Using the Diagnostics Instruments Spot Camera
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(Edited by Dr. Dave McShaffrey, who introduced all the errors)

The Spot camera is a cooled CCD digital camera of very high resolution, light sensitivity, and cost -- a camera of this type costs around $7000 - $9000. Thus, care must be taken in its use.
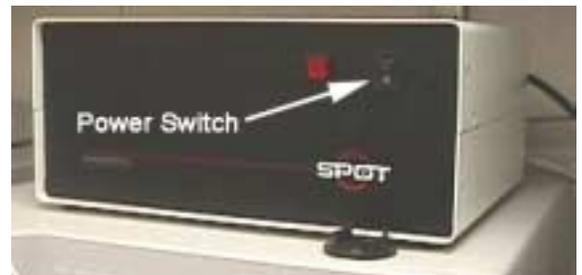
The camera is mounted on the microscope, as shown in the figure to the right.

Turning on the camera

The camera must be turned on at the power supply (shown to the right), located near the computer.

First turn on the power strip along side the computer, then turn on the camera power supply. The red indicator light will illuminate when the power supply is on.

Acquiring Images from the Spot camera

Open the Adobe PhotoShop program by double clicking on the PhotoShop icon.

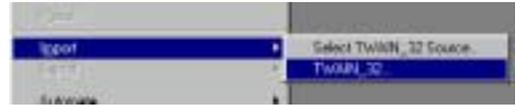From the 'File' drop-down menu, choose the 'Import' option.

Click on 'Select Twain_32 Source'

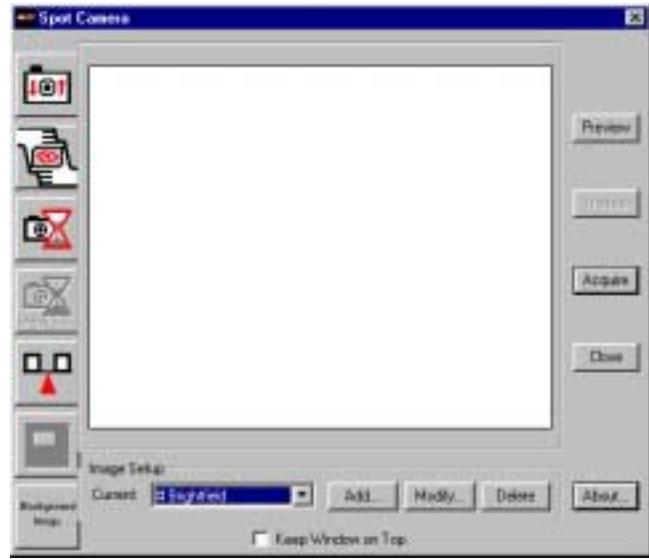In the option window that appears, select the 'Spot Camera' as the import source.

Opening the Image Import Window

To open the Spot camera window, under 'Import'
On the 'File' menu, select 'Twain_32'

This will open the camera Image Import
Window. This is the window you will use to
control the camera.

Camera Controls

Make sure under Image Setup that
'Brightfield' (not #Brightfield) is
selected

** **Do not Add, Modify or Delete
the Image Setup setting** ***

**The Image controls that you may use are indicated to the right.**

'A' is the 'Focus' control
> This is used to focus the image as viewed through the camera.

'B' is the 'Framing' control this is used to position the image in the frame as observed through the camera.

'C' is the 'Exposure' control
> This sets the proper exposure for the camera. **Normally you will not use this since the exposure will be set automatically when you shot the image.**
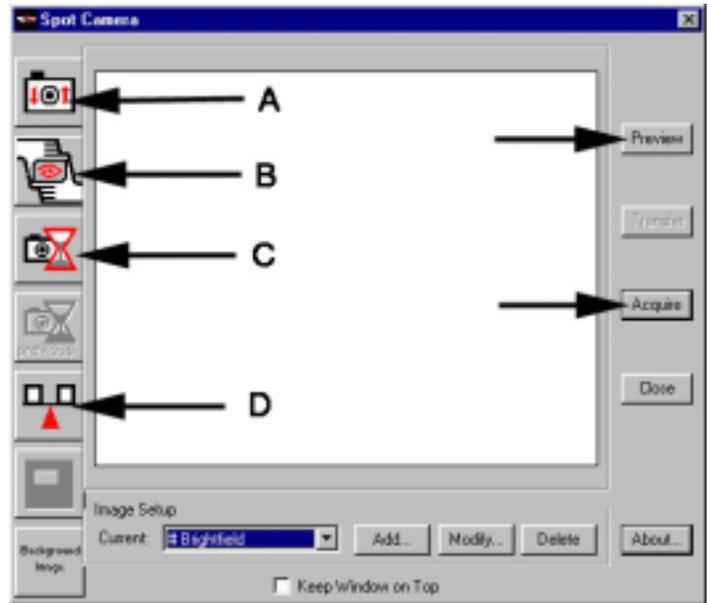
'D' is the 'White balance' control this is used to assure that the background color is white.

The 'Preview' button allows viewing the image before importing to PhotoShop.

The 'Acquire' Button shots the picture and returns it to PhotoShop.

Standard procedure for importing an image.

Turn on the microscope.

The power switch is a small toggle on the back, right-hand side.

1. Setting the illumination level

The illuminator control panel is on the lower right-hand side of the microscope.

Move the slider level to approximately so that the lights in positions '4' or '6' are illuminated.

If the slider level has no effect, push the 'preset' button.

It is best to set this once and then not to change it during a photo session. If this is changed after the 'white balance' is set (see below), then the white balance may need to be reset.

2. Setting the white balance.

Position the microscope slide to a <u>clear area (no tissue)</u> Click the 'white balance' control button, and then click 'Begin'

After the process is complete, click OK to save the white balance settings to the 'Brightfield' setup.
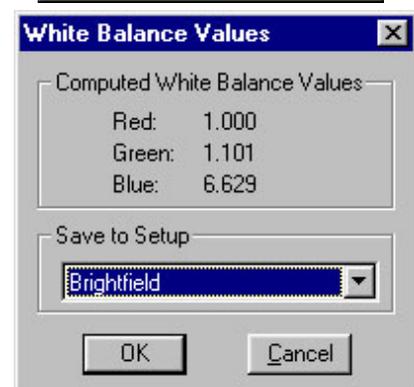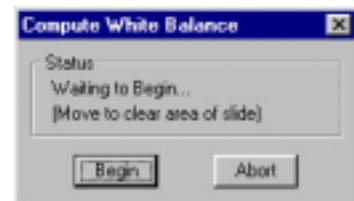
If you get an "Exposure too short…" error message, see notes below about adjusting the light level.

3. Adjusting the image brightness and contrast

Possibly the most important adjust you will make is to image brightness and contrast.

These are normally adjusted using the **substage diaphragm**, located under the microscope stage, as show to the right.

In general, the **substage diaphragm** must be nearly closed under low magnification, and opened as the magnification is increased. Opening the substage diaphragm increases the brightness of the image but decreases the contrast, and these two must be balanced to get the best possible image.

Too much light

The Spot camera is so sensitive that an error message will appear if you try to set the focus, exposure or white balance for an image that is too bright.

When this error occurs, the brightness must be decreased. This can be done in several ways, including:
1) closing the substage diaphragm
2) using the neutral density filters (see below)
3) using the illuminator preset button (see below)

However, it's best not to adjust the microscope illuminator slider lever if the white balance is already set.

Using Neutral Density Filters

Neutral density filters decrease brightness without changing the 'color' of the light. The 'ND6' and 'ND25' filters are located below the mechanical stage knobs on the right-hand side of the microscope. Flipping the levers adds or removes the filters from the light path.


Using the Illuminator Preset button

The Illuminator Preset button is a convenient way to easily switch between a brightness that is suitable for viewing an image through the microscope, and a brightness that is low enough for the Spot camera.

Push the button to increase the brightness when viewing the specimen through the microscope, and push it again before taking the picture.

Note: make sure the white balance is set for the image under the low (preset off) level.
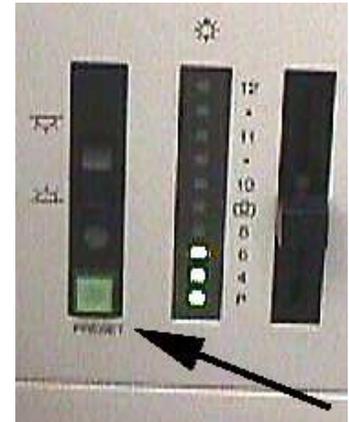
4. Setting the focus
Reposition the microscope slide so that specimen to be photographed is centered.

Clicking the 'Focus' command button will open the window shown to the right.

Click "Begin" to start focusing

The camera will start taking a series of rapid-fire, black and white images. Depending upon the predominate colors in your image, the filter color may be set to red, green or blue (sometime this matters, sometimes not).
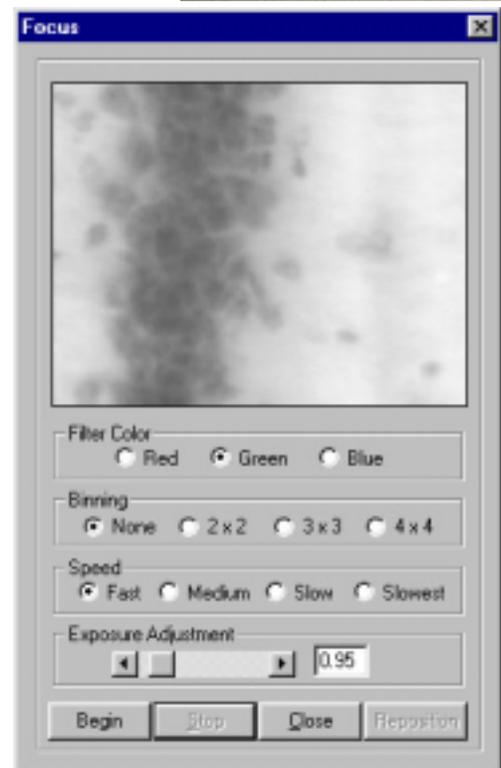
The image can be focused by turning the focusing knobs on the microscope stage, or by turning a focusing ring located just above the microscope on the camera mount, as shown to the right. The advantage of using the camera focusing ring is that the image can be in focus when viewed through the microscope and through the camera.

NOTE: it is best to focus on part of the specimen that has high contrast, since the focusing image very 'grainy'. In general, the image observed while focusing never look very sharp.

Click 'Stop" when you are done focusing, and close the focus window.

5. Framing the image

The Framing control can be used to check and make adjustments to the composition of the image.

Click the 'Framing Control button to open the Frame Window, as shown to the right.

Click 'begin' to …. begin.

It works much like the focus window; a series of quick images are taken, so that you can adjust the position of the specimen using the mechanical stage knobs on the microscope.
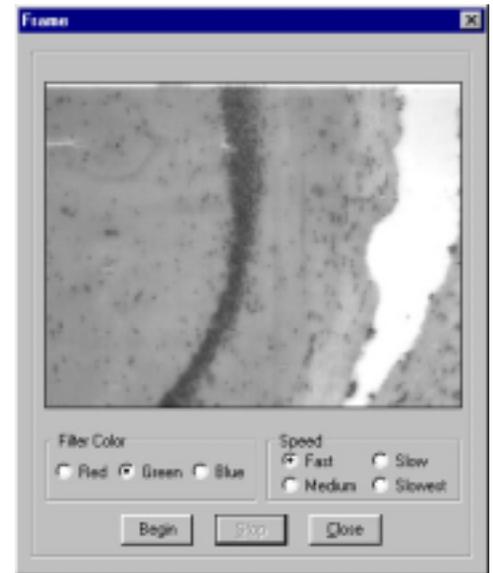
When the image suitable positioned, click 'stop' and close the window.

6. Taking the picture and passing it to PhotoShop

Click on the Preview button on the right to see what your image will look like. If it looks good, you can just click on the Acquire button to move it into PhotoShop.

Close the Image Control Window; the image is now ready for work in PhotoShop.