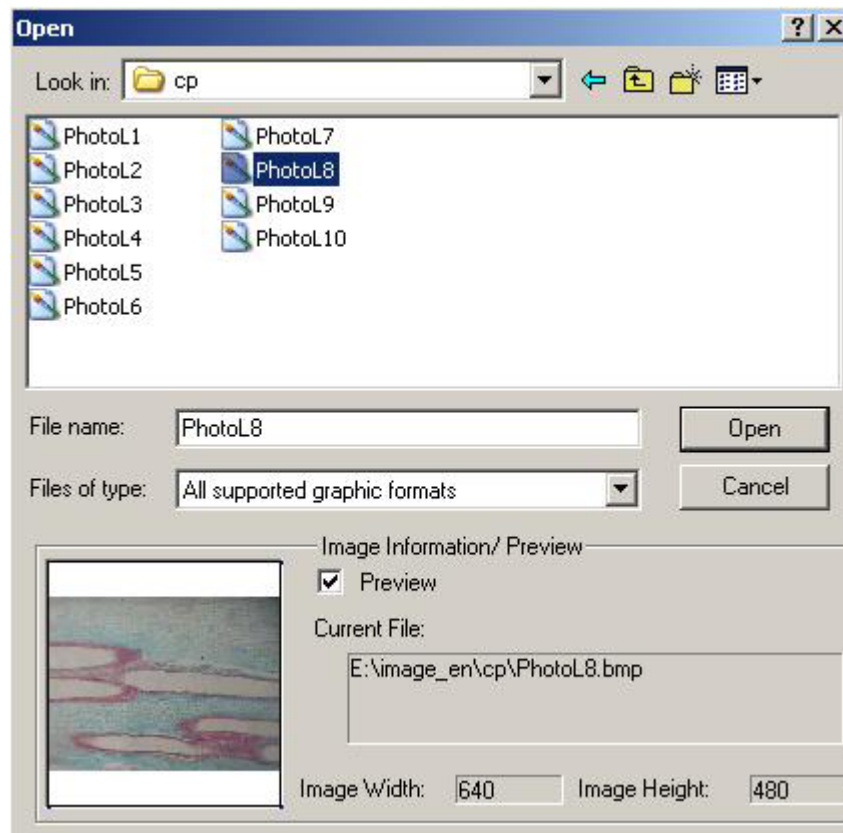
*PhotoLib*<sup>®</sup> supports, and will open, many image formats. These are identified in the File type list box.

When you open an image, *PhotoLib*<sup>®</sup> places it into a new image window. It becomes the active image. More than one image can be open within *PhotoLib*<sup>®</sup> simultaneously.

**Note -** *PhotoLib*<sup>®</sup> maintains, at the bottom of the File menu, a list of the last four files you have opened. You can access any of these files by simply clicking on its file name. If no files are listed (beneath Exit), then you must use the Open command to open the file. Also you can use the Browser to view images under any directory you selected. Brief informations are given in Browser item.

<i>File Name</i>	<i>From this list box, select the name of the file you want to open. You can either type the name of the file (with its entire path, if it is not in the current folder), or use the look in and Files of type selections to obtain a list of file names from which you can select. Double-clicking on a file name in the large list box (where both folder and file names are listed) will automatically open it. Note - if you simply type in the file name, be sure that the <b>Files of type</b> field correctly identifies the format of the file you want to open. Otherwise you will receive an error message</i>
------------------	--

	<i>when PhotoLib® tries to open the file.</i>
<i>Files of type</i>	<i>In this list box, select the image format of the file you want to open. If you select All Formats, PhotoLib® uses the file's extension to identify its format (e.g., TIF for TIFF, PCX for ZSoft files, .BMP for bitmap files, and so forth). If your image file does not use standard format-identifying extensions, you must type the name of your file in the File Name field, then select its format from the File Type list box. Otherwise, PhotoLib® will select a format based on the file name extension.</i>
<i>Preview</i>	<i>Click this button to preview your image in miniature size. In preview mode, statistics and information about your image (e.g. image width, height and image location) will be displayed. The default state is no Preview.</i>




**Fig.4.1-2 Open an image file**

#### 4.1.3 Close(C)

Use the *Close* command to close an active image and remove its window from the screen.

**Note - if you have modified an image before attempting to close it, PhotoLib® can issue a warning asking if you want to save it first.**

**4.1.4 Save(S) Ctrl+S **

Use the *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 active in its window. If the image is in an untitled window, *PhotoLib*<sup>®</sup> will issue the *Save File As* dialog box.

The *Save* command can be used to save your 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 you close an image and choose not to save its changes, *PhotoLib*<sup>®</sup> 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. If you need to store just the contents of an AOI, use the *Copy To...* command.

**4.1.5 Save as(A)...**

Use the *Save As* command to store the contents of the current window, to a file that you specify, in the format that you specify.

At the end of a *Save As* operation, your image window will be associated with the new file and the new format (i.e., its title bar will display the new file name). See Fig 4.1-3.

**Save in:** Find the folder into which you want to save the file. You may create a new folder using the *New Folder* button.

**File name:** Enter the name of the file you want the image saved to.

To specify the file's location, you can either enter its entire path (disk and folder), or specify its location using the *Save in* list box.

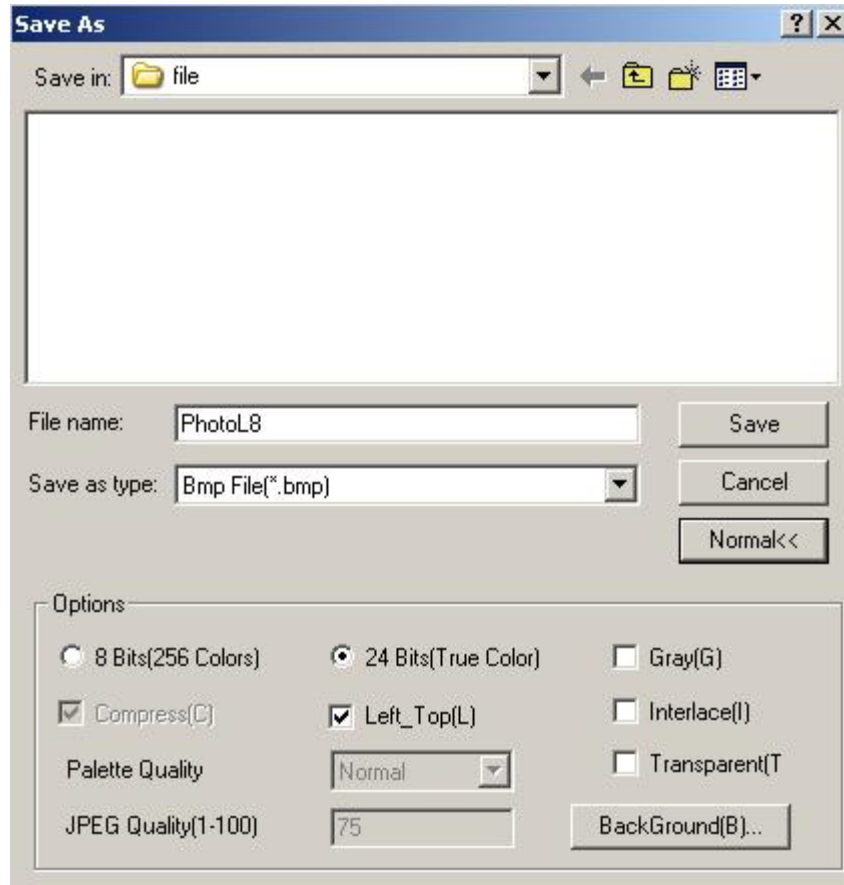
**Save as type:** In this list box, select the format in which you want the image saved. It is also used to convert a single image from one format to another. For example, if you needed a TIFF file converted to PCX format, you would simply open the TIFF image, then use *Save As* command with the PCX format option to save it

to a new file.

**The *Save As* command serves several important uses beyond simply storing an image to a new file name (click *Advanced* button). It is also used to:**

Gray	<i>It is used to convert the active image's color format. If Gray checkbox is clicked, the active image (color image or gray level image) will be changed to 8 Bits gray level image. Otherwise you can choose to save active image in 24 Bits or 8 Bits. When you select to save it in 8 Bits, you can adjust image palette quality in Palette Quality listbox.</i>
8 Bits	<i>Save active image in 256 gray level or 256 index color. Note: - if you plan to use the image with another program, be sure it is compatible with the selected compression method. Not all programs support compressed and uncompressed format variants.</i>
24 Bits	<i>Save active image as a 24 bits True Color image.</i>
Compression	<i>Save an image with different compression or quality options from those it was originally created with. For example, if your original TIFF file was uncompressed, you can use Save As command with the LZW compression option to store it in compressed form. Note - if you plan to use the image with another program, be sure it is compatible with the selected compression method. Not all programs support compressed and uncompressed format variants.</i>
Left_Top	<i>Use this command to encode active image from left_top to right_bottom style.</i>
Interlace	<i>Use this command to encode active image with interlace mode.</i>
Palette Quality	<i>If you save an image in 8 bits color mode, you can choose palette quality listed (e.g. Normal, Good, Better, Best).</i>
Transparent	<i>Use this command to encode an image in transparent mode.</i>
JPEG Quality	<i>If you save an image in JPEG format (*.jpg), you may adjust save quality in the edit box. The value range from 0 to 100.</i>

**Note - Detailed information of the above academic terminologies can be found in the books about image processing and image compression or in the internet**



**Fig.4.1-3 Save image as**

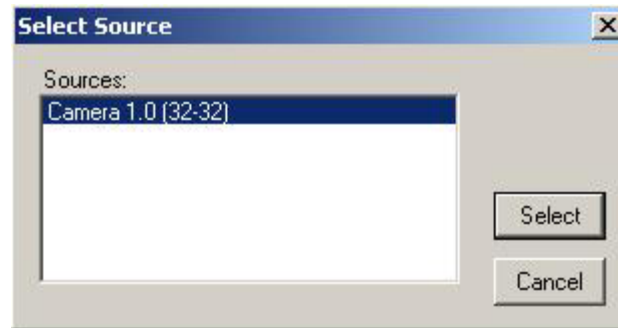
**Notes:: About image encoding and compression, please see the reference about image processing**

#### **4.1.6 Import Photo (I)**

**Use *Import Photo* to capture image from image import devices such as Scanner, Digital Camera, USB Camera or devices support VFW, WDM and Twain interface.**

##### **(1) Select Devices(E)...**

**Select active import device from all devices available in the list box, see Fig4.1-4.**



**Fig.4.1-4 Select Input Devices**  
**(2) Capture... (C)...**

A Twain interface dialog will be display in the Frame Window. If capture button is clicked, the image displayed in Twain window will be capture to the window or the database. There should be some setting buttons in the dialog. Help can be found in the specific devices manual or help menu.

**(3) VFW Capture(V)** 

A specially design window which will display video image from the devices. It support device with VFW (Video For Window) interface. See Fig.4.1-5

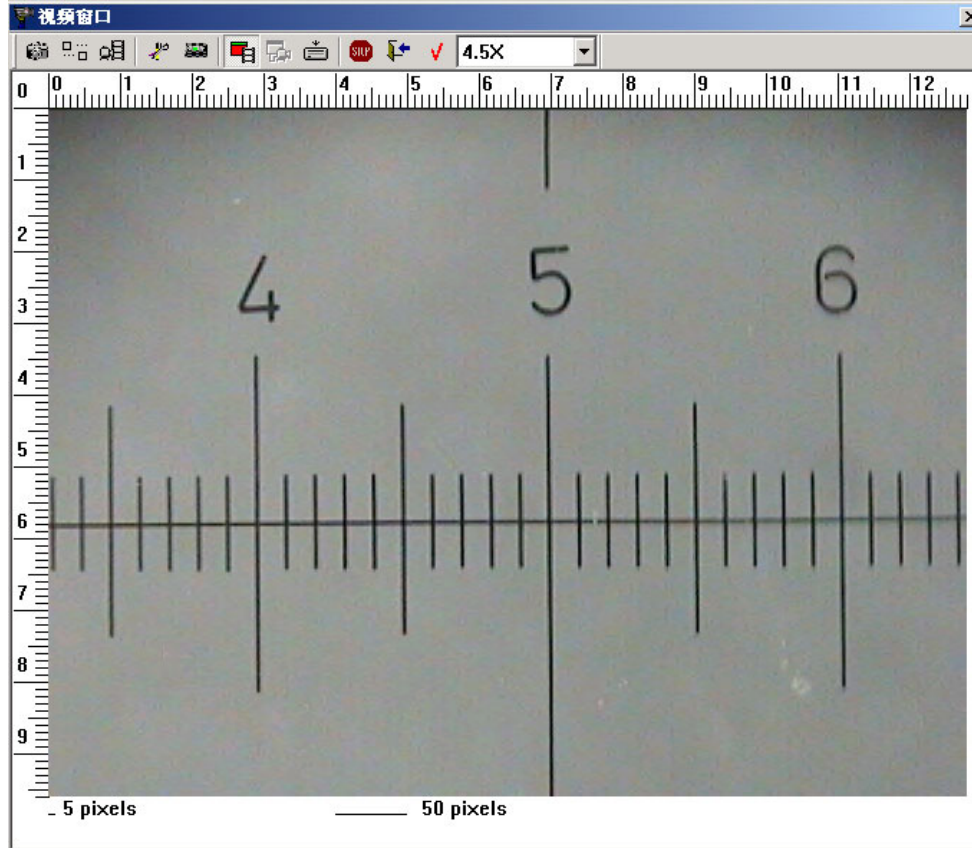













图 4.1-5 Video Window

<p>Single Capture </p>	<p>Set active image displayed in the Video Window as a new image window. You can change options such as name, format and direction of this image window when saving it to a file.</p>
<p>Timed Capture </p>	<p>Click this command to capture a sequence of images from import device. You can adjust Time Interval and Frames To be Captured in the dialog window. See Fig. 4.1-6</p>
<p>Video Capture </p>	<p>Click this button to begin capturing a sequence of images to create a video file named CAPTURE.AVI that will be placed in the direction "C:\\" by default. To end capture click again or press ESC key. Also you can change saved file's name and direction by choosing Save Video As... command in File menu. Make sure you have enough disk space before you begin to do this command.</p>
<p>Video Format </p>	<p>Use Video Format command to choose import device in all listed devices, and you can change Image Size which will be saved as Video, and you also can choose Image Format (e.g. RGB 24, RGB 16, UYVY, YUY2).</p>
<p>Video Source Control </p>	<p>Use this command to adjust configurations of current selected import device. You should refer to more information in import device's user manual.</p>

Video Preview 	If click this command, the real-time video will be displayed in the window. Otherwise it will always display the latest one.
Video Compress 	Select proper program existed to do video compress.
Close Video Window 	Close this Video Window only.
Exit 	Exit the entire program.
Reload 	Set the magnification as the first one.
Magnification 	List all magnifications you specified in Sys Magnification dialog window. When select proper magnification, the current scale will be displayed at the bottom of the window. There exist two lines. By default, its unit is pixel, the longer line represent 50 pixels and the shorter one represent 5 pixels. After you define your own resolutions (See more in Set Resolution) and choose one of them in the list, the longer line will show 50 pixels on the screen are equivalent to how many units as your choice, the shorter one will show 5 pixels on the screen are equivalent to how many units as your choice.

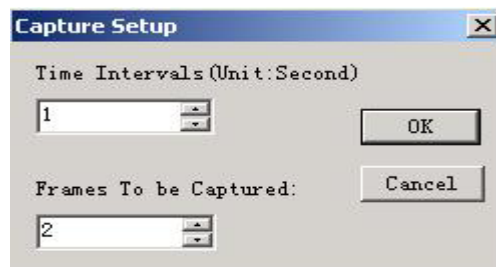


Fig.4.1-6 Timed Capture

## 4.1.7 Desktop (D)

Select this option if you want to capture the entire screen, the same function as the *PrtScr* button.

## 4.1.8 Open Database (E)

When select this command, the program will display an *Open Database* dialog box as shown in Fig.4.1-7. In DB name you can input name and location of the database file (\*.mdb) you want to open or use browse to indicate it.

After open a database, you may get some useful information, including PHOTO\_NO, TYPE, TOPIC, USAGE, ADDRESS, OWNER, DATA, PHOTO\_PATH, IMAGE\_SUM,



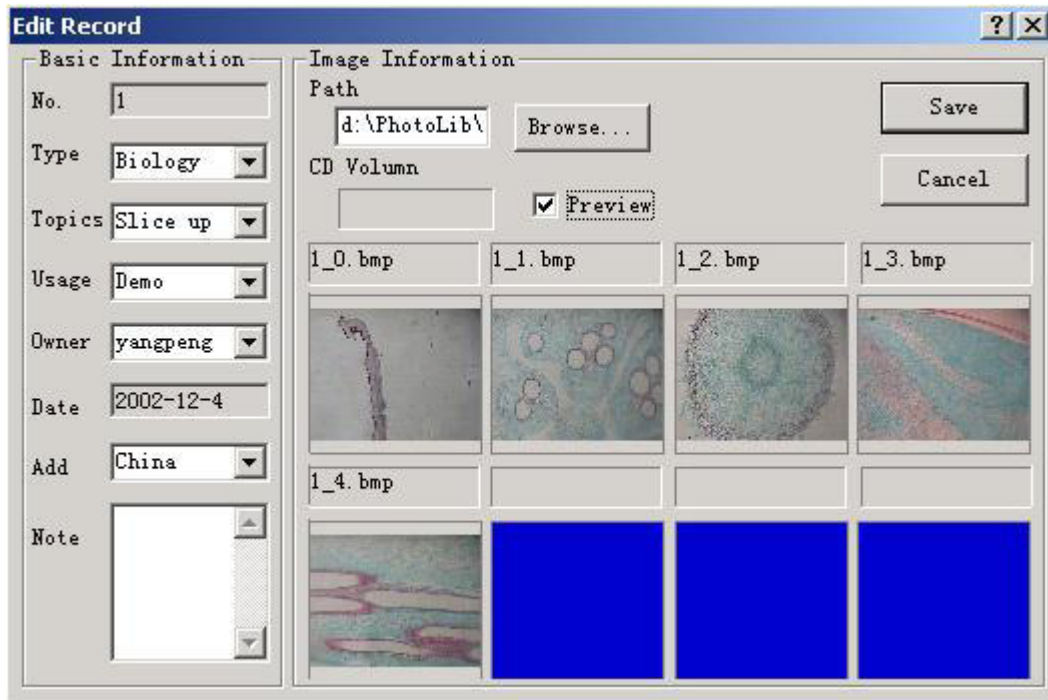



Fig.4.1-8 Edit Data Base record



图 4.1-9 Add Record

## 4.1.9 Disconnect Database (S)

Disconnect from an open database file.

**4.1.10 Print (P)...** Ctrl+P 

Use the *Print* command to print one or more copies of the current image to the selected output device. *PhotoLib*<sup>®</sup>'s *Print* command lets you take full advantage of your printer's capabilities. If your printer has built-in halftone or color dithering capabilities, you can use them. Or, you can instruct *PhotoLib*<sup>®</sup> to perform these processes before sending the image to the device.

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

**4.1.11 Print Preview (V)...** 

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

**4.1.12 Print Setup (U)...**

Click this button to access the setup panel for the printer you have selected. *PhotoLib*<sup>®</sup> will present the standard setup panel for your particular printer (this is the same panel you would receive if you were setting up your printer from the Windows Control Panel). Change your printer's setup to suit your needs, click its *OK* button to return.

**4.1.13 Send (D)...**

Use the *Send* command to send text and images to one or more people using Internet or Microsoft e-mail. You can compose a message and include one of the active images as a file attachment.

**4.1.14 Exit (X)**


Exit PhotoLib<sup>®</sup>.

**4.2 Edit Menu****4.2.1 Undo** Ctrl+Z 

Most operations can be undone (<Ctrl>+<Z>) if you make a mistake. Alternatively, you can restore all or part of an image to its last saved version.


4.2.2 Redo Ctrl+Y 

Use the *Redo* command (<Ctrl>+<Y>) to undo the most recent *Undo* operation.

4.2.3 Cut(I) Ctrl+X 


Use the *Cut* command (<Ctrl> + <X>) to copy the contents of the selected AOI to the Windows Clipboard and replace the AOI in the image with the background color selected in the *Paint Box*. If no AOI is active, *PhotoLib*<sup>®</sup> copies the entire active image to the Clipboard and replaces it with the background color in the *Paint Box*. The *Cut* operation changes the contents of the image in the active window (i.e. *Cut* deletes the AOI pixels). Any data already existing on the Clipboard will be replaced.

The data copied to the Clipboard can be pasted into the active window or into another open window using the *Paste* command. You can also create a new window directly from the Clipboard contents using the *Paste As a New File* command.

4.2.4 Copy(C) Ctrl+C 

Use the *Copy* command (<Ctrl> +<C>) to copy the contents of the selected AOI to the Window Clipboard. If no AOI is active, *PhotoLib*<sup>®</sup> copies the entire active image to the Clipboard. *Copy* will not change the contents of the image in the active window (i.e., copy does not delete the copied pixels). Any data already existed on the Clipboard will be replaced by the new one.

The copied data can be pasted into the active window or into another open window using the *Paste* command. You can also create a new window directly from the Clipboard contents using the *Paste As a New File* command.

4.2.5 Paste(P) Ctrl+V 

Use the *Paste* command (<Ctrl> + <V>) to place the contents of the Windows Clipboard into the active image. You would use *Paste* to transfer part of one image into another.

Before you can execute the *Paste* command, you must have somehow placed valid image data on the Windows Clipboard (see the *Copy* command). If there are no data on the Clipboard, the *Paste* command will not be active. Image data can be pasted into any image type that *PhotoLib*<sup>®</sup> supports.

*PhotoLib*<sup>®</sup> will accept image data from other applications via the Clipboard as long as it is in Windows DIB format. If you attempt to *Paste* non-image data (e.g., text or spreadsheet data) to an image window, after you first perform *Copy* operation, the Paste will still in Grayed or Disable status and thus you will Paste nothing.

When you select the *Paste* command, *PhotoLib*<sup>®</sup> will initially position the Clipboard data in the upper-left corner of the currently active window. Put your cursor over the Clipboard data. Your cursor will appear as a 4-way arrow and will allow you to drag the Clipboard data to the desired position you want. When you are happy with its position, click the right mouse button permanently set the Clipboard data into the image. The Clipboard pixels will overlay those at the specified position.

If the Clipboard image is larger than the destination image, it ask you whether to enlarge the background image or not. Please make sure to select the right image before confirming the *Paste* operation (left-mouse click).

#### 4.2.6 Selective Paste (S)...

Use *Selective Paste* command to place the contents of the Windows Clipboard into a new image, which become the active image. When to do this, you can choose the format of the new image from the following options (See Fig.4.2-1):

DIB	Device Independent Bitmap
DDB	Device Dependent Bitmap
Palette	Index Bitmap

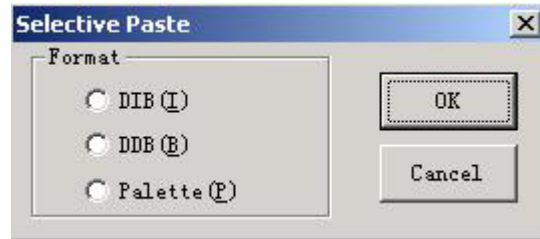


Fig. 4.2-1 Selective Paste

#### 4.2.7 Paste As a New File (N)

Use the *Paste As a New File* command to place the contents of the Windows Clipboard into a new image, which becomes the active image.

Before you can execute the *Paste As a New File* command, you must have somehow placed valid image data on the Windows Clipboard (see the *Copy* command). If there are no data on the Clipboard, the *Paste* command will not be active.

The class of the new image will be the same as that of the original image. *PhotoLib*<sup>®</sup> will accept image data from other applications via the Clipboard as long as it is in Windows bitmap (BMP), Tagged Image File Format (TIF), Device Independent Bitmap (DIB) or Windows' Picture form. If you attempt to *Paste* non-image data (e.g., text or spreadsheet data) to an image window, you will receive an error message.

#### 4.2.8 Delete (D) Del

Use *Delete* command (<Del>) to set active rectangular AOI area into background color selected in the *Paint Box*, if there is no AOI area exist the whole image will be deleted.

#### 4.2.9 Copy To (O)...

Copy entire active image to a disk file. When to do this, you must enter file name and location and also you can select image format from following selection in file save type list:

Monochromatic Bitmap; 16 Bits Bitmap; 256 Color Bitmap; 24 Bits Bitmap.

## 4.2.10 Paste From (E)...

*Paste* an image from a file in disk. When click this button will display *Open* dialog window to let you choose proper file in proper location. If the image file is larger than active image, *PhotoLib*® will issue a warning asking if you want to enlarge the image.

**4.3 Image Menu**

## 4.3.1 Select (S)

You can use selection borders to select pixels. When you *Select* pixels, you are selecting resolution dependent on information of the image.


When you click on the *Select* command, you will have following options:

**(1) Select All (A) Ctrl+A**

*Select* all pixels on a layer within the canvas boundaries

**(2) Rectangle Select (S)** 

Select a rectangle area of the image pixel. When *Rectangle Select* command is active, A "+" shape cursor will be appeared in the image area, using left mouse button to determine the first point, then keep the left mouse button down and move the mouse, after the left mouse button is up, a rectangle area will be appeared on the image area. This region is the *Rectangle Selected* region. If the user put the mouse button on the selected area, then a *Move* shape mouse cursor will appeared, then the user can move the rectangle to where ever he want.

**(3) Move (M)** 

*Move* the mouser cursor inside the selection area, and drag the selection area to a new position, then use *Merge Float Wnd* command to merge images. When this command is active, the mouse cursor will change to *Move* shape. See the *Rectangle Selection* to learn how to get selection area.

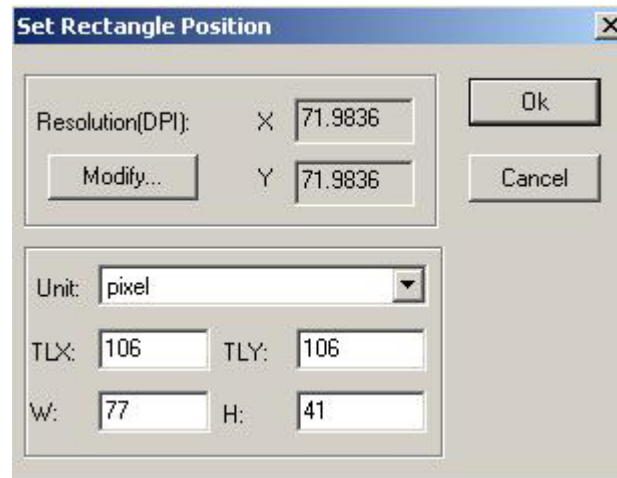
**(4) Deselect (D)**

*Deselect* selected area on the image (including the entire image area).

**(5) Make Selection (P)...**

User can use the *Make Selection* command to make an exact selection area. A *Rectangle Selection* made selection area must be made first, then one can evoke the *Make Selection* dialog and make fine selection.

The dialog will show current image resolution in both directions (See 4.3-1). One can also modify the image resolution in this dialog using *Modify... to Set Image Resolution*.



**Fig.4.3-1 Set rectangle size for selection**

<i>Unit</i>	<i>Display unit of the image can be selected first.</i>
<i>TLX</i>	<i>The X value of the selection area's topleft point.</i>
<i>TLY</i>	<i>The Y value of the selection area's topleft point.</i>
<i>H</i>	<i>The selection area height</i>
<i>W</i>	<i>The selection area width</i>

**(6) Merge Float Wnd Ctrl+M**

**When there exists a float window on the current active window,**

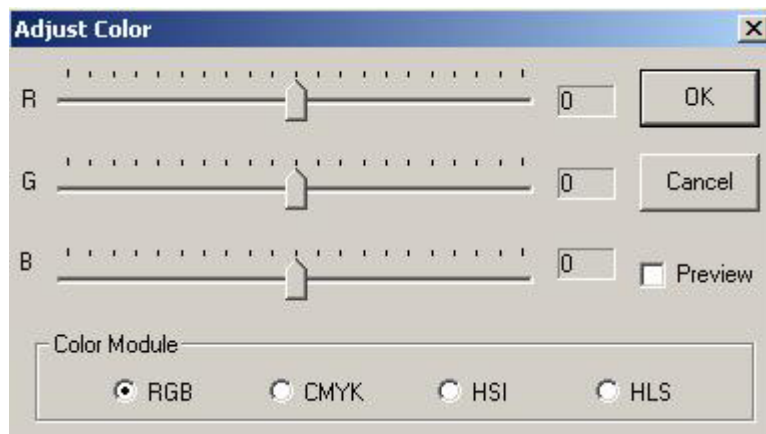
use *Merge Float Wnd* command can merge the float window and current image window into one image window

#### 4.3.2 Adjust (A)

When you click on the *Adjust* command, you will receive a menu from which you can choose the *Adjust* operation you want to perform as following:

##### (1) Color (R)...

The *Color* command changes the overall mixture of colors in an image for generalized color correction. The *Color* command will evoke a dialog is shown in Fig.4.3-2.

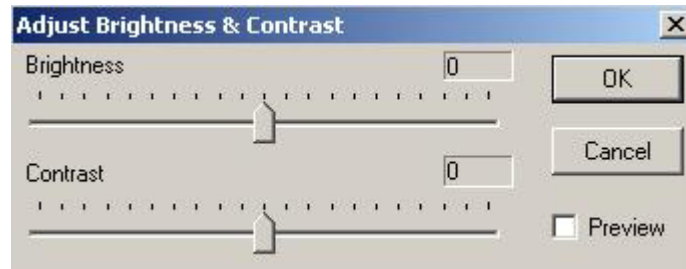


**Fig.4.3-2 Image Color Adjust**  
There are four color modules exist:

RGB	<p><i>PhotoLib®'s RGB mode uses the RGB model, assigning 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 a 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.</i></p> <p><i>RGB images use three colors, or channels, to reproduce up to 16.7 million colors on-screen; the three channels translate to 24 (8 x 3) bits of color information per pixel. (In 16-bit-per-channel images, this translates to 48 bits per pixel, with the ability to reproduce many more colors.) In addition to being the default mode for new PhotoLib® images, the RGB model is used by computer monitors to display colors. This means that when working in color modes other than RGB, such as CMYK, PhotoLib® uses RGB mode for display on-screen.</i></p> <p><i>Although RGB is a standard color model, the exact range of colors represented can vary, depending on the application or display device. PhotoLib®'s RGB mode varies according to the working space setting that you have specified in the Color Settings dialog box.</i></p>
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CMYK	<p>The CMYK model is based on the light-absorbing quality of ink printed on paper. As white light strikes translucent inks, certain visible wavelengths are absorbed while others are reflected back to your eyes.</p> <p>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.</p> <p>The subtractive (CMY) and additive (RGB) colors are complementary colors. Each pair of subtractive colors creates an additive color, and vice versa.</p>
HSI	<p>Based on the human perception of color, the HSI model describes three fundamental characteristics of color:</p> <p>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.</p> <p>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.</p> <p>Intensity is the relative lightness or darkness of the color, usually measured as a percentage from 0% (black) to 100% (white).</p> <p>Although you can use the HSI model in PhotoLib® to define a color in the Color palette or Color Picker dialog box, there is no HSI mode available for creating and editing images.</p>
HLS	<p>The HLS model is very similar to the HSI color model. The main difference between the two is the calculation used to produce the brightness value. In the HSI model, a pixel's brightness (I) is derived from the mean of its three (R, G and B) color values. In the HLS model, a pixel's brightness (L) is determined from the mean of the minimum and maximum value of its three color values.</p>
Preview	<p>Select this checkbox can display real-time effect when you change sliderbar.</p>

**The values beside the slide bar show the color changes for variant color channels. For RGB channel values can range from -100 to +100. For CMYK channel values can range from -100 to +100. For HSI channel H value can range from -180 to 180, S value can range from -275 to 275, I value can range from -442 to 442. For HLS channel, H value can range from -180 to 180, L value can range from -100 to 100, S value can range from -100 to 100.**

**(2) Brightness/Contrast... Shift+B****Fig.4.3-3 Contrast/brightness adjust**

The *Brightness/Contrast* command (<Shift>+<B>) lets you make 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 a loss of detail in the image. Its dialog is shown in Fig.4.3-3.

<i>Preview</i>	Select this checkbox can display real-time effect when you change slide bar
----------------	---

Dragging the slide bar to the left decreases the level and to the right increases it. The number at the right of each slider value displays the brightness or contrast value. Values can range from -100 to +100.

**(3) Gamma... Shift+G**

*Gamma* measures the brightness of middle tone values produced by a device (often a monitor). A higher gamma value yields an overall darker image. Dragging the slide bar to the left decreases the level and to the right increases it. Values can range from 0 to 3.0. The gamma adjust dialog is shown in Fig.4.3-4.

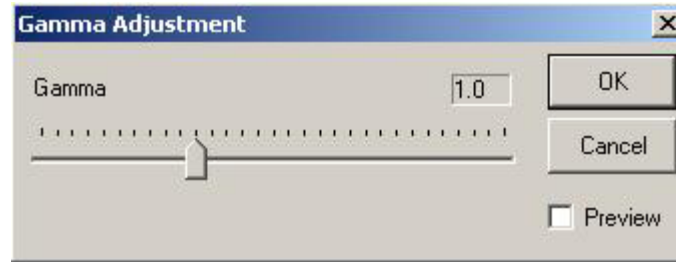


Fig.4.3-4 Gamma Adjustment

Preview

Select this checkbox can display real-time effect when you change slide bar

**(4) HMS... Shift+H**

Use *HMS...* command to adjust the H (High Light), M (Middle tone) and S (Shadow) part of the image. Each part's value can range from -100 to 100. This command is only available for 24 bits True Color image. The HMS adjust dialog is shown in Fig.4.3-5

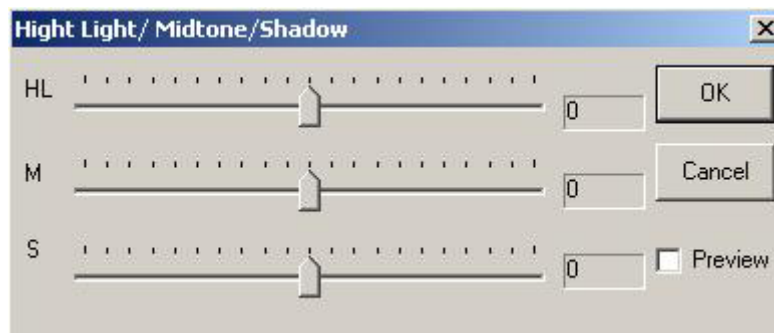


图 4.3-5 HL/M/S Adjust

Preview

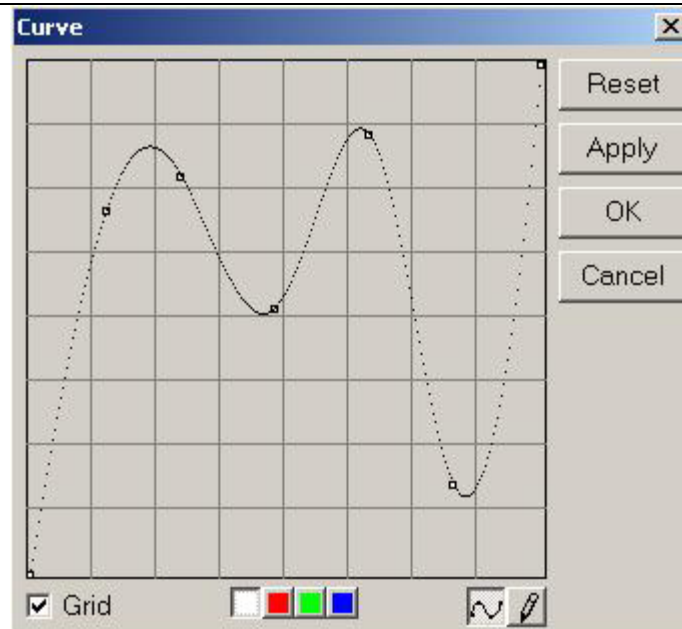
Select this checkbox can display real-time effect when you change slide bar.

**(5) Curve(C)...**

*Curve* dialog box lets you adjust the entire tonal range of an image. But instead of making adjustments using only three variables (highlights, shadows, middle tones), with *Curve* you can adjust any point along a 0-255 scale while keeping up to 15 other values constant. You can also use *Curve* to make precise adjustments to individual color channels in 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 pixels have identical Input and Output values. The curve adjust is shown in Fig.4.3-6.

Curves	Drag the curve until the image looks the way you want it
Pencil	Select the pencil at the bottom of the dialog box, and drag to draw a new arbitrary curve.
Channel	To adjust the color balance of the image, choose the channel (R, G or B) you want to adjust from the Channel button. To select RGB channels at the same time, you can click the white button which is located on the left of R (Red), G (Green) and B (Blue) buttons.



**Fig.4.3-6 Curve adjust dialog  
(6) Auto Level**

The *Auto Level* command moves the level sliders automatically to set highlights and shadows. It defines the lightest and darkest pixels in each color channel as white and black and then redistributes intermediate pixel values proportionately. Because *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 the first 0.5% of either extreme when identifying the lightest and darkest pixels in the image. You can change this default setting at menu *Set up -> Auto Clipping Range*.

This ensures that white and black values are based on representative rather than extreme pixel values.

*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* controls manually is more precise.

See *Auto Contrast* for another auto adjust command.

### (7) Auto Contrast

The *Auto Contrast* command adjusts the overall contrast and mixture of colors in an RGB image automatically. Because 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 high lights appear lighter and shadows appear darker.

When identifying the lightest and darkest pixels in an image, *Auto Contrast* clips the white and black pixels by 0.5%--that is, it ignores the first 0.5% of either extreme. You can change this default setting at menu *Set up -> Auto Clipping Range*. This ensures that white and black values are based on representative rather than extreme pixel values.

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

See *Auto Levelst* for another auto adjust command.

### (8) Color Bits (B)...

Use *Color Bits* command to adjust active image's bits count. You can choose 24 bits, 8 bits, 4 bits or 1 bit to represent one pixel. Its dialog is show in Fig.4.3-7. *PhotoLib®* is for scientific image processing and analysis, 24 bits and 8 bits are supported currently



Fig.4.3-7 Change Color bits  
(9) Color-->Gray (G)...

Use *Color -> Gray* command to change color image (True Color image or index color image ) to 8 bits gray scale image. If the image is true color image, change to gray scale will evoke the display of the palette if the *Paint Box* is visible. If the image is an indexed color image, then color in the *Palette Box* will also change to relative gray color

#### (10) Color Separation

Use *Color Separation* command to separate a special color channel from a color image. You can choose one of Red, Green or Blue color to separate. For every pixel, if you select Red color to separate, then only red channel has been kept, the image green and blue information will be discarded.

See Color Filter for another color operation.

#### (11) Color Filter

Use *Color Filter* command to filter a special color channel from a color image. You can choose one of Red, Green or Blue color to filter. For every pixel, if you select Red color to filter, then only red channel will be discarded, green and blue information will be remained.

See Color Separation for another color operation

#### (12) Negative

Use the *Negative* command to instruct *PhotoLib*<sup>®</sup> to reverse the pixel values for your active image without going through the

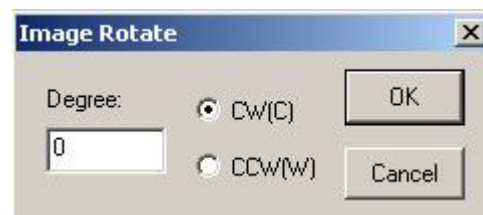
lookup table.

### (13) Contrast/Brightness Tool

Use *Contrast/Brightness* command to adjust image's Brightness or Contrast. Moving left-button-down mouse horizontally will change image's Brightness, while moving left-button-down mouse vertically will change image's Contrast. The command effect relate not only to mouse move distance but also to the value set in *Space Set* dialog.

#### 4.3.3 Rotate(R)

<i>Rotate 90</i>	<i>PhotoLib® rotates the image counterclockwise by a quarter-turn.</i>
<i>Rotate 180</i>	<i>PhotoLib® creates a mirror image of the original image in the application area, so that the top right corner of the original image becomes the bottom left corner, and the top left corner of the original image is now the bottom right corner.</i>
<i>Rotate 270</i>	<i>PhotoLib® Rotate the image counterclockwise by 270 degrees.</i>
<i>Rotate Arbitrary</i>	<i>Arbitrary to rotate the image by the angle you specify. If you choose this option, enter an angle between 0 and 360 degrees in the angle text box, then select C and CC to rotate clockwise or counterclockwise. Other area of image will be filled in with background color, which can be selected in Paint Box with sample tool (See Fig.4.3-8).</i>
<i>Horizontal Mirror</i>	<i>PhotoLib® 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.</i>
<i>Vertical Mirror</i>	<i>PhotoLib® reverses the position of 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.</i>



**Fig4.3-8 Image Rotation**

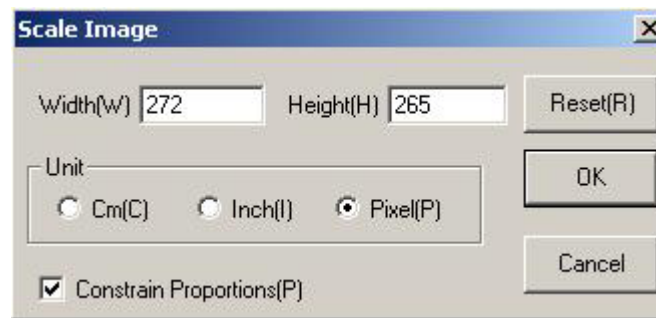
#### 4.3.4 Crop (R)

*Crop* command is the process of removing portions of an image to

create focus or strengthen the composition you select. Removed part of the image will be filled with white color. Before you do the *Crop* command, you must select the part of the image you want to keep using *Rectangle Select* command to *select* a region you are interested in.

#### 4.3.5 Scale (L)...

Use the *Scale* command to change your image at a specified size. This command actually changes spatial resolution by adding (replicating) or removing (decimating) pixels to achieve the specified dimensions (see Fig.4.3-9).



**Fig.4.3-9 Image Scale Operation**

<i>Width</i>	<i>The scaled new image width</i>
<i>Height</i>	<i>The scaled new image height</i>
<i>Units</i>	<i>From this group box, select the unit of measure (Cm, Inch or Pixel) you want the Width and Height measurements expressed as.</i>
<i>Constrain Proportions.</i>	<i>To maintain the current proportions of pixel width to pixel height, select <b>Constrain Proportions</b>. This option automatically updates the width as you change the height, and vice versa. Otherwise, unselect Constrain Proportions check box.</i>

#### 4.3.6 Canvas Size(V)...

Use *Canvas Size* command lets you add or remove work space around an existing image. You can crop an image by decreasing the canvas area. Added canvas appears in the same color or transparency as the background (See Fig.4.3-10)

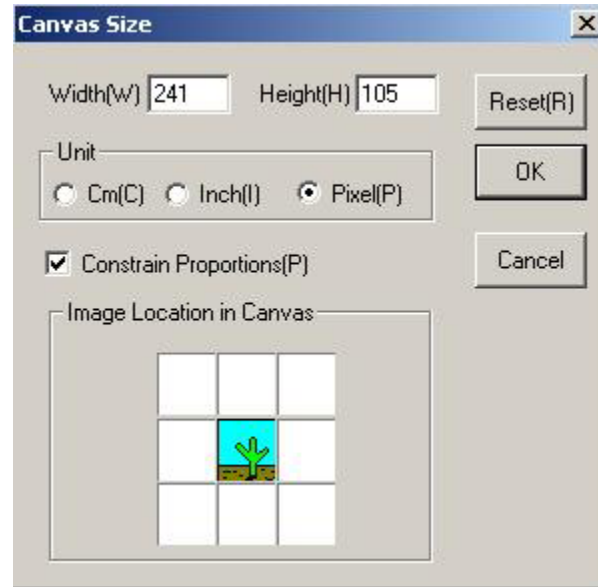


Fig.4.3-10 Canvas Size Adjust

**Width:** New image width including the image width and the edge.

**Height:** New image height including the image height and the edge.

**Units:** From this group box, select the unit of measure (Cm ,Inch or Pixel) you want the Width and Height measurements expressed as.

**Constrain Proportions:** To maintain the current proportions of pixel width to pixel height, select *Constrain Proportions*. This option automatically updates the width as you change the height, and vice versa. Otherwise, unselect *Constrain Proportions* check box.

**Photo Location in the Canvas:** Click a square to indicate where to position the existing image on the new canvas.

#### 4.3.7 Picker (P)

*Picker tool* can be used to pick out specified pixel intensity value (for graylevel image) or color value (for true color image) in the image by pointing it out with moving mouse. The value can be set

as foreground or background color.

#### 4.3.8 Erase(E)

*Erase tool* make you replace pixels with background color as you drag through them.

#### 4.3.9 Fill(F)

*Fill tool* fills adjacent pixels that are similar in color value to the pixels you click.

#### 4.3.10 Zoom Tool(Z)

Click left button of mouse on image will enlarge the image to the larger scale and click right button of mouse on image will reduce the image to the smaller scale. The scales are listed in Toolbar's *Quick Room*

#### 4.3.11 Panning(N)

If the image's actual size is larger than that of frame window, use *Panning* command to move image to display specified area. It's function is similar to scroll bar but more convenience.

### 4.4 Layer Menu

#### 4.4.1 Select Object (S)

After drawing or painting on the specific layer (not the *background layer*), use *Select Object* command to select interested object. You can select one object by clicking on it, or select a group of objects by including them in a rectangle area (just like *Rectangle Select* operation). See more information of *Selected Object* by choosing *Measure->Measure* command.

#### 4.4.2 Point (P)

Draw a *Point* at the place where you click mouse left button on the specified layer. To set the *Point* characteristic, one can use *Select Object* tool and double click the *Point* drawn, then a dialog will appear as shown in Fig.4.4-1. The detail information can be

found in the *Setup->Drawing Defaults*.

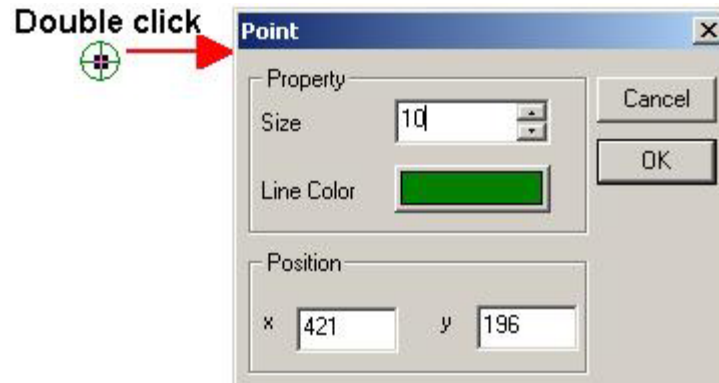


Fig.4.4-1 Point label

#### 4.4.3 Line(L)

Draw a *Line* between the two points after one select the specified layer. Using *Select Object* tool and double click on the *Line* drawn, a *Line* characteristic setup dialog will be shown as in Fig.4.4-2.

The detailed information about *Line* label setup can be found in the *Setup->Drawing Defaults*.

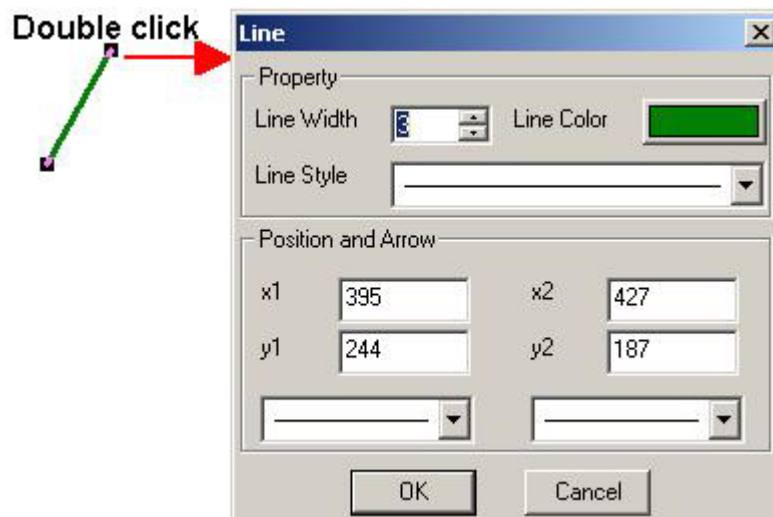


Fig.4.4-2 Line Label

#### 4.4.4 Angle (A)

Draw an *Angle* when click three points on the specified layer, the second one will be the vertex. Using *Select Object* tool and double

click on the *Angle* drawn, an *Angle* characteristic setup dialog will be shown as in Fig.4.4-3. The detail about angle label setup can be found in the *Setup->Drawing Defaults*.

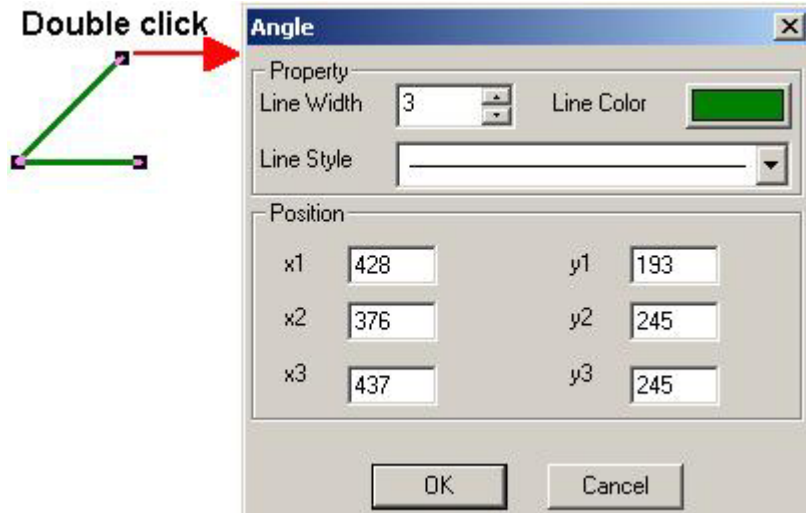


Fig.4.4-3 Angle Label

4.4.5 Rectangle(R)



Draw a *Rectangle* area on the specified layer. Using *Select Object* tool and double click on the *Rectangle* drawn, a *Rectangle* characteristic setup dialog will be shown as in Fig.4.4-4. The detail about rectangle label setup can be found in the *Setup->Drawing Defaults*.

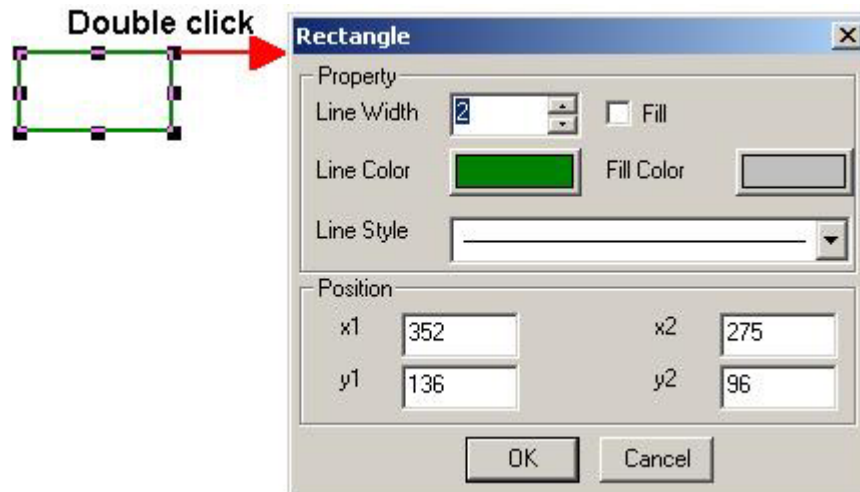


Fig.4.4-4 Rectangle Label

4.4.6 Round Rectangle (O) 

Draw a *Round Rectangle* area on the specified layer. Using *Select Object* tool and double click on the *Round Rectangle* drawn, a *Round Rectangle* characteristic setup dialog will be shown as in Fig.4.4-5. The detail about round rectangle label setup can be found in the *Setup->Drawing Defaults*.

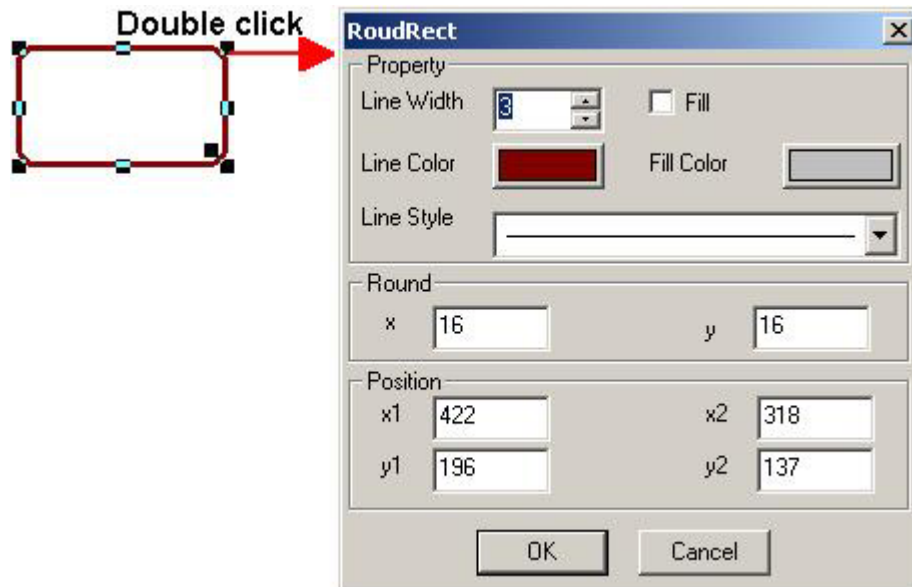


Fig.4.4-5 Round Rectangle Label

4.4.7 Ellipse(E) 

Draw an *Ellipse* area on the specified layer. Using *Select Object* tool and double click on the *Ellipse* drawn, an *Ellipse* characteristic setup dialog will be shown as in Fig.4.4-6. The detail about ellipse label setup can be found in the *Setup->Drawing Defaults*.

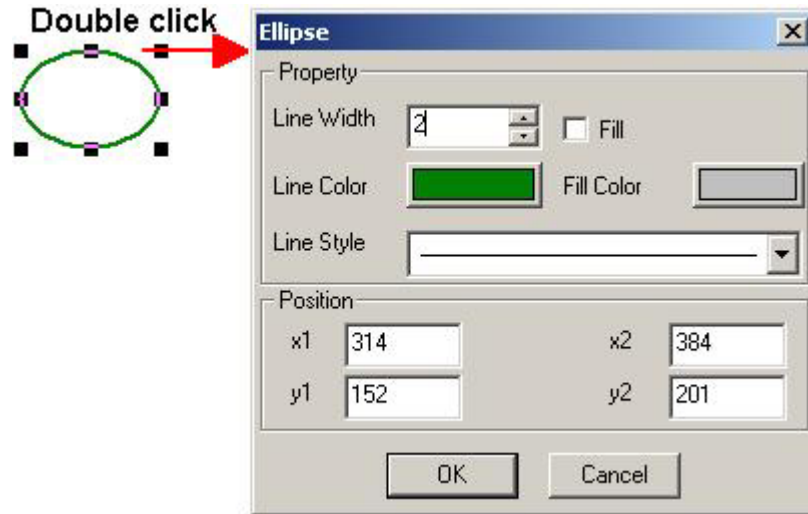


Fig.4.4-6 Ellipse Label

## 4.4.8 Polygon(N)



Draw a *Polygon* area on the specified layer by clicking a sequence of points. Using *Select Object* tool and double click on the *Polygon* drawn, a *Polygon* characteristic setup dialog will be shown as in Fig.4.4-7. The detail about polygon label setup can be found in the *Setup->Drawing Defaults*.

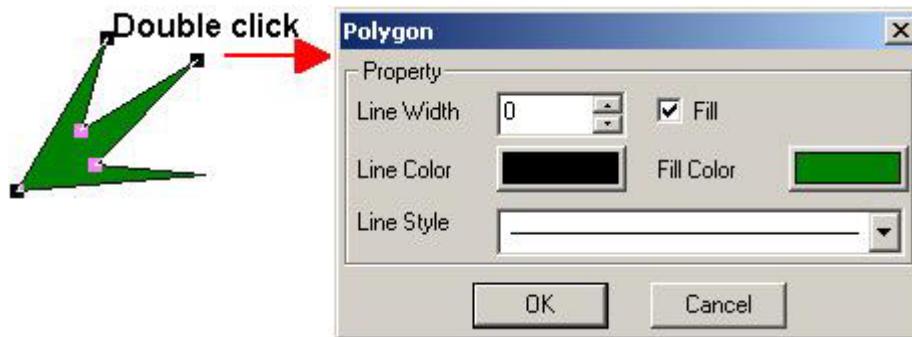


Fig.4.4-7 Polygon Label

## 4.4.9 Text(T)



Draw a rectangle area in which you can enter any interested *Text*. Using *Select Object* tool and double click on the *Text* rectangle drawn, a *Text* characteristic setup dialog will be shown as in Fig.4.4-8. The detail about text rectangle label setup can be found in the *Setup->Drawing Defaults*.

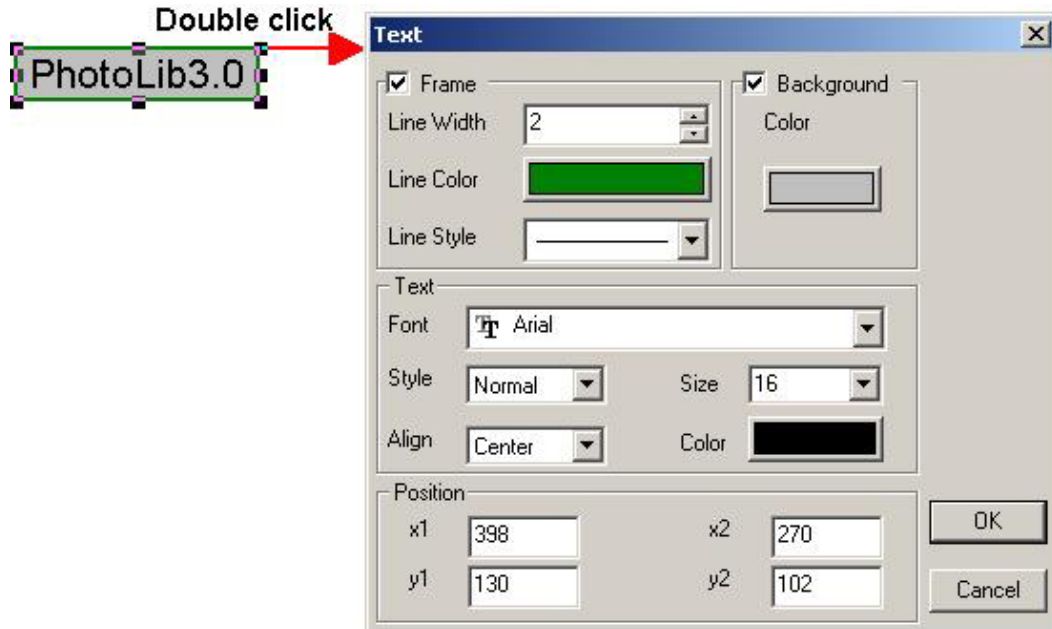


Fig.4.4-8 Text Label

## 4.4.10 Up Most(U)



Change the selected object's relative position to the *Up Most* of all.

## 4.4.11 Down Most(D)



Change the selected object's relative position to the *Down Most* of all.

## 4.4.12 Move Up



Change the selected object's relative position to the upper place of the two

## 4.4.13 Move Down



Change the selected object's relative position to the lower place of the two.



Fig.4.4-9 Relative Position of Different Label

## 4.5 Process Menu

### 4.5.1 Filters(E)...

Use *Filters* command to apply one of *PhotoLib*<sup>®</sup>'s numerous *Filters* to the active image. *Filters* operations reduce or boost the rate of brightness change in an image. If you are not familiar with the process and effects of filtering, you might want to review some discussion about the Spatial Filtering. *PhotoLib*<sup>®</sup> provides an extensive set of convolution and non convolution (morphological) *Filters*. You can also create your own filtering kernels and apply them with the *Filters* command.

When you select the *Filters* command, the Filter tab dialog is opened. Each group of *Filters* has its own property sheet or tab, where you select the type and size of filter you want to use. Filtered results are almost always written to the active image. You may use the *Undo* command if you want to remove the effects of a *Filter* you have applied.

Clicking on the *Filters* command displays the *Filters* dialog box and one of several tab dialog pages.

Enhancement Filters tab dialog; Edge Filters tab dialog;  
Morphological Filters tab dialog; Kernels tab dialog

#### (1) Image Enhancement

The property page has the following *Filters* (shown in Fig.4.5-1).

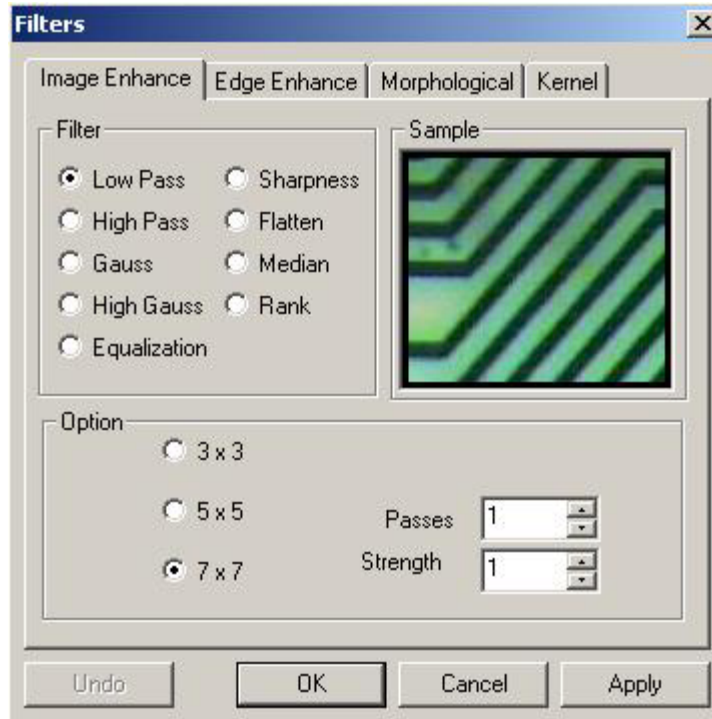


Fig.4.5-1 Image Enhancement Property Page

Select Enhancement (also known as convolution) filters from this tab.

LoPass	<p>Select this filter if you want to soften an image by eliminating high-frequency information (this has the effect of blurring sharp edges). The LoPass filter replaces the center pixel with the mean value in its neighborhood. The LoPass filter can also be used to remove noise.</p>
HiPass	<p>Select this filter if you want to enhance high-frequency information. The HiPass filter replaces the center pixel with a convolved value that significantly increases its contrast from its neighbors. The HiPass filter leaves only elements of high contrast.</p>
Gauss	<p>Use 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 LoPass filter, but it degrades the image less than the LoPass filter.</p>
Higauss	<p>Use this filter when you want to enhance fine details. Its operation is similar to the unsharp masking technique (see the Sharpen filter), but it introduces less noise in the process. It uses a Gaussian curve type of kernel. Available in 7x7 and 9x9 kernel sizes.</p>
Local	<p>This filter is used to enhance pixel contrast based on the histogram of the local neighborhood. (See options below.)</p>

Equalize	
Sharpen	Select this filter if you want to enhance fine detail, or refocus an image that is blurred. The Sharpen filter sharpens the image using the "unsharp masking technique."
Median	Select this filter if you want 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	Select this filter if you want 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 differences between the selected pixel and the center pixel is greater than the threshold value, the Rank filter replaces the center pixel with the selected pixel.

### Options:

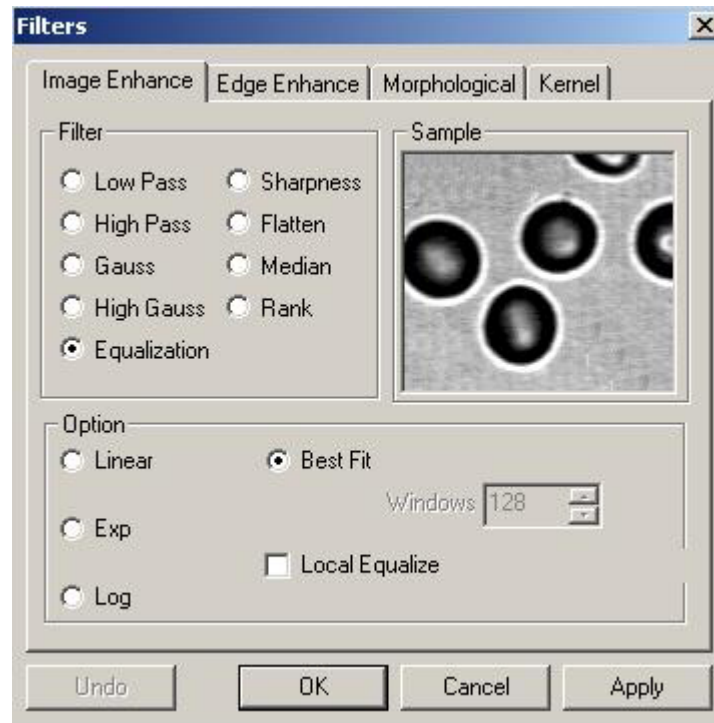
- 1. If you have selected one of the *Enhancement filters*, the options will relate to kernel size and filtering strength. The following options will be presented:**

3 x 3	Select this button to use the 3 x 3 kernel size. A small kernel produces a more subtle filtering effect.
5 x 5	Select this button to use the 5 x 5 kernel size.
7 x 7	Select this button to use the 7 x 7 kernel size. A large kernel produces a more extreme filtering effect.
Passes	Enter the number of times you want the filter applied to your 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 LoPass filter, will be softened further by a second pass.
Strength	Enter a value from 1 - 10 that reflects how much of the filtering effect you want applied to the image. A value of 10 specifies that you want 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. 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 you have selected *Local Equalization filters*, 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 (See Fig.4.5-2).

<i>Window</i>	<i>Image pixel 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 windows produce smoother results, while small windows more closely track small details.</i>
<i>Best Fit</i>	<i>Use the Best Fit command to optimize the values for your particular image. The results are achieved by stretching the local histogram to maximize contrast between the brightest and darkest pixels in the local window region.</i>
<i>Linear</i>	<i>This option distributes the histogram equally across the intensity scale. This function produces a high contrast image with the highest possible dynamic range.</i>
<i>Logarithmic</i>	<i>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. Useful for increasing the contrast in a very light image.</i>
<i>Exponential</i>	<i>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. Useful for increasing the contrast in a very dark image.</i>



**Fig.4.5-2 Filters—Image Enhancement**

(2) Edge Enhancement

This property page has following filters(See Fig.4.5-3).

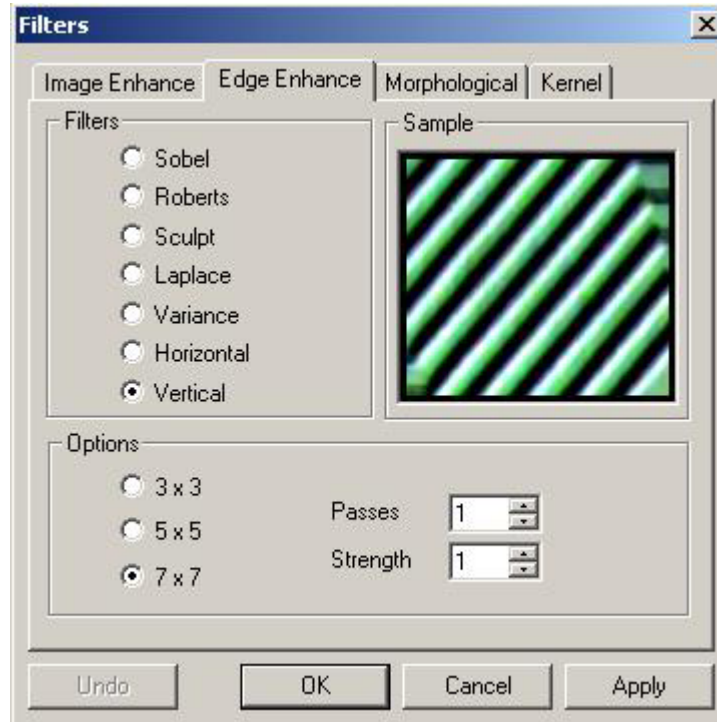


Fig.4.5-3Filter— Edge Enhancement

Sobel	Select this filter if you want to enhance just the principal edges in an image. The Sobel applies a mathematical formula to a 3 x 3 neighborhood to locate and highlight its edges.
Roberts	Select this filter if you want 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 replaced.
Sculpt	Use this filter to apply a sculpted effect to the image.
Horizontal	User this filter to detect and emphasize horizontal edges.
Vertical	Use this filter to detect and emphasize vertical edges.

Options:

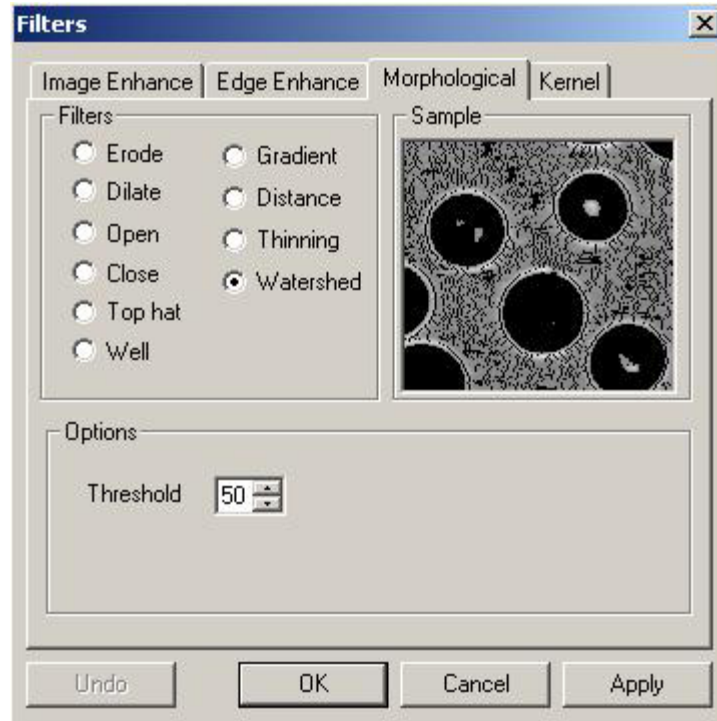
1. If you have selected one of the *Edge filters*, the options will relate to kernel size and filtering strength. The following options will be presented:

<b>3 x 3</b>	Select this button to use the 3 x 3 kernel size. A small kernel produces a more subtle filtering effect.
<b>5 x 5</b>	Select this button to use the 5 x 5 kernel size.
<b>7 x 7</b>	Select this button to use the 7 x 7 kernel size. A large kernel produces a more extreme filtering effect.
◆ <b>Passes</b>	Enter the number of times you want the filter applied to your 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 <i>LoPass filter</i> , will be softened further by a second pass.
◆ <b>Strength</b>	Enter a value from 1 - 10 that reflects how much of the filtering effect you want applied to the image. A value of 10 specifies that you want 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.

2. If you have selected Sobel, Phase or Roberts, no options are available.

(3) Morphological

This property page has following filters(see Fig.4.5-4)



**Fig.4.5-4**Filters — Morphological

<i>Erode</i>	<i>Select this morphological filter if you want to modify the size of objects in your image. The Erode filter erodes the edges of bright objects, and enlarges dark ones.</i>
<i>Dilate</i>	<i>Select this morphological filter if you want to modify the size of objects in your image. The Dilation filter dilates bright objects, and erodes dark ones.</i>
<i>Open</i>	<i>Select this morphological filter if you want to modify the shape of objects in your image. Assuming your image contains bright objects on a dark field, the Open filter will smooth object contours, separate narrowly connected objects, and remove small dark holes.</i>
<i>Close</i>	<i>Select this morphological filter if you want to modify the shape of objects in your image. Assuming your image contains bright objects on a dark field, the Close filter will fill gaps and enlarge protrusions to connect objects that are close together.</i>
<i>Tophat</i>	<i>Use this filter to detect and emphasize points, or grains, that are brighter than the background. Available in 3 kernel sizes; click the radio button indicating the kernel size that most closely matches the size of the grains you want to detect.</i>
<i>Well</i>	<i>Use this filter to detect and emphasize points, or grains, that are darker than the background. Available in 3 kernel sizes; click the radio button indicating the kernel size that most closely matches the size of the grains you want to detect.</i>

**Options:**

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

<i>2 x 2 Square</i>	<i>Select this button to use the 2 x 2 square kernel configuration.</i>
<i>3 x 1 Row</i>	<i>Select this button to use the 3 x 1 row kernel configuration.</i>
<i>1 x 3 Column</i>	<i>Select this button to use the 1 x 3 column kernel configuration.</i>
<i>3 x 3 Cross</i>	<i>Select this button to use the 3 x 3 cross kernel configuration.</i>
<i>5 x 5 Circle</i>	<i>Select this button to use the 5 x 5 circular kernel configuration.</i>
<i>7 x 7 Circle</i>	<i>Select this button to use the 7 x 7 circular kernel configuration. This is a two-pass filter, accomplished using a 5 x 5 circle followed by a 3 x 3 cross.</i>
<i>11 x 11 Circle</i>	<i>Select this button to use the 11 x 11 circular kernel configuration. 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.</i>
<i>Passes</i>	<i>Select the number of times you want PhotoLib® to iterate the filter.</i>

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

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

<i>3 x 3</i>	<i>Select this button to use the 3 x 3 square kernel configuration.</i>
<i>5 x 5</i>	<i>Select this button to use the 5 x 5 square kernel configuration.</i>
<i>7 x 7</i>	<i>Select this button to use the 7 x 7 square kernel configuration.</i>

**3. If you have selected the *Watershed*, *Thinning* or *Distance* filter, this options will has relation with threshold value. The following**

options will be presented:

Threshold	Enter a percentage value from 1 - 100 that specifies the intensity value you want PhotoLib <sup>®</sup> to use for binarizing the image. For example, a Threshold of 50% on a Gray Scale image would set all values $\leq 127$ to 0 (black) and all values $\geq 128$ to the maximum value for that image class (white).
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#### (4) Operation Kernels

The *Kernel* tab dialog page allows you to edit the kernel files for the morphological and convolution filters.

**Note - The HiPass, LoPass, Laplace and Unsharp *Kernel* files are used by the HiPass, LoPass, Laplacian and Sharpen options listed in the 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	Click this button to modify the kernel for a selected filter type, either convolution or morphological filters.
Edit	Click this button to modify the selected filter kernel using the Edit Kernel dialog box.
Name	This list box contains the name of the selected kernel file. If you want to save the modified kernel file to the same file, leave it as is. If you want 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 from one to nine pixels. As you modify the Kernel Size, the shape of the kernel representation changes accordingly. In the center of the dialog box, there are white boxes containing coefficients that will be multiplied with each pixel that will be taken into account by the filter kernel. You can change any coefficient by clicking on it to select it, then changing it as you will.
Fill	Click this button to fill every element of the kernel with a particular value. The Fill Kernel dialog box appears. You may enter a value between 0 and 10. Using the Fill button is useful for setting all coefficients to the same value. You may then change the coefficients that require a different value.
Offset	The pixel whose value is being changed is usually the center-most pixel. You may, however, designate any pixel you want. PhotoLib <sup>®</sup> signals the pixel to be changed by putting a box around it. Use the X and Y Offset spin buttons to do so.
New	Click this button in the Kernels tab dialog to create a new filter kernel. The Edit Kernel dialog box appears.

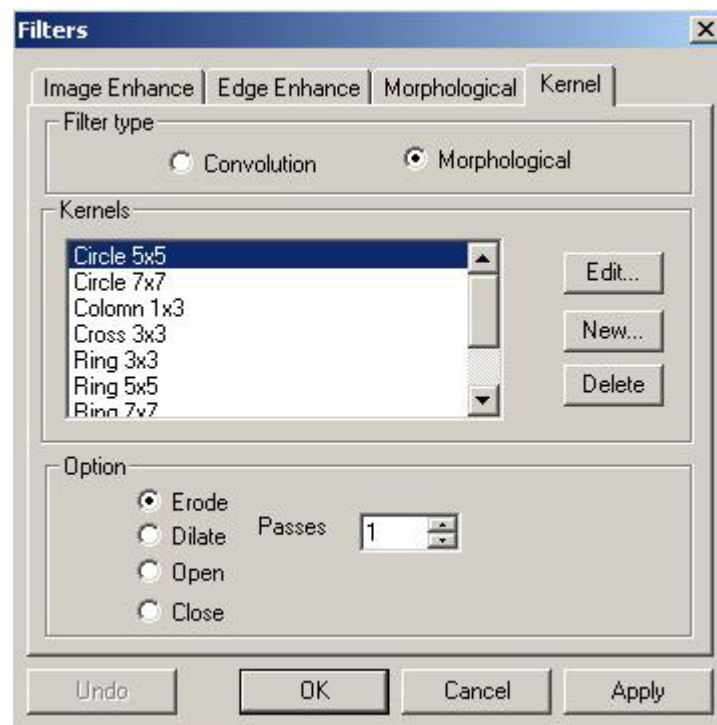
This dialog box functions in the same way as the dialog box for

editing (described above), with the exception that you must provide the file name for the new kernel file.

*Note - You may choose a different path for your kernel file, but PhotoLib® will not list it when you invoke the Filter dialog box.*

**Observe that the above dialog box represents a configuration for a new morphological filter kernel (Kernel Sum are not represented).**

Delete	Click this button in the Kernels tab dialog to delete the selected filter kernel file.
Options	The choices in this group box will vary depending upon the kind of filter you have selected.



**Fig.4.5-5 Filters—Operation Kernels**

#### 4.5.2 Arithmetic(A)...

Use the *Arithmetic* command to perform arithmetic and logic operations upon the active image, sequence, or AOI. Such operations can be performed between two images (such as subtracting a "Hi Pass" filtered image from an original image to

emphasize high-contrast elements), or between an image and a constant value (such as "ANDing" an image with 240 to retain only the 4 most significant bits of information). See Fig.4.5-7.

The *Arithmetic* command can be used on both monochrome and color images. When applied to a True Color image, the operation will be applied to all three channels. For example, if you were subtracting a value of 10 from the image, 10 would be subtracted from the Red value, from the Green value, and from the Blue value in each pixel.

When you select the *Arithmetic* command, the Image Arithmetic dialog box will be presented. Within this box, select the kind of operation you want to perform, the image or value you want it to work with, and a destination for the results.

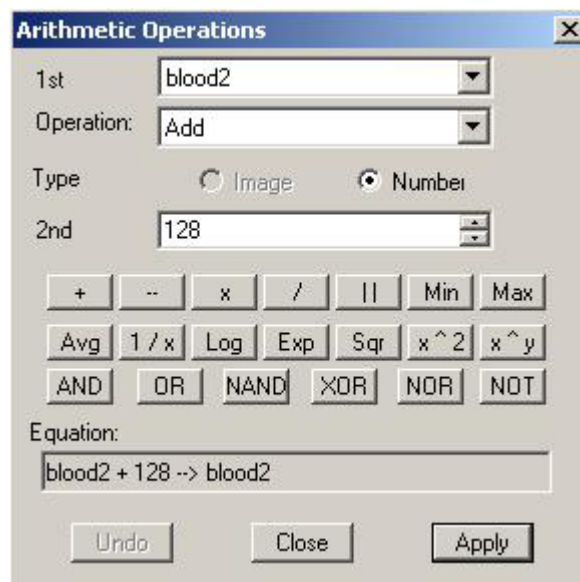
<i>Ist Operand</i>	Select one of the files in this list box to tell PhotoLib® what active image to use for the operation.
<i>Operation</i>	Select the kind of operation you want PhotoLib® to perform from the drop-down list box, or click on the appropriate "calculator" button.
<i>AND</i>	Click this button to perform a logical "AND" between your active image and the specified operand. Only bit values that are "on" in both operands, will be "on" in the result.
<i>OR</i>	Click this button to perform a logical "OR" between your active image and the specified operand. Bit values that are "on" in either operand, will be "on" in the result.
<i>XOR</i>	Click this button to perform a logical "XOR" (exclusive OR) between your active image and the specified operand. Only when a bit value is "on" in one operand and "off" in the other will the bit be "on" in the result. If bit values are "on" in both operands, or if they are "off" in both operands, they will be "off" in the result.
<i>NAND</i>	Click this button to perform a logical "NAND" between your active image and the specified operand. "NAND" produces a result that is the complement of an "AND" operation. Bit values that are "off" in either, or both, operands, will be "on" in the result.
<i>NOR</i>	Click this button to perform a logical "NOR" between your active image and the specified operand. "NOR" produces a result that is the complement of an "OR" operation. Bit values that are "off" on both images, will be "on" in the result.
<i>NOT</i>	Click this button to perform a logical "NOT" on the bit values of your active image. Every bit value that is "on" in the active image will be "off" in the result. Every bit value that is "off" in the active image will be "on" in the result. Use this command to invert the pixels in your image, producing a "negative" effect.

Add	Click this button to add the specified operand to the active image. If a pixel's result falls outside of the image's intensity scale, it will be clipped to the highest /lowest permitted value.
Subtract	Click this button to subtract the specified operand from the active image. If a pixel's result falls outside of the image's intensity scale, it will be clipped to the highest /lowest permitted value.
Multiply	Click this button to multiply the active image by the specified operand. If a pixel's result falls outside of the image's intensity scale, it will be clipped to the highest /lowest permitted value.
Divide	Click this button to divide the active image by the specified operand. If a pixel's result falls outside of the image's intensity scale, it will be clipped to the highest /lowest permitted value.
Absolute	Click this button to obtain the absolute value between the specified operand and the active image. If a pixel's result falls outside of the image's intensity scale, it will be clipped to the highest /lowest permitted value.
Minimum	Click this button to replace each pixel with the smallest value of the two operands.
Maximum	Click this button to replace each pixel with the largest value of the two operands.
Average	Click this button to replace each pixel with the mean value of the two operands.
Invert	Click this button to replace each pixel with its inverse (1/pixel). Argument: scaling factor new pixel = scaling factor / original pixel. Pixel values equal to 0 are invalid.
Logarithm	Click this button to replace each pixel with its logarithm. Pixel values less than or equal to 0 are invalid.
Exponential	Click this button to replace each pixel with its exponent.
Square Root	Click this button to replace each pixel with its square root. Pixel values less than 0 are invalid.
Square	Click this button to replace each pixel with its second power.
X to the power of Y	Click this button to replace each pixel with its Yth power. Y is limited to positive values. Pixel values less than 0 are invalid if Y is less than 1.
2nd Operand	Click the appropriate radio button to tell PhotoLib <sup>®</sup> what operand (besides the active image) to use for the specified operation.
Image	Set this option if you want to use another image for the specified operation. You must also select, in the adjacent list box, the image you want to use. This image must be one that is currently open within PhotoLib <sup>®</sup> ; it cannot be an image on disk. The two images need not be of the same image class.
Number	Set this option if you want to use a constant value for the specified operation. If a logical operation has been selected, numbers from 0 - 255 can be entered. If an arithmetic operation has been selected, any value can be specified, including negative and fractional values. Scientific notation may be used.

Image Equation	<i>PhotoLib® summarizes your command here.</i>
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**Note - *Log, Square root, Square, X to Y, and Exp* will increase or decrease pixel values dramatically and may only be useful when used on floating point images. To apply these operations to 8 bit images, convert the image into a float point image first.**

**Using *Log, Square root, Square, X to Y* on images containing pixels whose values are invalid for the given operation, will result in the following approximations: Negative infinite results will be set to the minimum value supported by the image type (i.e., 0 for 8, 12, 16, 24, 36, 48 bit images). Positive infinite results will be set to the maximum value supported by the image type (i.e., 255 for 8 bit, 4096 for 12...). Indeterminate results (e.g., 0/0) will be arbitrarily set to the minimum value supported by the image type.**



**Fig.4.5-7 Image Arithmetic Operation**

#### 4.5.3 PseudoColor(P)...

**Use the *Pseudo-Color* command to "colorize" the active monochrome image. You might do this to highlight certain features in a gray scale image. For example, you might want to display all densities above a certain point in red, or, if your imaging device recorded thermal information, all temperatures**

below a certain point in blue.

When you pseudo-color a monochrome image, you build a special palette through which your monochrome image is displayed.

Pseudo-coloring an image does not modify the pixel values in your image bitmap in any way (it does not convert your image to True Color or Palette, for example). 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 pixel values in a pseudo-colored image actually represent continuous-tone intensity information, whereas a Palette image's pixel carries no intensity significance. Secondly, a Palette image includes a palette table that is actually part of the image file.

You can select the colors to map to the gray values. The buttons at each end of the color strip bring up the color dialog, which allows you to select the starting and ending colors of the range.

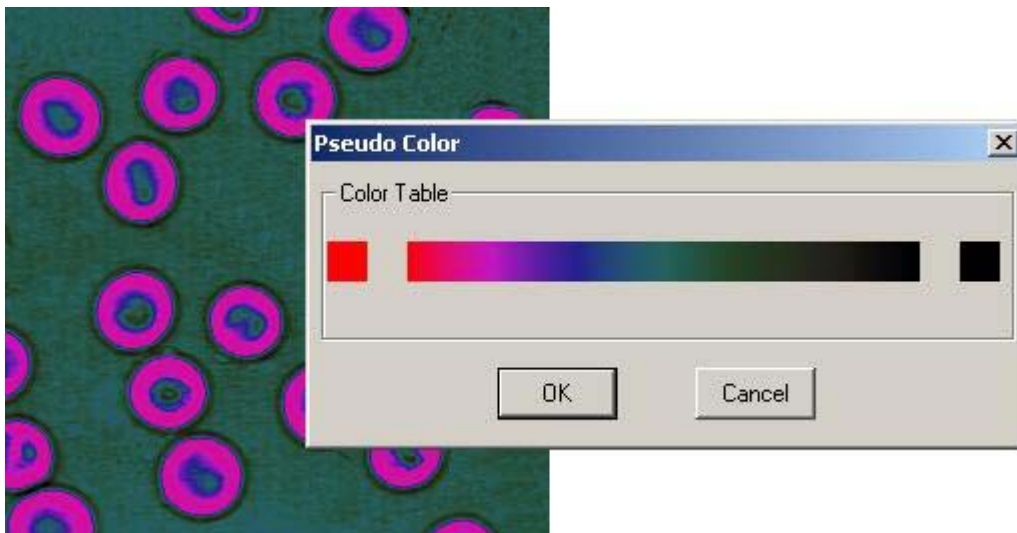
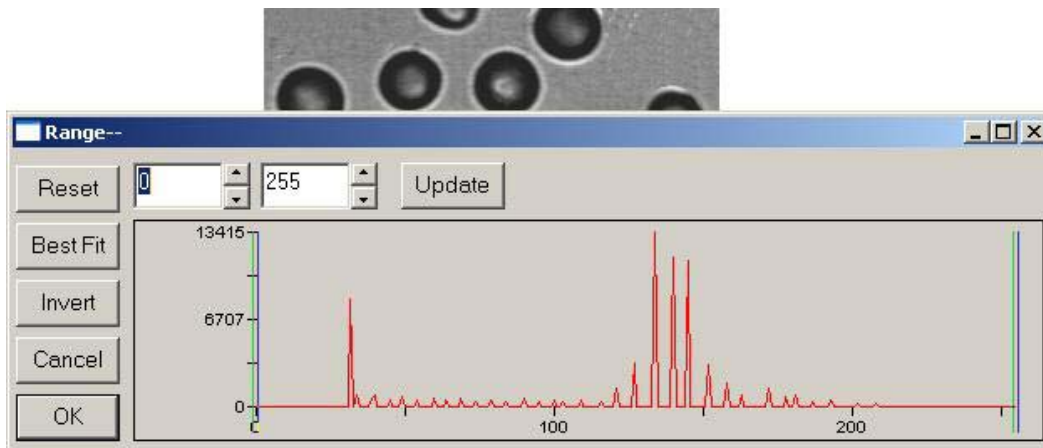


Fig.4.5-8 PseudoColor Processing

#### 4.5.4 Range(R)...

The *Range* command allows you to set the intensity levels of your images to increase contrast and enhance display in low-light

situations. Selecting the *Range* command opens the *Range* dialog box (See Fig.4.5-9).



**Fig.4.5-9 RangeOperation**

Two vertical markers show the upper and lower limits of the intensity levels. These markers can be moved with your cursor. If you are looking at a color image, the histogram will reflect the red, green, and blue values with lines of the same color.

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

<i>Reset</i>	<i>The Reset button allows you to reset the black and white levels to the high and low ends of the dynamic range.</i>
<i>Best Fit</i>	<i>The Best Fit button automatically sets the intensity levels to the "best fit". Best fit instructs PhotoLib® to optimize the Brightness and Contrast values for your particular image.</i>
<i>Inv</i>	<i>The Inv button reverses the image.</i>
<i>Update</i>	<i>Update refreshes the display range with the most current image information.</i>

#### 4.5.5 Segmentation(S)...

*Segmentation* command is a process by which certain colors (or gray levels) in an image can be visually identified then isolated from the image as a whole. Areas identified by segmentation (classes) can be either removed from the image or kept, 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 naturally occurs in most acquired images.

The process of identifying colors is key to the operation of *Segmentation*. Because of the vast differences possible in images, and therefore the color composition of the object(s) to be identified, *PhotoLib*® provides Histogram-based models for identifying the segmented area.

When the *Segmentation* command is activated on a true color image, choose one channel of Red, Green and Blue to do operation.

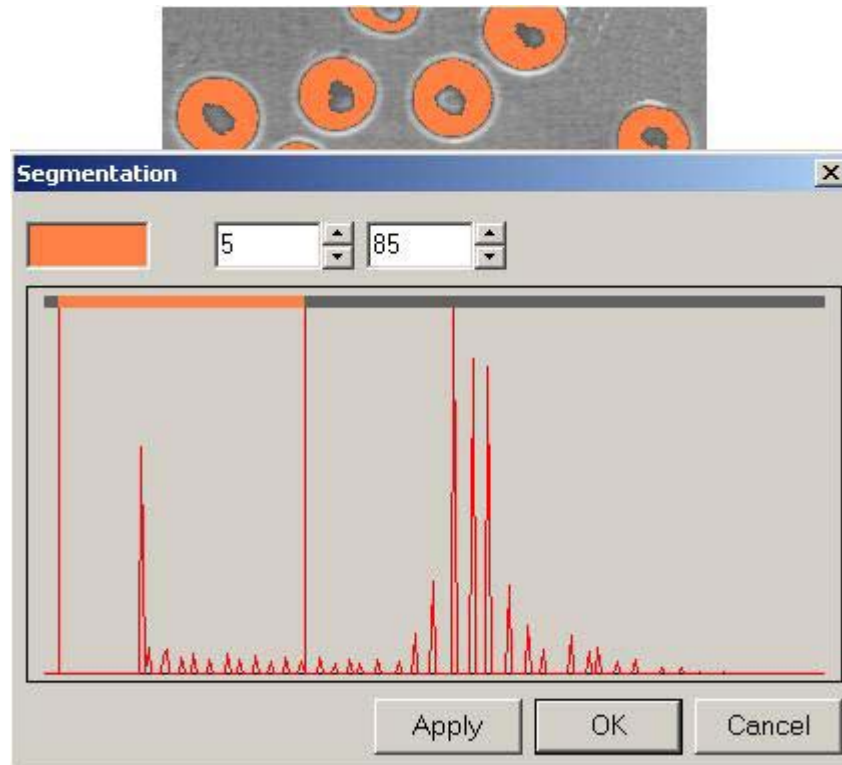


Fig.4.5-10 Segmentation

## 4.6 Measure Menu

### 4.6.1 Histogram(H)...

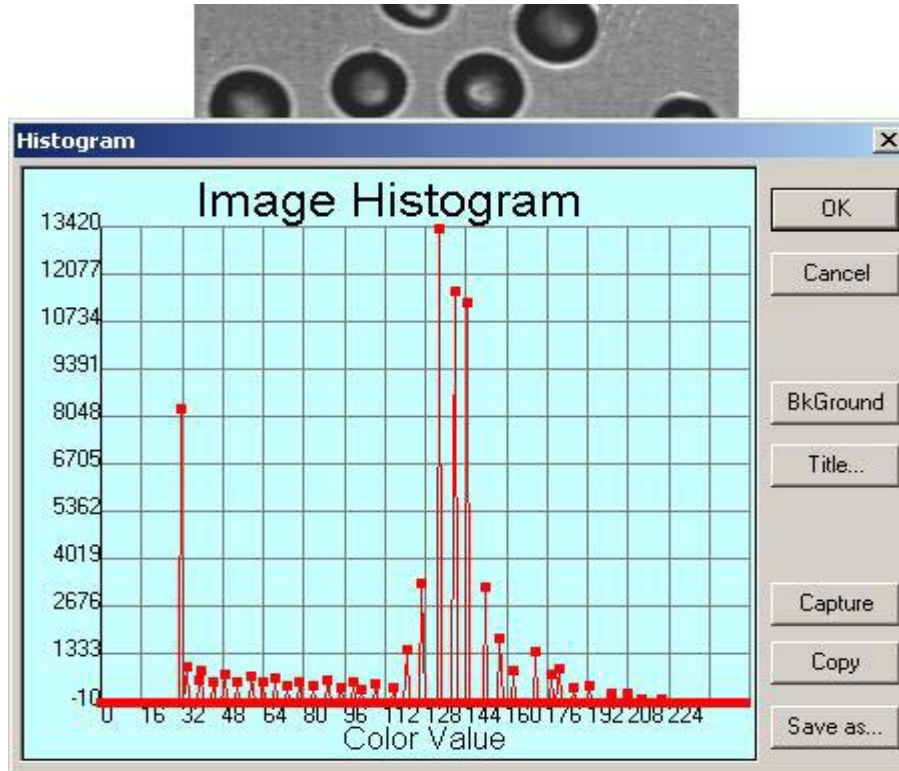
A *Histogram* illustrates how pixels in an image are distributed by

graphing the number of pixels at each color intensity level. This can show you 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) to make a good correction (see 4.6-1).

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 middle tones. An image with full tonal range has a high number of pixels in all areas. Identifying the tonal range helps determine appropriate tonal corrections.

In a *Histogram*, the X-axis represents the intensity scale (range from 0 to 255), and the Y-axis measures the spatial value (as defined by the current spatial calibration). You can use the slide bar to adjust the current spatial calibration.

<i>BkGround</i>	<i>Invoke Windows Color dialog to set the background color of the histogram window</i>
<i>Title</i>	<i>Use this command to set title related to each image's histogram</i>
<i>Capture</i>	<i>Capture the active image in the histogram window as a new untitled image</i>
<i>Copy</i>	<i>Copy the histogram window's content into Windows Clipboard</i>



**Fig.4.6-1 Histogram**

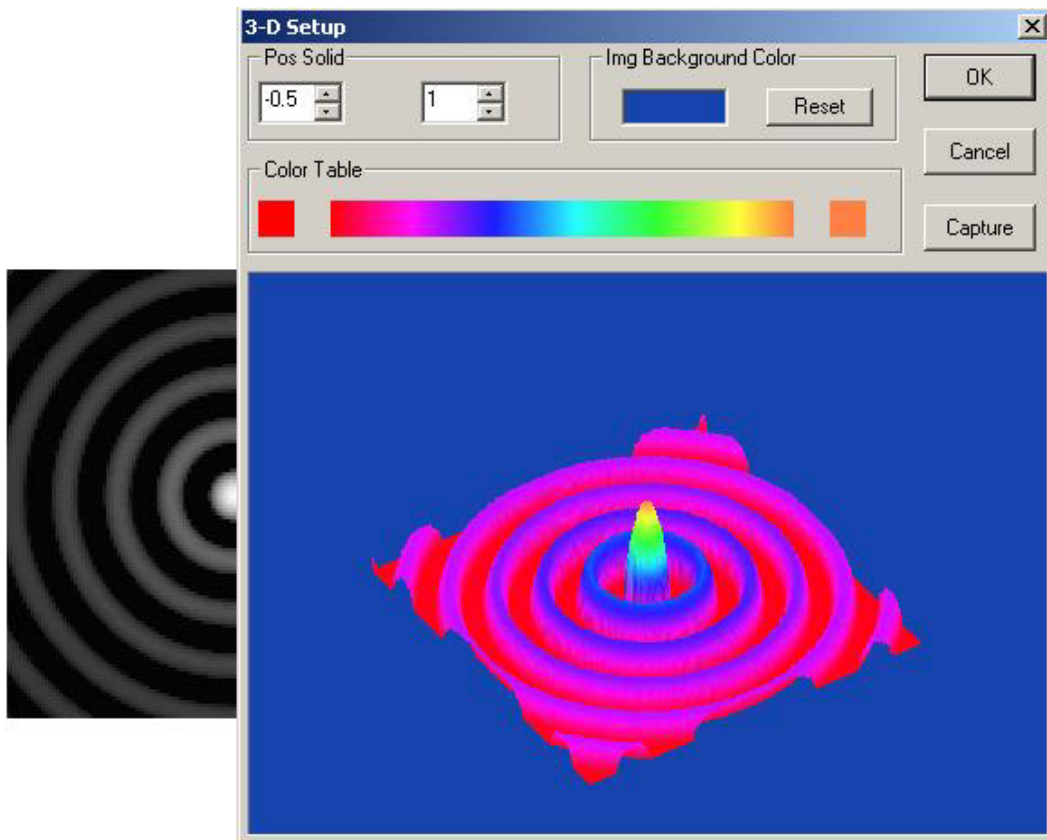
**4.6.2 Surface Plot (P)...**

**The *Surface Plot* (or 3-D Plot) tool creates a three-dimensional representation of the intensity of an image (see Fig.4.6-2). When using the *Surface Plot* tool, keep in mind that X = length; Y = width; and Z = height.**

**In viewpoint window, you can adjust the elevation and rotation of the image by moving the mouse.**

<i>Pos</i>	<i>The left edit control indicate the relative position of the entire image in the viewpoint window, default value is 0.5.</i>
<i>Solid:</i>	<i>The right edit control indicate the relative height of the display of the Z scale, default value is 1.</i>
<i>Reset:</i>	<i>Set the Pos Solid's two edit control to their default values.</i>
<i>Img Bk Color:</i>	<i>Choose this command will display a color dialog which you can adjust the background color of viewpoint window.</i>
<i>Capture:</i>	<i>Capture the active image in the viewpoint window as a new image.</i>
<i>Color:</i>	<i>You can select the colors to map the gray values found in the surface plot. The button at each end of the color strip bring up the color dialog, which allows you to select the starting and ending colors of the range. (Please refer to</i>

	<i>Pseudo-Color for more information.)</i>
--	--



**Fig.4.6-2 3D Surface**

#### 4.6.3 Line Profile (L)...

Use *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 use this command you must first select *Layer Manager* tool to set the active layer and draw lines on it.

**In a *Line Profile*, the X-axis represents the spatial scale, and the Y-axis measures the intensity value (range from 0 to 255, See Fig.4.6-3) .**

<i>BkGround:</i>	<i>Invoke Windows Color dialog to set the background color of the histogram window</i>
------------------	--

Title:	Use this command to set title related to each image's histogram
Capture:	Capture the active image in the histogram window as a new untitled image
Copy:	Copy the histogram window's content into Windows Clipboard

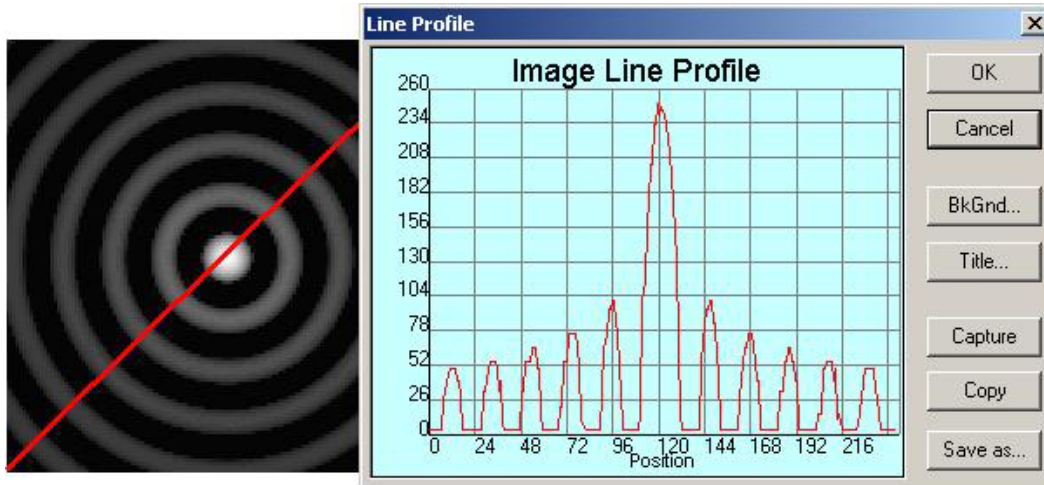


Fig.4.6-3 Line Profile

4.6.4 Bitmap Analysis (A)...

The *Bitmap Analysis* command on the *Measure* menu is used to view the pixel values of the active window in numeric format.

When the *Bitmap Analysis* command is selected, the *Bitmap Analysis* window is opened and the pixel values associated with the active image are displayed (see fig4.6-4).

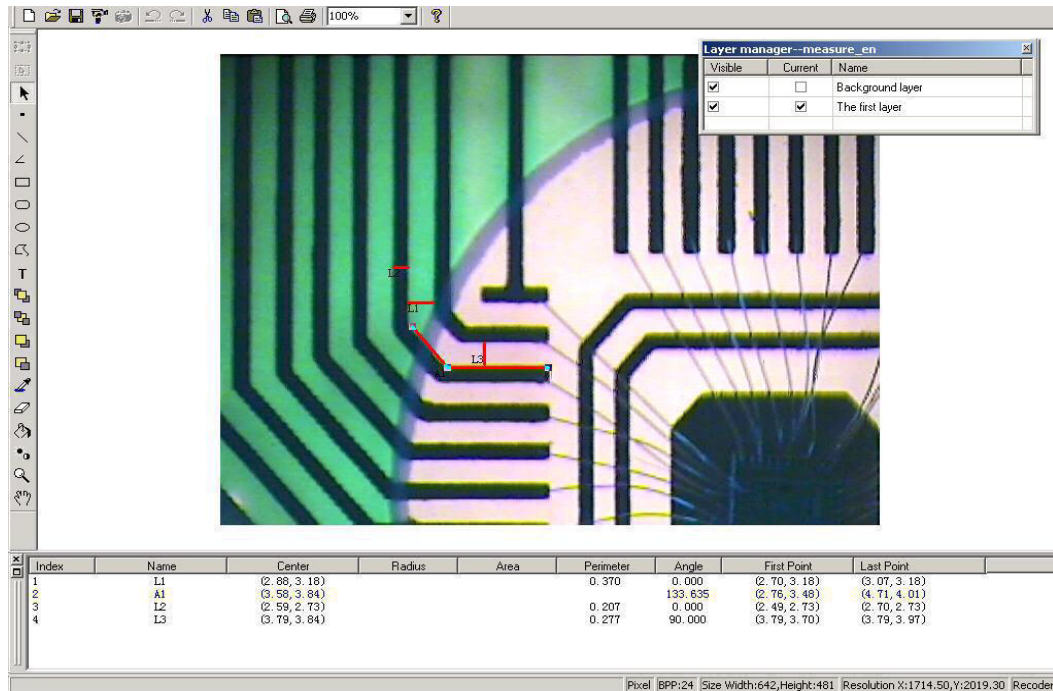
Height	You can adjust height of <i>Bitmap Analysis</i> window to display.
Width	You can adjust width of <i>Bitmap Analysis</i> window to display.
Zero	Set all pixels in the <i>Bitmap Analysis</i> window to 0.
Max	Set all pixels in the <i>Bitmap Analysis</i> window to 255.
Hide	Minimize the <i>Bitmap Analysis</i> window.

**Note:** This command is only used for gray scale image.



	<i>length. They are related to the resolution set in Set Resolution window.</i>
<i>Define Unit</i>	<i>Define your own Length Unit.</i>
<i>Angle Unit</i>	<i>Choose between Radian and Angle.</i>

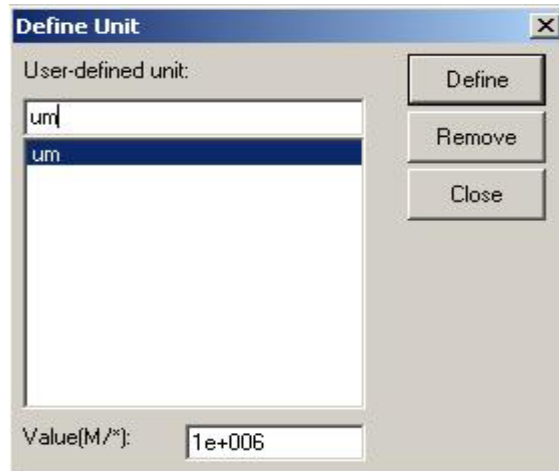
**Note: To do your measurement, you must choose right layer first (more information in *Layer Manager*).**



**Fig4.6-5 Measurement**



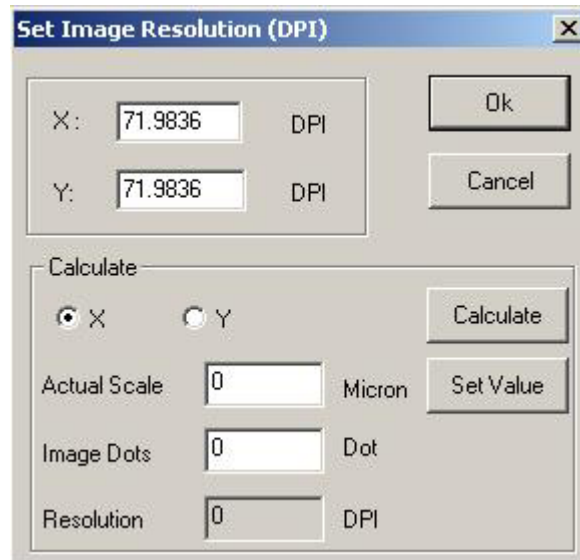
**Fig.4.6-6 The R-Button Popup Menu**



**Fig.4.6-7 Own Defined Length Unit**

#### 4.6.6 Set Resolution(R)...

Use *Set Resolution* command to set your own image resolution to calibrate the spatial scale. By default, *PhotoLib*<sup>®</sup> expresses spatial measurements in terms of pixels. The *Set Resolution* command is used to change the terms in which *PhotoLib*<sup>®</sup> report such measurements. You should use this command if you want to measure objects in terms of microns (Fig.4.6-8).



**Fig.4.6-8 Image Resolution Setup**

X

Indicate horizontal DPI (Dots Per Inch) of current resolution. By default, the value is set as 7.62.

<i>Y</i>	<i>Indicate vertical DPI (Dots Per Inch) of current resolution. By default, the value is set as 7.62. You can calculate new resolution with following selections. If you want to set horizontal resolution, select X radio button or select Y radio button while setting vertical resolution.</i>
<i>Actual Scale</i>	<i>Indicate the dot values set in the Image Dots edit box will represent how many values in micron units.</i>
<i>Image Dots</i>	<i>Indicate the micron values set in the Actual Scale edit box will be represented by how many pixel dots on the screen.</i>

**After set up *Actual Scale* and *Image Dots* edit box properly, click *Calculate* button will calculate related resolution that will be displayed in *Resolution* static box in DPI unit. Click *Set Value* button will set the calculated value as current resolution while updating values in X and Y edit box. When set appropriate resolution, all measurements will be displayed with this unit. (See more in *Measure* command).**

#### 4.6.7 Mass Counting (C)...

**Use the *Mass Counting* command to perform counting operation. This command is performed on the entire image.**

**The basic steps involved in a counting task are to:**

**Set the range of intensities that identify the object you want to count using the tools in the *Counting Setup* dialog box or with *Point Based Counting* command.**

**Select the kinds of measurement you want to record in the *Mass Counting*.**

**The total sum and the effect of *Mass Counting* will be displayed in the *Mass Counting* dialog's preview window. All counted cell will be filled with the color and indicated with sign number and coordinate both of which can be adjusted with *Setup* button.**

**Click *Set On Image* button to set the current effect displayed in preview window on the actual image.**

**Click *Close* button will close the *Mass Counting* dialog box.**

**Note: This command can only be used on gray level image.**

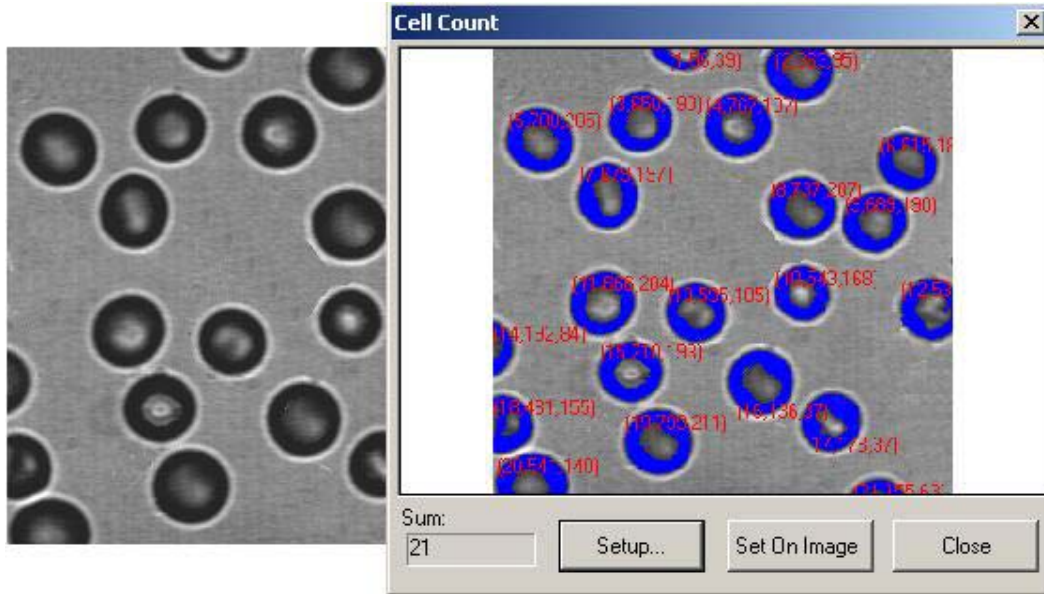


Fig.4.6-9 Counting

4.6.8 Point Based Counting (P)...

Use *Point Based Countin* command to set current mouse-point's pixel value as upper limit of Gray level used for *Mass Counting* operation.

4.6.9 Counting Setup (T)...

Before performing your *Mass Counting* operation, be sure following options have been set up properly:

Limited Condition:

Gray	Set Gray level range used for Mass Counting. If you set range from 0 to 128, then only the pixels in this range will be taken into consider. You can set the range manually or use Point Based Counting command.
Girth	Set Girth range used for Mass Counting. If you set range from 1 to 10000, then only object of image with girth in this range will be taken into consideration.
Area	Set Area range used for Mass Counting. If you set range from 1 to 10000, then only object of image with area in this range will be taken into consideration.
4 Connection	Indicate pixel's connection relationship with neighbors'. When counting, each pixel's north, south, east and west direction's neighborhood will be taken into consideration.
8 Connection	Indicate pixel's connection relationship with neighbors'. When counting, each pixel's north, south, east, west,

	<i>northeast, southeast, northwest and southwest direction's neighborhood will be taken into consideration.</i>
<i>Cell</i>	<i>We can fill in the right counted object with the color we specified in R, G, B edit box (each part range from 0 to 255) or use Select Color button to activate windows color dialog.</i>
<i>Sign the Order</i>	<i>If check this box, every object will be indicated by sign number and coordinate with the color we specified in R, G, B edit box (each part range from 0 to 255) or use Select Color button to activate windows color dialog.</i>

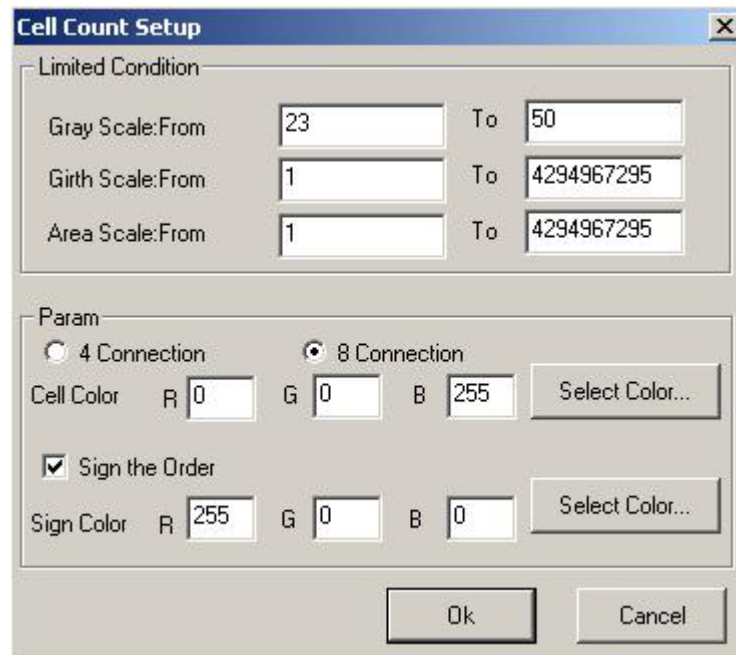


Fig.4.6-10 Counting Setup

## 4.7 View Menu

In this *View* menu you can select to display specified bars or boxes in the frame window by clicking the corresponding command. Also you can adjust display mode in this menu.

### 4.7.1 Toolbar

Most tools have shortcut that are displayed in the tool options bar, including New, Open, Save, Import Photo, Single Capture, Undo, Redo, Delete, Cut, Paste, Print Preview, Print, About, Quick Zoom. The Toolbar is context sensitive and changes as different tools are selected. The first time you start the application, the Toolbar appears at the top of the screen.

#### 4. 7. 2 Statue Bar

Most statistic data of active image can be seen at statue bar ,including display unit, image bit count, image height, image width, resolution (see more information in Set Resolution dialog ) and so on. The first time you start the application, the Statue Bar appears at the bottom of the frame window.

#### Tool Box

The first time you start the application, the *ToolBox* appears on the left side of the frame window. Some tools in the toolbox have options that appear in the context-sensitive tool options bar. These include the tools that let you select, paint, draw, annotate, sample, erase, fill, adjust Brightness/Contrast, scale and panning image. Using *Paint and Draw tool*, you can draw *Point, Line, Angle, Rectangle, Round Rectangle, Ellipse, Polygon* and *Text* on specified layer (See relative information in *Layer Manager* and *Draw Default*). After you draw or paint on the image, you can use Select tool to choose the object you are interested and you also can choose *Measure -> Measure* to see more statistic details such as *order number, name, center position, radius, area, perimeter, angle, start position, end position*. The four tools following *Paint and Draw* tool allow you to change relative position of selected component on specified layer. Sample tool can be used to *Pick* out specified pixel intensity value (for gray level image) or color value (for true color image) in the image by pointing it out with moving mouse, which can be set as foreground or background color. *Erase* tool make you replace pixels with background color as you drag through them. *Fill* tool fills adjacent pixels that are similar in color value to the pixels you click. *Brightness/Contrast* tool can adjust image's brightness (horizontally) or contrast (vertically) by moving mouse with left button down (see how to change step in *Set Up* command). If choose *Scale* tool, click mouse's left button will enlarge image size and click right button will reduce image size following the percentage order listed in the *Quick Room*. If image's *Actual Size* is larger than that of frame window, using *Panning* tool to move image to show interested part in frame

window. It has the same function as scroll bar.

### **Paint Box**

*Paint Box* let you choose foreground and background color with *Sample* tool (select in ToolBox). By default, the foreground color is set as White (255) and the background color is set as Black (0). If active image is 24 bits true color, use Windows color dialog to make selection. If active image is 256 indexed image, all palette colors will be displayed in *Paint Box*. Then you can specify foreground color and background color not only from Windows color dialog but also from palette color listed.

### **Browser**

Choose **command** to manage images on hard disk. When click **Browser**, it will display a Browser window look like Windows explorer. The left side of the Browser window is the direction on hard disk and the right side show images' preview under the right direction you specified. Click right button of mouse in the right side will pop out a menu in which Browser lets you delete, refresh, select , sort, and process image files. You can use the Browser to perform tasks such as creating new folders; renaming, moving, and deleting files. You can also view individual file information and data imported from your digital camera. Double click an image will display it with full size as active image. You can choose to display full screen images with Manual play style or Auto play style. For Auto choice, set related parameters in Play Setup

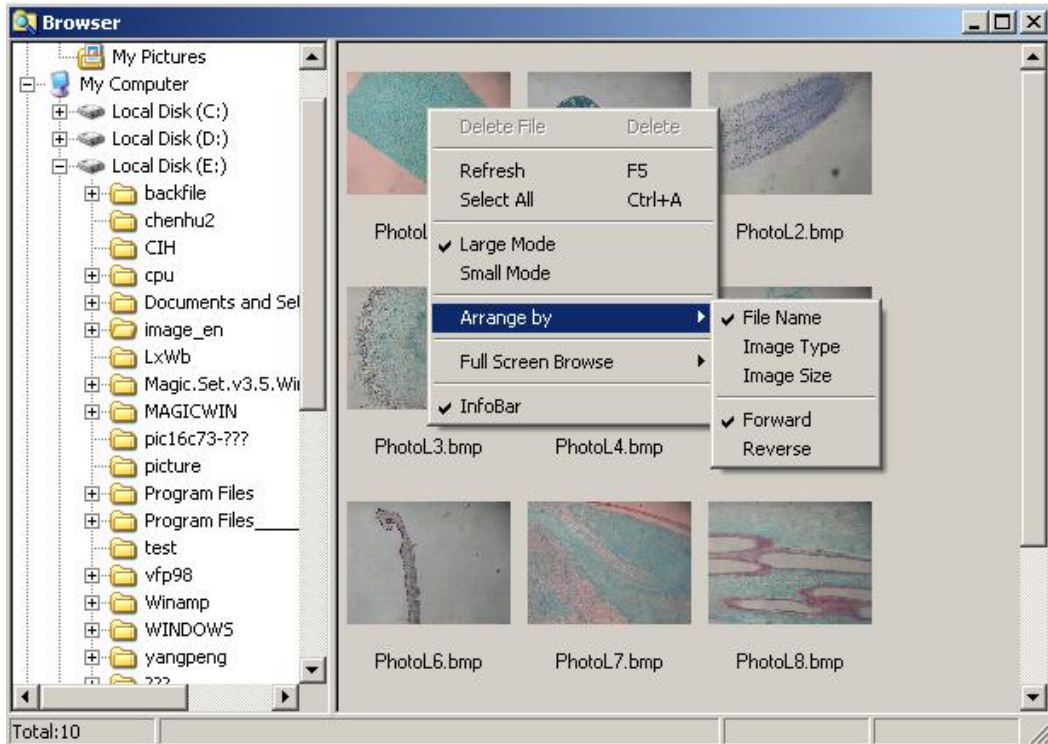


Fig.4.7-1 Image Browser

#### 4. 7. 3 Layer Manager

**Layers allow you to work on one element of an image without disturbing the others. Think of layers as sheets of acetate stacked one on top of the other. Where there is no image on a layer, you can see through to the layers below. You can change the composition of an image by changing the order and attributes of layers. In addition, special features such as adjustment layers, fill layers, and layer styles let you create sophisticated effects. See more details in Layer Manager.**

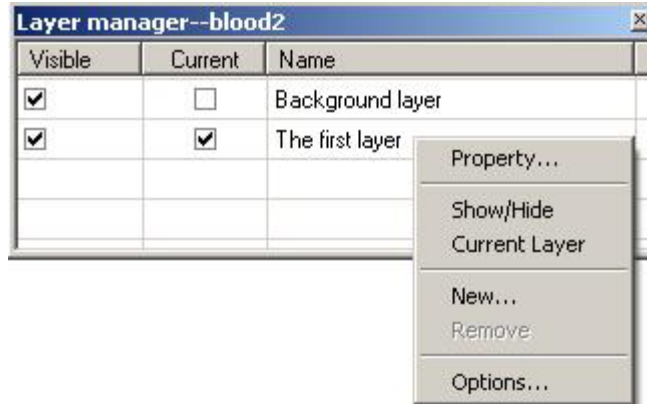


Fig.4.7-2 Layer Manager

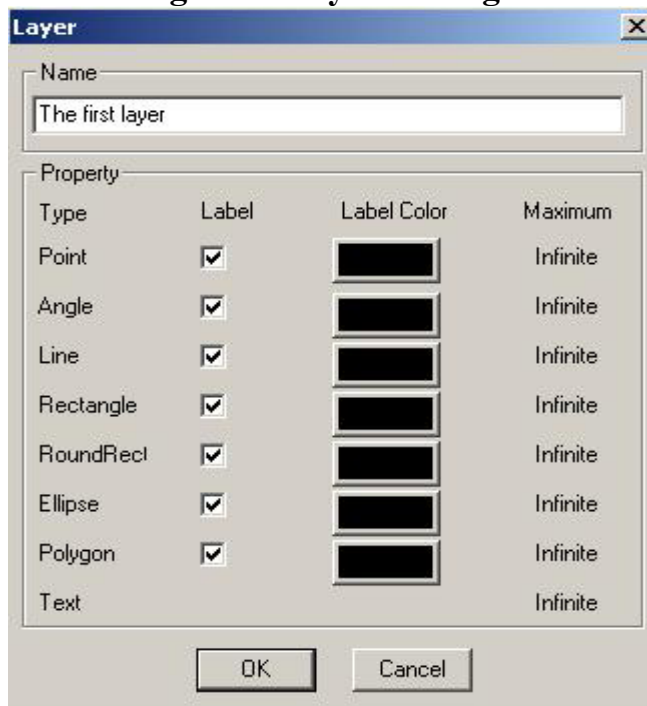


Fig.4.7-3 Property of Layer

4. 7. 4 DB Image Browse

If you have used Open Database command to establish a connection with a database file, then this command help you to view images in it.



**Fig.4.7-4 DB Browse****4. 7. 5 Zoom In**

**Click the Zoom In command (<Ctrl>+<+>) to magnify image to the next preset percentage listed in Quick Room. Each click magnifies the image to the next preset percentage, centering the display around the point you click.**

*Zoom Out*

**Click the Zoom out command (<Ctrl>+<->) to reduce image to the previous preset percentage listed in Quick Room. Each click reduces the view to the previous preset percentage, centering the display around the point you click.**

*Actual Pixel*

**Click the Actual Pixel command to set the active image to its actual size(e.g. 100%).**

*Fit on Screen*

**This command scale both the zoom level and the window size to fit the available screen space.**

**4. 7. 6 Display Unit**

**Display image statistic in the unit of Pixel, Millimeter or Inch.**

*Partial View*

**Use this command to magnify partial selected image to display, You can set up relative settings in the Set Up -> Partial View Default.**

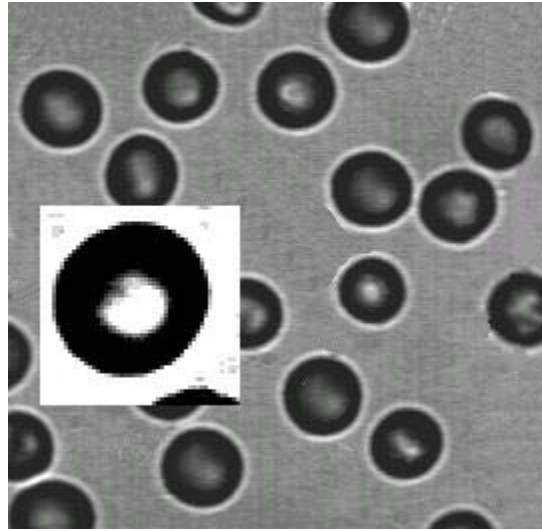


Fig.4.7-5 Partial View

## 4.8 System Setup Menu

In *Set Up* menu ,you have following options:

### 4.8.1 Company Name

Enter your company's name in the following dialog's edit box.



Fig.4.8-1 Company Name Setup

### 4.8.2 Space Set

Use this command to set up *Brightness/Contrast* change step. The value entered in the edit box will be used to calculate adjust step according to mouse move scale on the screen. For example, assuming enter value is 30 (unit = pixel) and moving mouse on the screen with 60 pixels, then value 2 ( $60/30$ ) will be used for brightness or contrast adjust. The smaller enter value and longer mouse-moving distance mean the more distinct effect of *Brightness/Contrast* operation, and vice versa.



图 4.8-2 Space set

#### 4.8.3 Drawing Default

When select this command ,display a setup dialog in which you can set all default drawing properties. See more in *Drawing Default*.

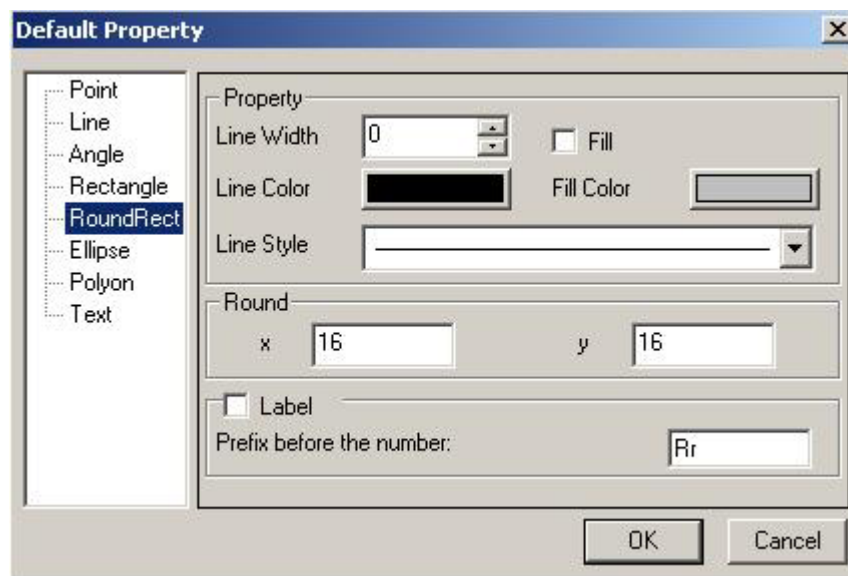


图 4.8-3 Drawing setup

#### 4.8.4 Sys Magnification

This command can be used in the setting of the Video In Devices magnification or resolution. See more in *System Magnification*.

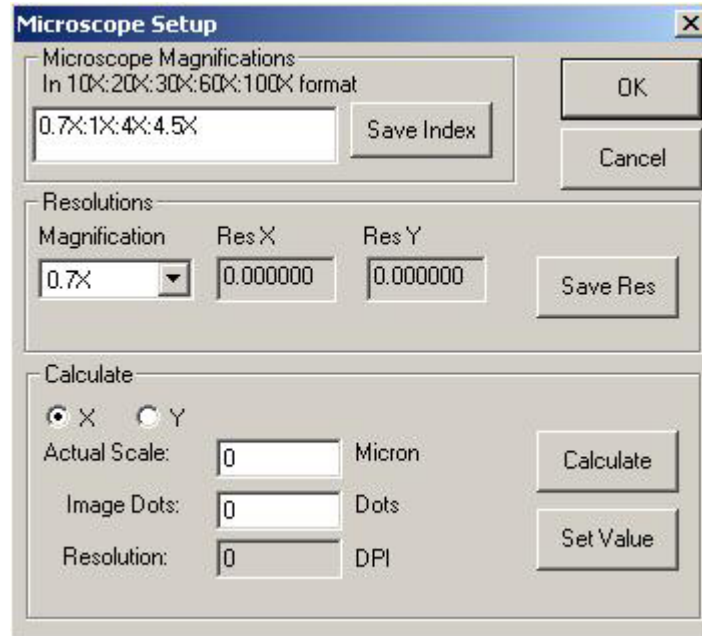


图 4.8-4 Sys microscope setup

#### 4.8.5 Partial View Default

Set default settings of partial view. You can set Gamma , Brightness and Contrast values. You also can set width , height and scale values of partial view.

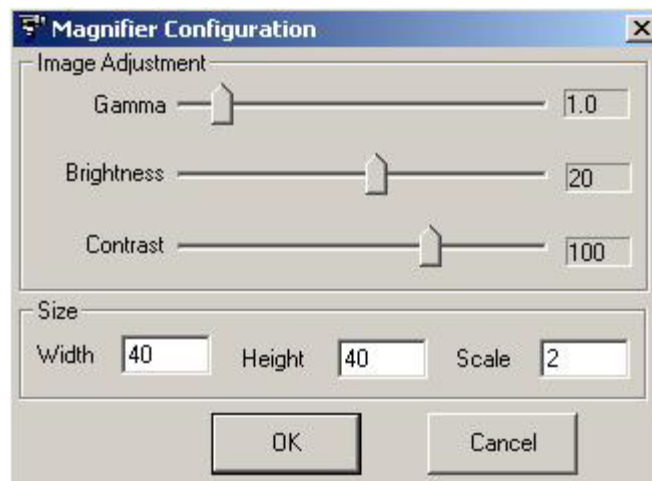
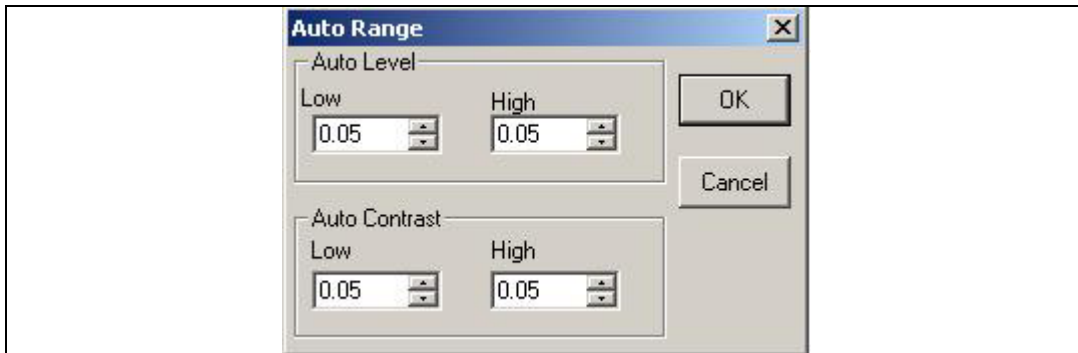


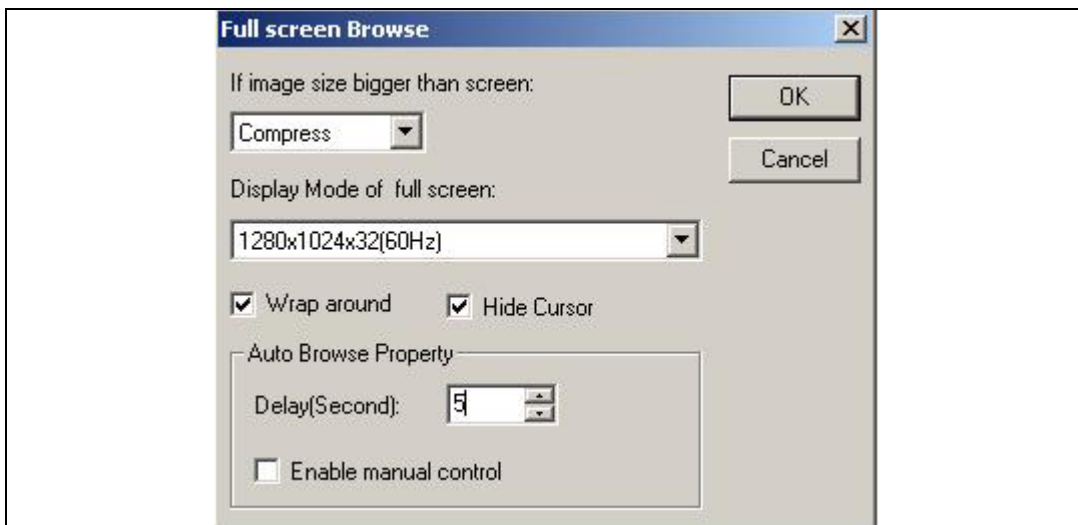
Fig.4.8-5 PartialView Default

#### 4.8.6 Auto Clipping Range

Set the upper level and low level used for Auto Level and Auto

**Contrast command.****Fig.4.8-6 Auto Clipping Range Setup****4. 8. 7 Play Setup**

**If choose *Auto play* style in Browse command, set related parameters in this dialog**

**图 4.8-7 Play Setup****4. 8. 8 Print Selection**

**User can select whether to print page header or page footnote, at the same he can determine whether to print the image label and measured parameters. He can also select different integration manners**

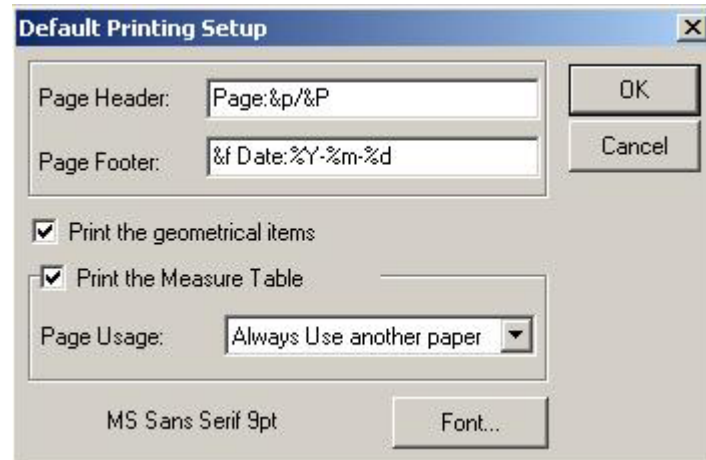


Fig.4.8-8 Print Setup

## 4.9 Window Menu

Window menu commands control the display of images in *PhotoLib*<sup>®</sup>. You can arrange the display of multiple images in the *PhotoLib*<sup>®</sup> workspace.

**New Window:** Create a new image of the active image.

**Cascade:** Use the *Cascade Images* command to arrange your open image windows so that they are roughly equally-sized and layered, leaving only their title bar and left border visible. *Cascade Images* rearranges only the open image windows.

**Tile:** Use the *Tile Images* command to arrange your open image windows so that all windows are visible and roughly equally sized across the screen. *Tile Images* rearranges only the open image windows.

**Arrange Icon:**

## 4.10 Help Menu

### 4.10.1 Help Content

Click this command to invoke *PhotoLib*<sup>®</sup>'s online help system.

### 4.10.2 About

Show relative information about *PhotoLib*<sup>®</sup> including Version, Date and Company name etc.

## Chapter5 Appendix

### 5.1 How to Set the System Magnification (Microscope)

The correct setting of the microscope magnification index is the premise for the correct measurement. If you have selected the Sunny Group's digital microscope and software, the system magnification has set for you in advance. Please do not modify it. If the hardware is bought from other companies, please set it by yourselves. Here we will show how to set the system magnifications step by step according to the hardware-SZM Digital Microscope (Note: you should have reticule with cross at hand and it's accuracy should be smaller than 0.1 micrometer).

**Step 1:** Connect the SZM digital microscope with computer and execute PhotoLib3.0.

**Step 2:** Select *Setup->Sys Magnification* menu, a *Microscope Setup* dialog box will shown as in Fig5.1. No input the microscope magnification indexes just as the same as you microscope has, for example : 4.5X:4X:3X:2X:1.5X:1X:0.8X:0.7X . Check it and click Save Index button and you will find the input indexes are shown in the *Magnification* combo box (Fig5.2). Click *Ok* button to exit *Microscope Setup* dialog box.

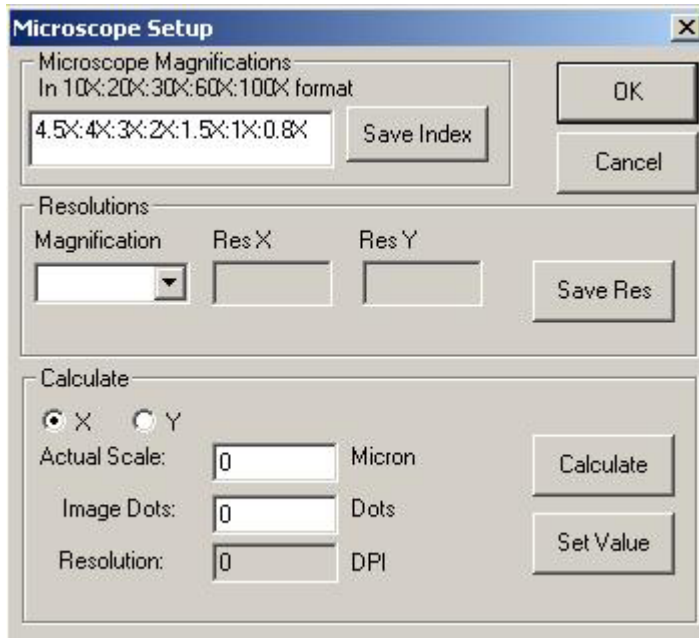


Fig.5.1 Microscope Setup

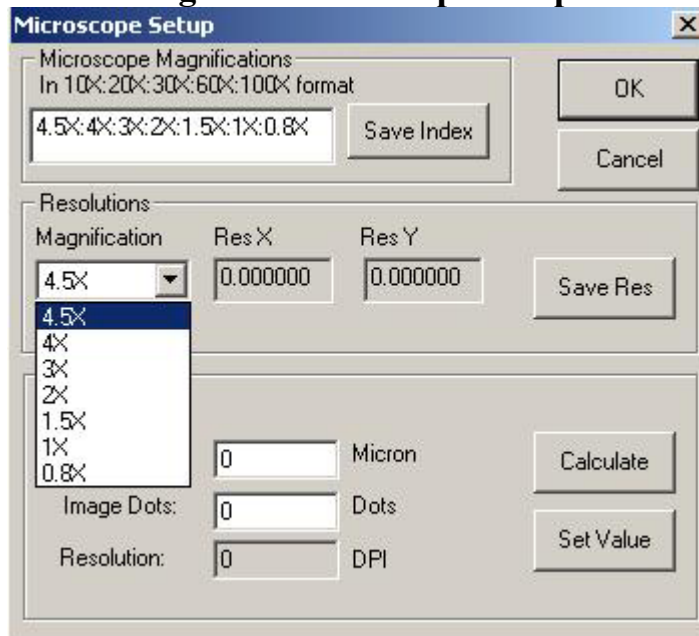


Fig.5.2 Microscope Setup

**Step 3:** Adjust the microscope *Magnification Index* to 4.5X, then adjust to focus the reticule and made it clear. Select *Import Image*-> *VFW Capture*, a video window will be shown as in Fig.3. Set the magnification index to 4.5X(See Fig.5.3). Click *Capture* Button and capture the image to the image window (See Fig.5-4). Using *Select Tool* to select a reticule whose length is 1mm as shown in Fig.5-4. In the status Bar, you will find the selection rectangle information labeled in red color, we found the width of the rectangle is 199, an average value can be arrived by repeating the above step)

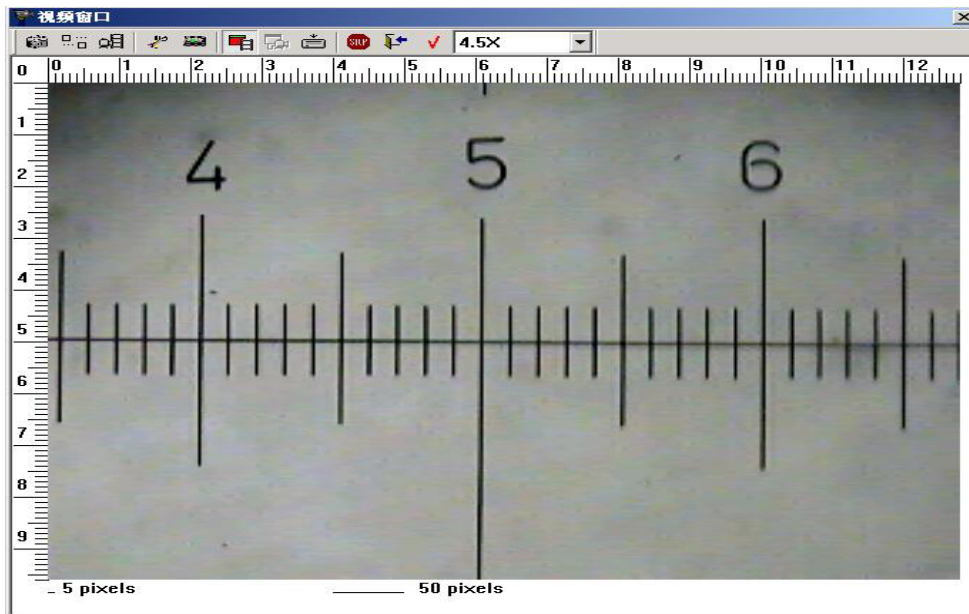


图 5-3

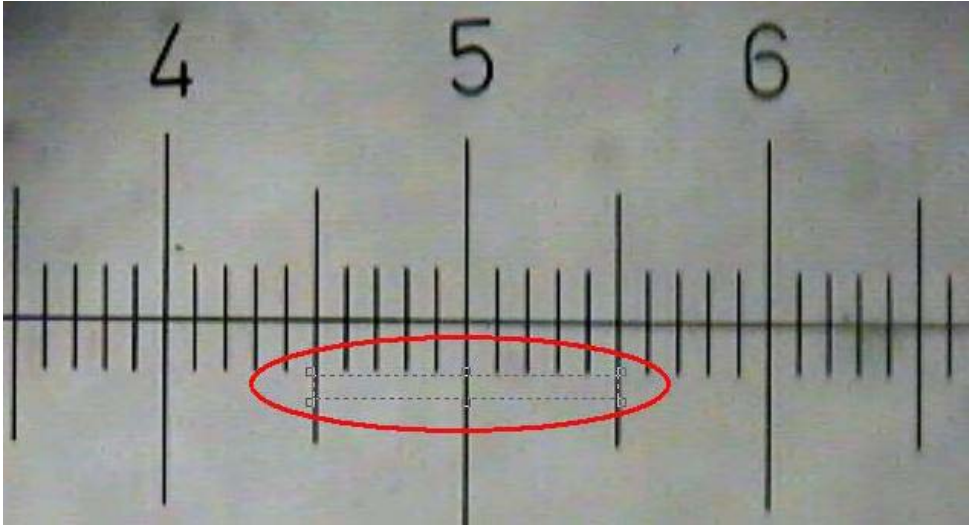


图 5-4



图 5-5

**Step 4:** Adjust the microscope *Magnification Index* to 4.5X, then adjust to focus the reticule and made it clear. Select *Import Image-> VFW Capture*, a video window will be showed as in Fig.3.

Set the magnification index to 4.5X(See Fig.5.3). Click *Capture Button* and capture the image to the image window (See Fig.5-6).

Using *Select Tool* to select a reticule whose length is 1mm as shown in Fig.5-6. In the status Bar, you will find the selection rectangle information noted in red color, we found the width of the rectangle is 245, an average value can be arrived by repeating the above step)



图 5-6



图 5-7

**Step 5:** In step 4 and Step 5, we got the Width(X) 199 and Height(Y) 245 relative to 1mm reticule length. Select *Setup->Sys Magnification* menu, a *Microscope Setup* dialog box will be shown as in Fig5-6. Select the single selection button X and input 1000(um) in the *Actual Scale:* edit box. Type 199 in the *Image Dots:* Edit box, click *Calculate* button, 5054.6 will be showed in the *Resolution* box. Click *Set Value* button, then this value will be displayed in the *Res X* box. Perform the same step then you will get the resolution in the Y direction. The result is shown in *Res Y* box as shown in Fig.5-9.

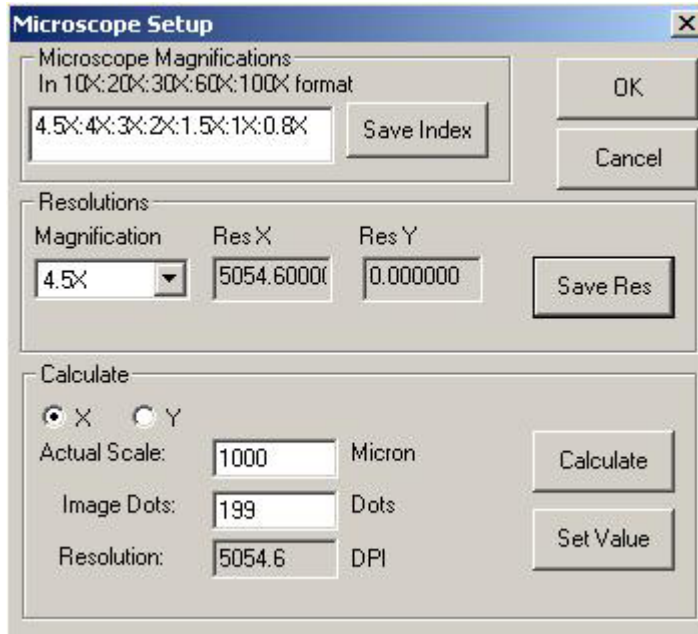


图 5-8

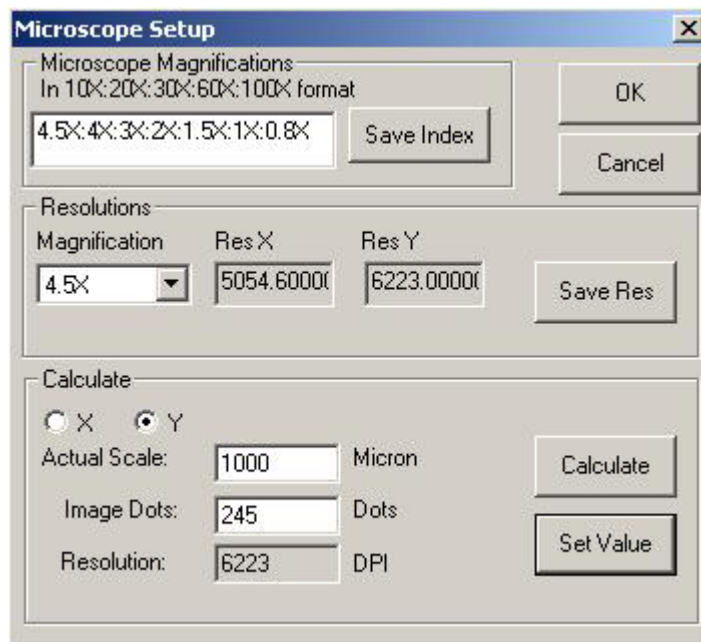


图 5-9

**Step:** Repeat Step 4 and 5 and we can get different resolution for its corresponding magnification indexes.

Now , you can test whether our settings are correct or not. Select *Import Image*-> *VFW Capture*, a video window will be shown as in Fig.3. Set the magnification index to 4.5X(See Fig.5.3). Focus the microscope to made the reticule clear and capture the image. Measure the length as shown in Fig.5-10 and Fig5-11. The data shows verify that our setting is correct.

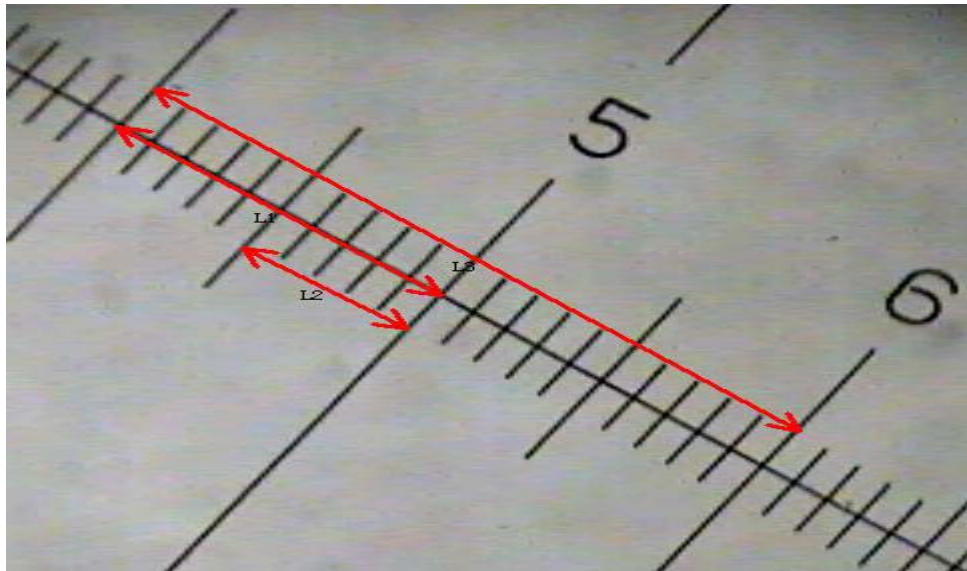


图 5-10

Index	Name	Center	Radius	Area	Perimeter	Angle	First Point	Last Point
1	L1	(1.25, 0.71)			0.999	144.550	(0.84, 0.42)	
2	L2	(1.36, 0.98)			0.497	146.037	(1.16, 0.84)	
3	L3	(1.74, 0.88)			2.000	144.002	(0.93, 0.29)	

图 5-11



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