

User Manual

QCapture Pro 5.1

Imaging and analysis software for acquiring, enhancing and analyzing your images



HIGH PERFORMANCE DIGITAL IMAGING

made easy

03-0006A-A

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1 Introduction

This QCapture-Pro start-up guide is designed to give you an introduction to the software. Included is a description of how to calibrate your system, capture an image, make some enhancements and finally make some basic measurements.

Further support is available from QImaging in the form of technical support by both phone and e-mail:

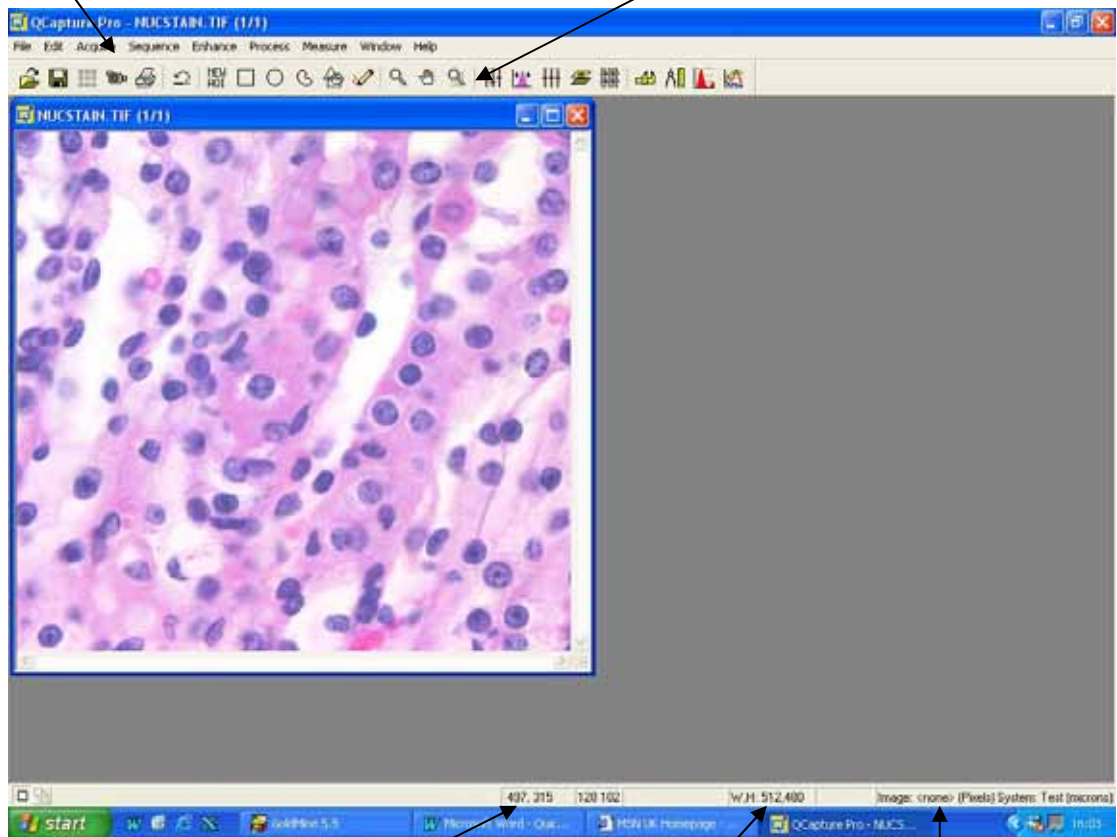
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2 The Workspace Preview

File Menu

Short Cut Menu



X, Y Position of cursor on Image

Height and Width of Image

Calibration units being used

3 Acquisition

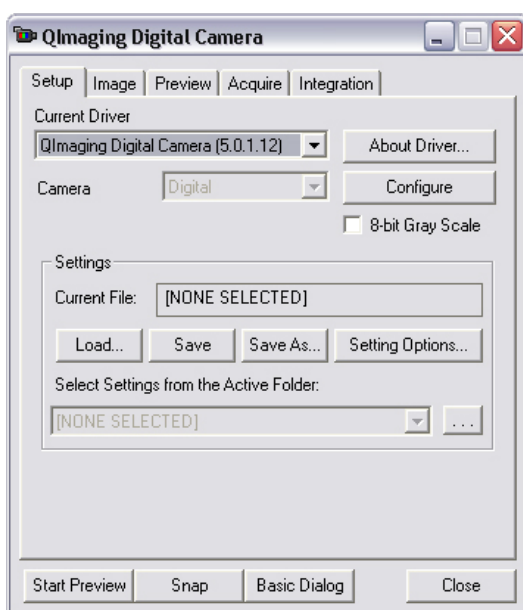
The first thing you will ever have to do is to capture an image.

To set up acquisition select the *Acquire* file menu and then select the *digital/video* option. Or just click on the camera icon in the short cut menu.



The camera icon shortcut

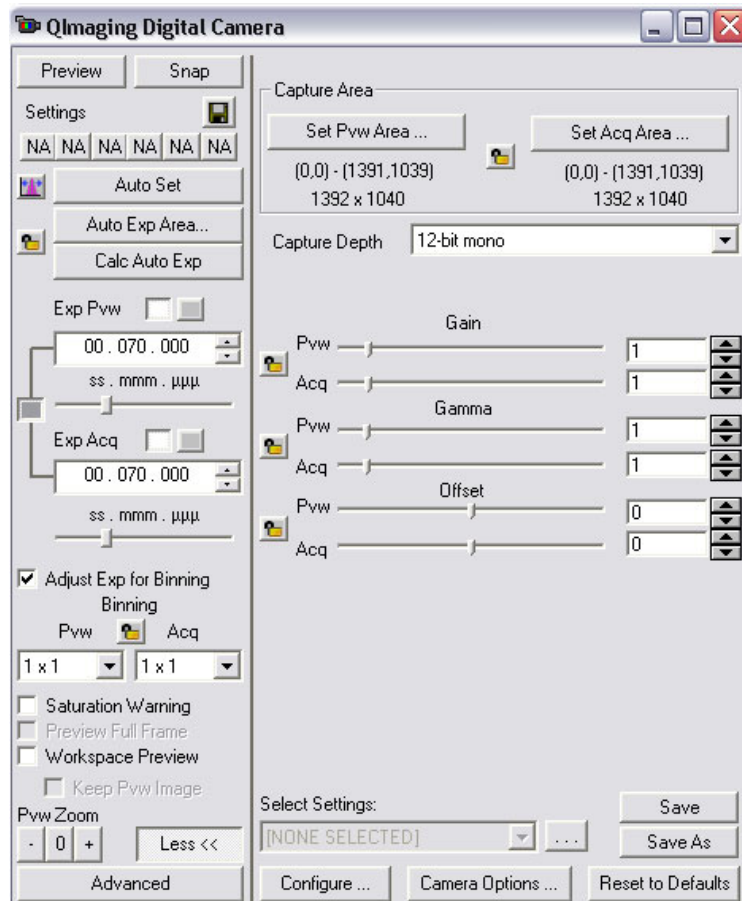
This will bring up the window below within the QCapture Pro Workspace.



You can switch between the 2 views using the Basic Dialog and Advanced buttons respectively. It is generally best to use the Basic Dialog box as this contains all the major tools to control your camera in one easy window. The advance dialog box should only be used when setting up a time-lapse experiment – there is an explanation of how to do this later on.

The Basic Dialog has two views. By selecting "More>>" you will see the additional features available from the Basic Dialog:

- 1) Setting the Preview and Acquisition Resolutions
- 2) Setting the Capture Area, i.e. a Region of Interest (ROI)
- 3) The capture depth (in bits)
- 4) Gain, Gamma and Offset controls of the camera
- 5) The White Balance settings/values
- 6) Select Settings which can then be assigned to the "numbered" settings on the Basic Dialog.

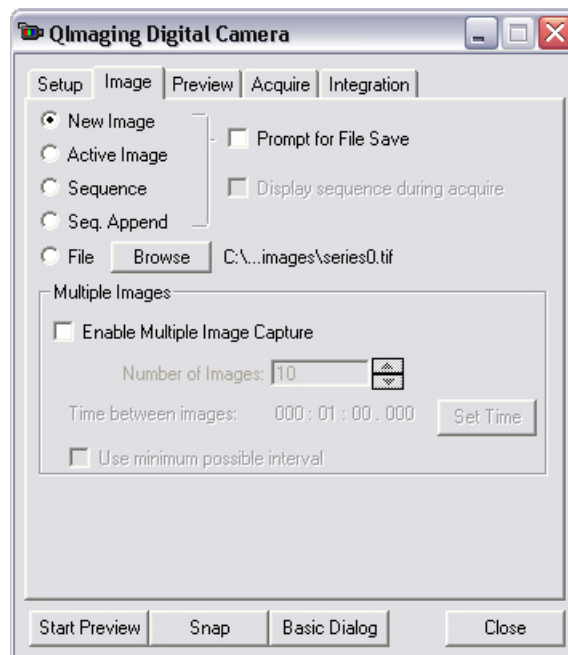


By clicking on "Preview" button (top left) you will get a live preview of the camera image. Beneath/beside the preview image will be a live histogram of the preview image. The position of the live histogram box (and several other options) can be set by right-clicking within the histogram window. The Preview button will change to read "Stop."

The size of the live preview is dependent upon the preview resolution selected as well as the computers display setting. The live preview size can be changed by clicking on the "-" or "+" buttons on the Pwv Zoom settings in the lower left corner of the basic dialog box.

Acquiring a Time Lapse Sequence

There are many acquisition options, such as capturing single images or sequences. These are selected from the *Image* tab of the main *Acquisition* Dialog Box.



Single Image Capture

New Image = Produces a new image in the workspace preview each time you press **Snap**. This means multiple images can be acquired and then saved and later.

Active image = This will continually update your last snapped image. So previously acquired images are not saved.

Multiple Image Capture

First tick the check box – Enable Multiple Image capture

Next enter how many images you wish to acquire.

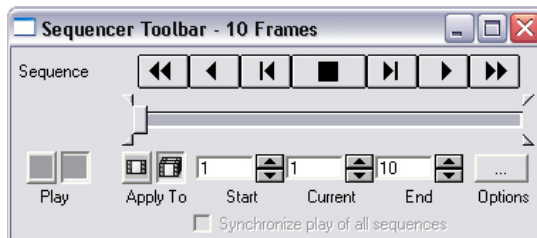
There are now 2 options: use the minimum possible interval between acquiring the images or perform time-lapse capture.

To use the minimum possible interval make sure the box is checked and Set Time is greyed out.

If you wish to perform time-lapse capture, select the Set Time button making sure that use minimum possible interval is unchecked. You will now have the option to set the time between acquisitions.

Sequence = This will generate a sequence file to RAM which is very much like an AVI sequence but with no compression. These sequences can then be played and edited.

A sequence control window is shown below.



To File = This will write a Tiff series to a specified file.

Once the above selections have been made you can select to preview. This can be done directly from the *Acquisition Dialog Box* or through the *Basic Dialog Box*, which is accessible from the bottom of the Acquisition Dialog Box.



Preview = Opens a Preview image

Snap = Acquires the image in the mode selected earlier – New image etc.

Advanced = Returns us to the Main Acquisition Window

The *Preview* and *Acquire* options slider bar sets the camera exposure time. When your preview image looks good you can start to capture images, as you require them.

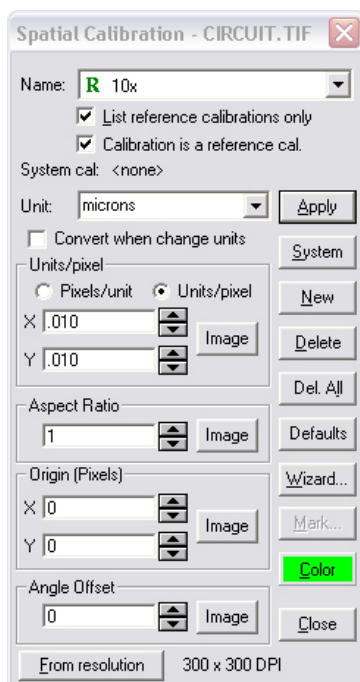
4 Calibration

Setting up a spatial calibration

This guide will look at setting up a spatial calibration. You will need to consider what you are going to calibrate against. Using a microscope a graticule can be used to set up calibration files for different objectives.

At this stage you will need a snapped image of a graticule or image with known distance on it ready.

Under the *Measure* file menu, select *Calibration* and then *Spatial*. This will load the Spatial Calibration Dialog Box.

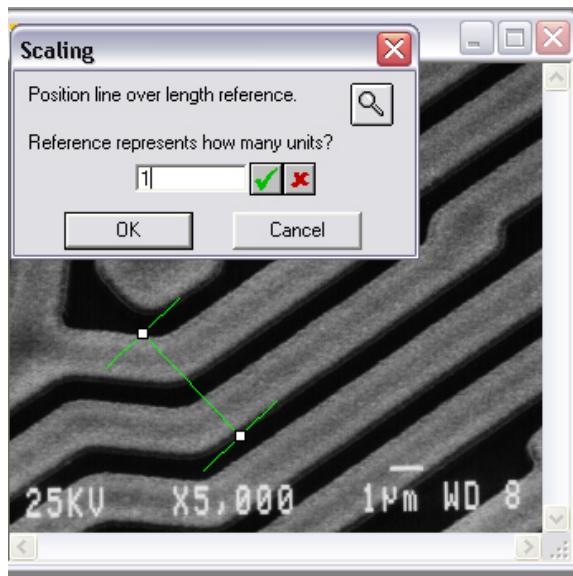


First select *New* and then give the calibration a *Name*; I will call mine 10x to indicate it was taken using a 10x objective.

Next select the *Unit* you wish to use: either enter your own or choose from the drop down menu; I will select *microns*.

Next select the *Image* button.

This will place a line on the image, which should be stretched over our known distance as shown below.



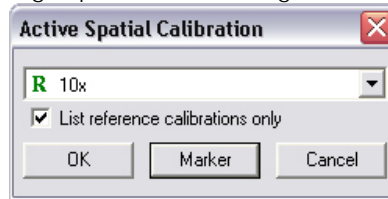
When you are happy select *OK*.

This will reload the *Spatial Calibration Dialog Box*. If you are happy with the calibration, select *System* to set this calibration file as a system calibration that will be used in the future when acquiring images on the 10x objective then select *OK*. This will load the new calibration and save it into the tiff tag of the subsequent images.

The name of the calibration will now appear in the bottom right hand side of the Workspace preview (Figure 1) shown on page 3.

Selecting a saved calibration

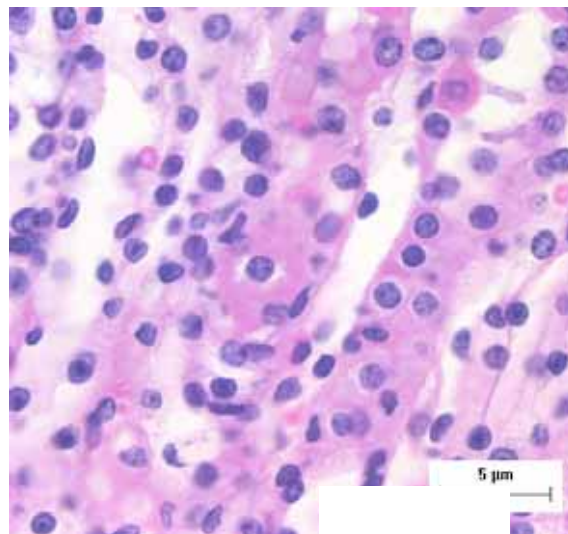
To call a saved calibration select the *Measure* File menu and select *Calibration* and this time select *Select Spatial*. This brings up the below dialog box.



A scale marker can be placed on the image now by clicking on *Marker*.



Click on the style you want, white on black or black on white, and it will put a marker on your image. If you hold down your left mouse button you can move it to its required position. Clicking the right mouse button burns the marker into the image.



5 Enhancement

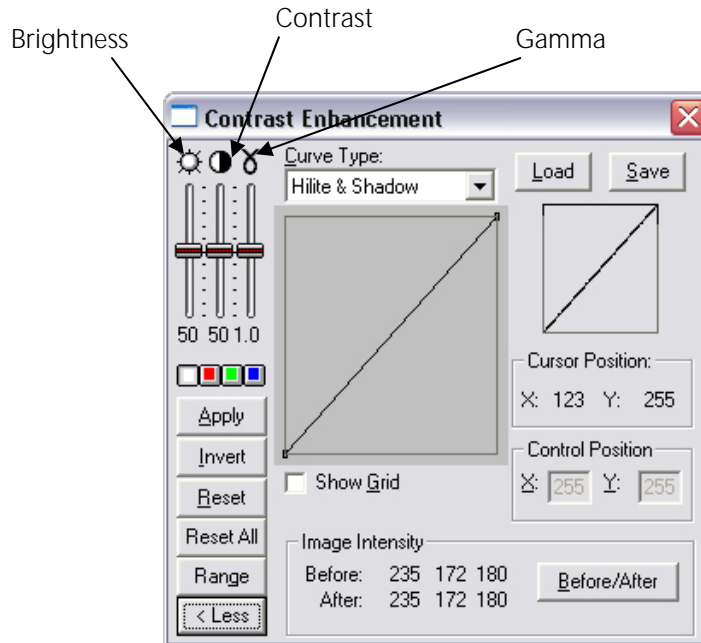
This section looks at Filters, Brightness and Contrast controls.

Any form of enhancement will alter the original image and so it is often worth getting the best image possible at the acquisition stage.

Contrast Enhancement

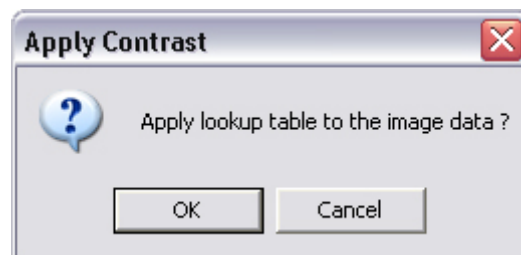
The contrast enhancement tool is available under the *Enhancement* file menu, by selecting *Contrast Enhancement*.

The *Contrast Enhancement* Dialog Box is shown below.



Here you can use the Brightness/Contrast and Gamma slider-bars to alter the image in real time. All three channels can be altered if the white cube is pressed or select the red, green or blue buttons to enhance individual colour channels.

If you select the *Apply* button this will change the properties of the image and so the message below will appear:

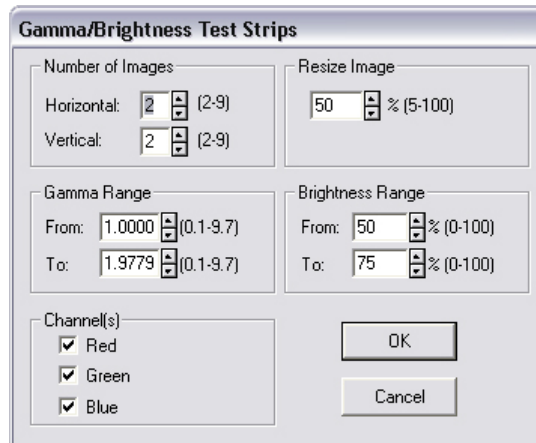


It may be worth making a copy of the original image before making any permanent changes.

A good time to use contrast enhancement is when preparing images for display work. Often an image on the monitor will not appear the same as the printed image.

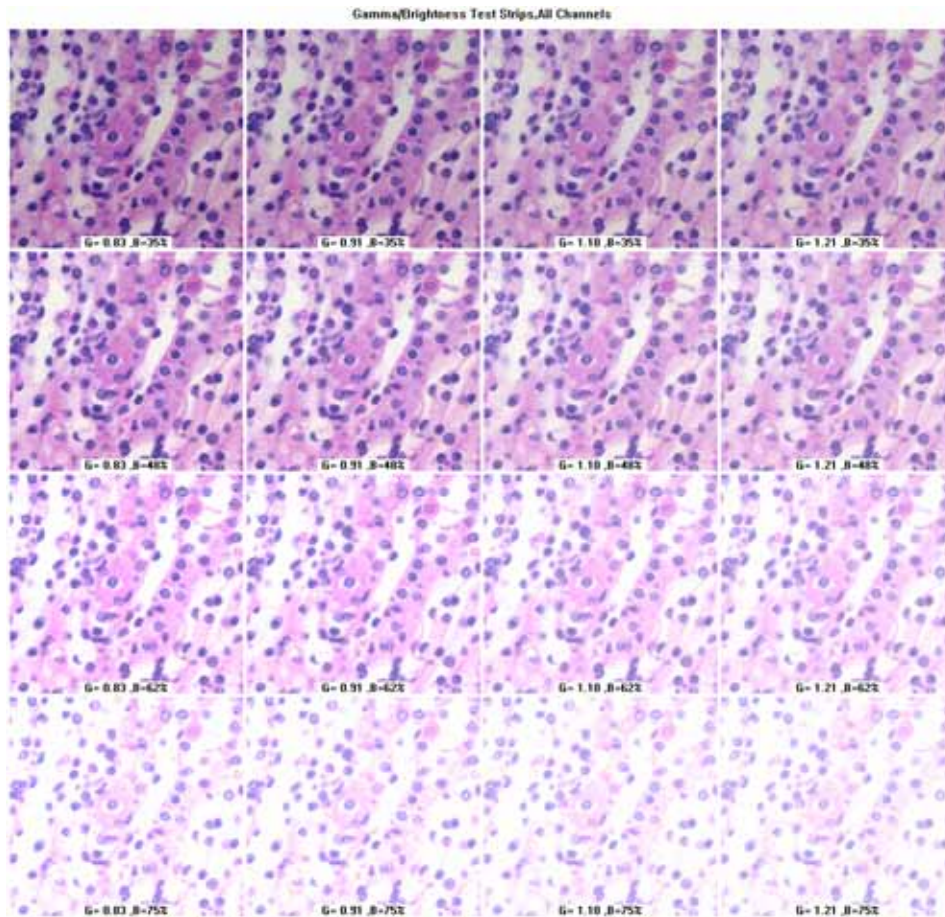
When printing for display it is possible to create a test print. Here you can select to alter brightness, gamma, contrast or a combination of two.

This can be accessed from the *File Menu* by selecting *Test Strips*.



This dialog box shows that I have selected to create a test print of, 4 images by 4 images, with varying Gamma from 0.82 to 1.21 and Brightness from 35 to 75.

You can now print the test sheet and select the best image that appears.



Each image has its own set of Gamma and Brightness settings and so if we return to our target image we can alter the contrast enhancement tool appropriately and then print the desired image.

Filter Tools

The Filters Dialog Box is accessed from the *Process* file menu.



There are several types of filters that can be used.

The preview window in the right hand corner allows us to roam the image and see the effects of the filter before applying it.

If you press the left button on the mouse you will see how the image is currently and if you let go you can see how it will be after the filter.

There is also a description of what the filter does under the preview image.

The most frequently used filters are *Sharpen* to enhance fine detail and *Median* to remove noise.

6 Manual Measurements

Within QCapture Pro there is the ability to make simple point to point measurements. This tool is located under the Measure Tab and then select Measure Distances... from the drop down menu. This will bring up the toolbar shown below.

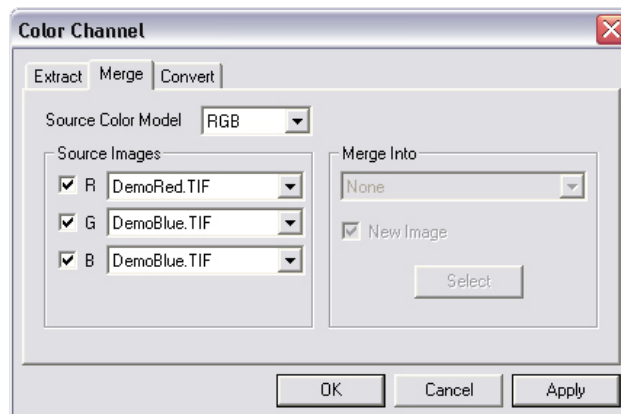


If you click on the left-hand button you can begin to make line measurements. To do this move the cursor on to the image and hold down the left mouse button, now drag the cursor over the image and let go when you reach the edge of the object you wish to measure. The distance of the line drawn will appear on the image.

7 Combining Colour Channels

If you are looking to capture fluorescent images it is best to use a monochrome camera and you can then generate a colour image after using the Colour Channel function found under the Process dropdown menu.

To do this have your individual monochrome images open in the workspace preview then go to the Process menu and select Colour Channel from the list which will open up the dialog box shown below.



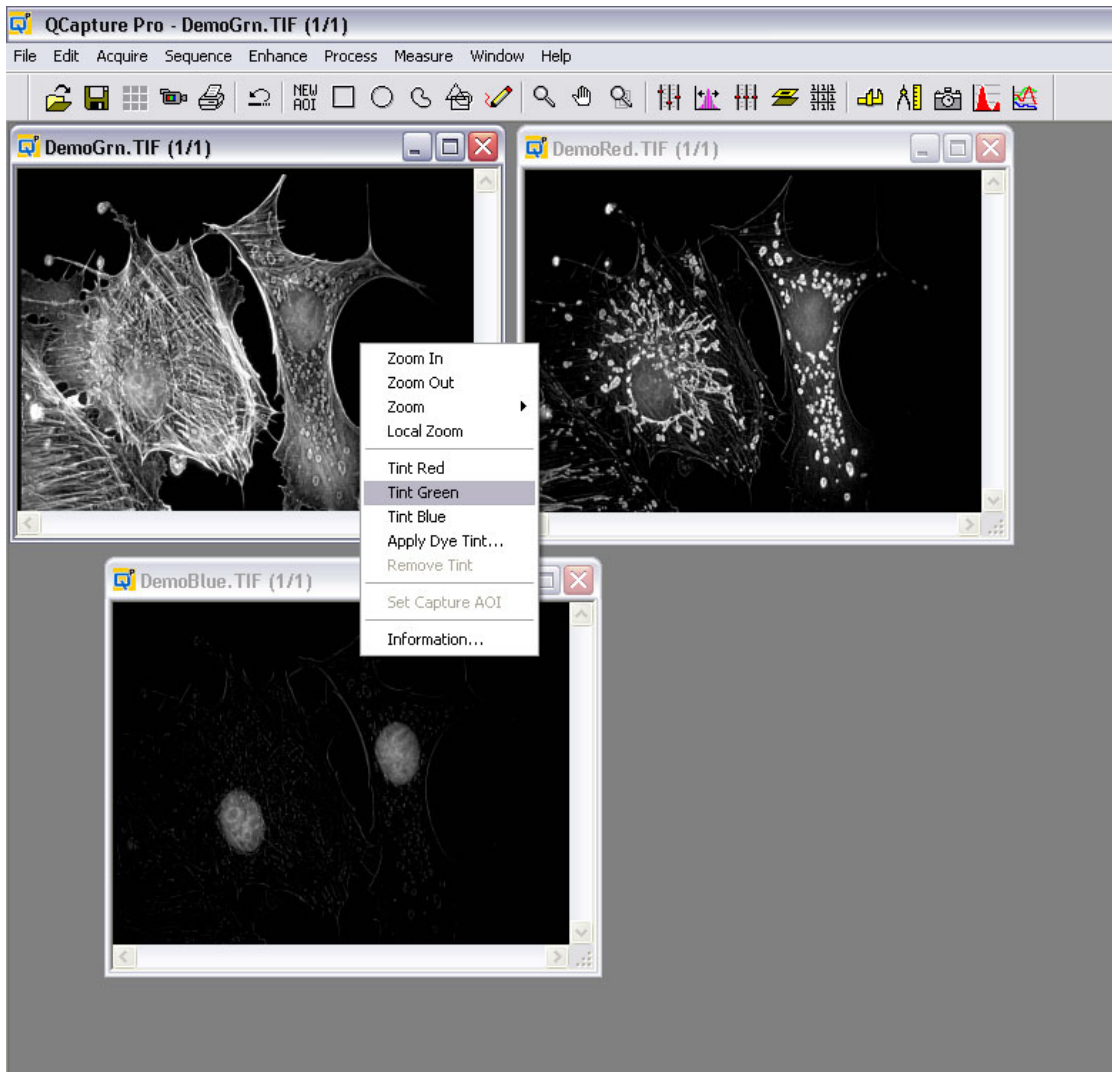
Make sure you are on the Merge tab at the top to combine the channels together and that Source Colour model is set to RGB.

Now just tick which colours you have i.e. Red/Green/Blue and then make sure the corresponding image is selected in the box next to it. A list of all the images open in the workspace preview will appear in each drop down box.

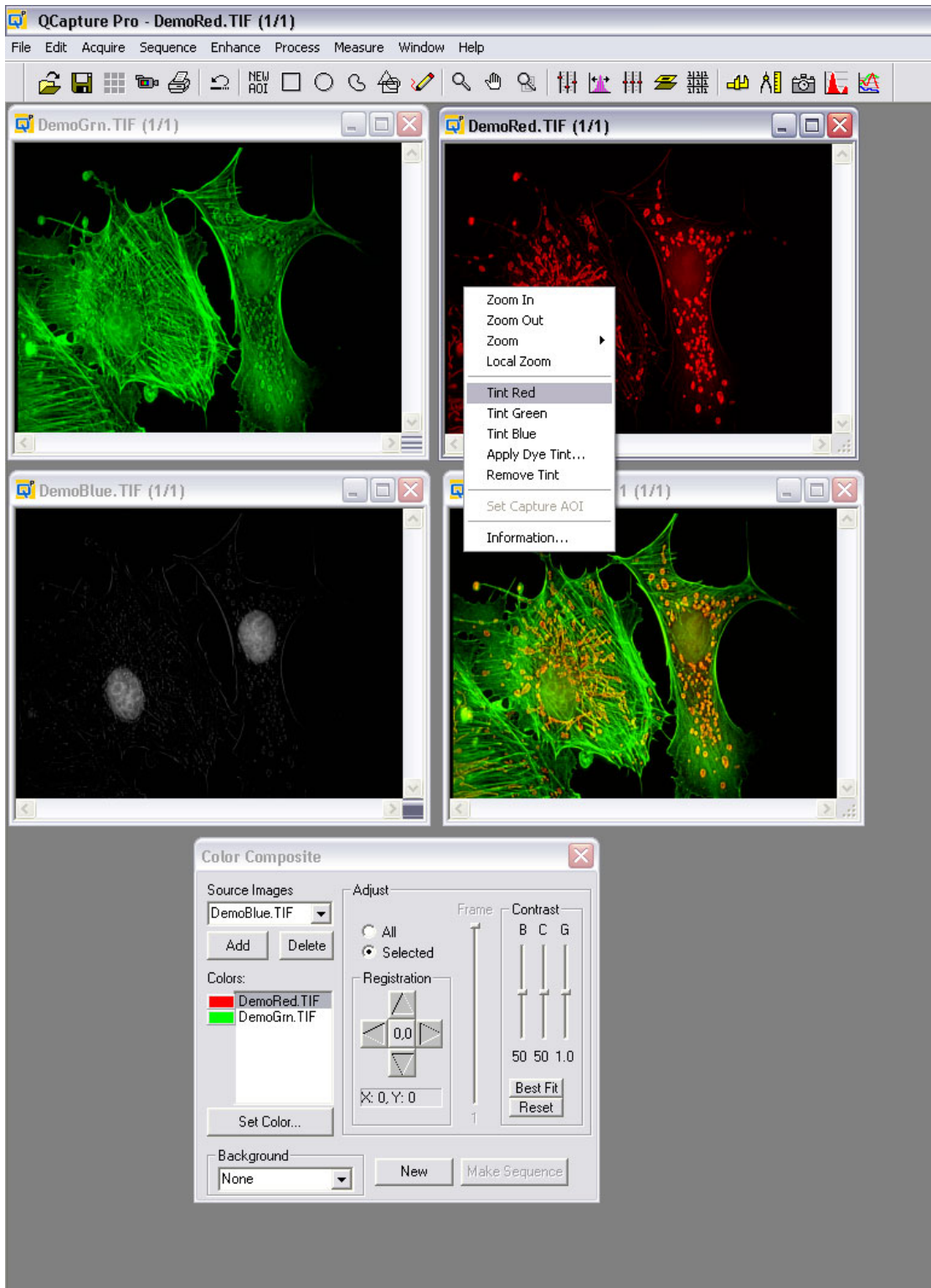
Once everything is set just click OK and a new image will appear with the colour channels combined and coloured. This can be treated as a new image and saved as you wish.

An alternate streamlined method for combining monochrome fluorescence images is also available within QCapture Pro.

Step 1 is to right click on the first mono image and select the appropriate tint.



In step 2, the second monochrome image is also tinted the appropriate colour, and after the tint is applied, a menu appears and the composite of the first two images is automatically created.

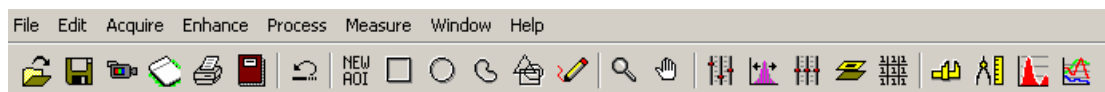


Assuming there are three monochrome images, the final step can be performed in two ways. By right clicking on the final mono image, or by using the Colour Composite menu, clicking the add button and selecting the correct source image.

If needed, each colour channel may be independently shifted for proper alignment by using the Registration feature.

8 The Short Cut Menu

Please find below an image of the short cut menu with a description of each function. All of the tools listed below can also be accessed through the various file menus.



Short cut functions from left to right.

- | | |
|--------------------------------|--|
| <i>Open document</i> | - <i>Open saved image from file or disk</i> |
| <i>Save current document</i> | - <i>Save current image to image folder</i> |
| <i>Video/digital capture</i> | - <i>Open camera driver dialog box</i> |
| <i>Scan to new document</i> | - <i>Capture through twain</i> |
| <i>Print current document</i> | - <i>Print open image</i> |
| <i>Launch report generator</i> | - <i>Open the report generator</i> |
| <i>Undo/redo last</i> | - <i>Undo last action</i> |
| <i>Delete/new AOI</i> | - <i>Delete or add a new AOI to an image</i> |
| <i>Rectangular AOI</i> | - <i>Draw rectangular AOI</i> |
| <i>Ellipse AOI</i> | - <i>Draw elliptical AOI</i> |
| <i>Irregular AOI</i> | - <i>Draw a freehand AOI</i> |
| <i>Multiple AOI</i> | - <i>Allows multiple AOI's on one image</i> |
| <i>Annotate</i> | - <i>Annotate an image</i> |
| <i>Zoom to point tool</i> | - <i>Zoom in on a point in an image</i> |
| <i>Pan image tool</i> | - <i>Scroll around an image</i> |
| <i>Contrast enhancement</i> | - <i>Make a contrast/brightness/gamma enhancement</i> |
| <i>Best fit equalisation</i> | - <i>Automatic contrast/brightness/gamma enhancement</i> |
| <i>Reset contrast</i> | - <i>Return to original image</i> |
| <i>Background operations</i> | - <i>Use to perform background subtraction</i> |
| <i>Spatial filtering</i> | - <i>Opens filter options</i> |
| <i>Spatial calibration</i> | - <i>Select from saved calibration files</i> |
| <i>Manual measurements</i> | - <i>Open manual measurements dialog box</i> |
| <i>Image histogram</i> | - <i>Generate histogram for current image</i> |
| <i>Line profile</i> | - <i>Generate a line profile for current image</i> |