

ImageSCI and ImageSource

User manual

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Part I

Introduction and Initial Setup

Introduction and Initial Setup

Introduction

This manual gives full instructions for setting up and using ImageSCI and for using the ImageSource software.

The manual is divided into three parts: *Introduction and Initial Setup* (this chapter), *Getting Started* and *Reference*.

The next section in this chapter gives a brief overview of the ImageSCI hardware and instructions for connecting up its components. The final section of the chapter gives an overview of the software.

The *Getting Started* part of the manual takes you through basic procedures for capturing an image and sending it to ImageAide for analysis.

The first chapter in the *Reference* part of the manual, Chapter 3, *Using ImageSource*, describes how to use setting Configurations, capture images and control the way images are displayed. It then shows you how to work with captured images for presentation purposes, including how to enhance them using a variety of techniques, and how to add annotations.

Chapter 4, *The ImageSource Application Window*, describes the layout of the program interface and shows you how to work with the Image Capture toolbox, Image windows, the Histogram window and the Browser. Chapter 5, *The Toolbars*, describes some general features of working with toolbars, and then provides instructions for using each of the tools. Chapter 6, *Menus*, describes each of the menus in turn, with instructions for using the commands they contain.

ImageSCI

Overview

ImageSCI is an affordable fully-automated gel documentation and analysis system. It features 16 bit performance with many outstanding features usually only associated with advanced systems.

Standard ImageSCI systems are supplied with:

- ImageSCI Darkroom fitted with 8-bit (16-bit performance provided by EDR) CCD camera and prefocused f1.2 lens with standard UV filter
- Integral transilluminator – 15 x 15cm, 302nm (sample size 15 x 12cm)
- UV/white light converter for white light applications (optional)
- Built-in PC running Windows XP
- 250MB internal zip and 1.44MB floppy drive
- ImageSource acquisition software
- ImageAide match analysis software
- Microsoft Office – Small Business Edition (optional).

ImageSCI is supplied with all necessary software installed in the PC, so all you need to do is to connect a keyboard, mouse and monitor.

Connecting up the System

To connect up ImageSCI:

- 1 Unscrew the knurled fixing screw holding the cover plate on the left-hand side of the ImageSCI system box.
- 2 Remove the cover plate to reveal the connectors beneath.
- 3 Plug in the monitor, keyboard and mouse leads – the sockets are labelled with appropriate icons.

Note You should also connect any other accessories, such as a printer, to the appropriate connectors beneath the cover panel.

- 4 Refit the cover panel, slotting the cables through the cutouts, and replace the knurled fixing screw to hold it in place.
- 5 Connect power cables to the power sockets on the ImageSCI (on the back) and monitor.

See *Getting Started with ImageSCI* (Chapter 2) for how to switch on the ImageSCI and use it to capture images.

Software overview

This section gives an overview of the software supplied with ImageSCI.

ImageSource

You use the ImageSource program to control the hardware, to capture images and to process the captured images. In particular, you can use ImageSource to control the illumination and exposure length while viewing a live image from the camera.

You can use ImageSource to capture images:

- from a live image
- as a single frame capture
- in a series with the same or variable exposures
- using auto exposure.

The patented Extended Dynamic Range (EDR) feature allows you to extend the dynamic range of the system's camera. In particular, it increases the detail in low intensity areas of the image allowing you (and analysis software like ImageAide) to distinguish features in dark parts of the object that would otherwise be undetectable without saturating the lighter areas.

The neutral field correction provided by ImageSource allows you to correct for uneven illumination while maintaining Good Laboratory Practice.

A histogram display allows you to maximize the image contrast without losing any detail.

For presentation purposes, you can process captured images to create a negative image, and increase or decrease the sharpness. You can also crop images or flip them horizontally or vertically. ImageSource also allows you to add graphical and textual

Introduction and Initial Setup

annotations. You can save the annotations in a separate file from the image to transfer them to other images. All processing is performed on a copy of the original image, which is saved with the original image. In accordance with Good Laboratory Practice, ImageAide always analyses the original unprocessed image in the image file.

Original and Processed images can be exported to files using a wide range of standard graphics formats, and you can choose whether or not to 'engrave' the annotations on the exported image.

ImageAide

ImageAide is an extremely powerful and easy-to-use gel analysis program. It is fully automated, allowing analyses to be carried out in seconds. However, it is also extremely flexible, giving you the option to control every aspect of the analysis manually if you wish. See the separate ImageAide documentation for details.

Summary

Your ImageSCI system should now be fully assembled and ready for use. You should now go to the *Getting Started* chapter to find out how to turn it on and start working productively with it.

The first chapter in the *Reference* part of the manual, *Using ImageSource*, builds on the *Getting Started* chapters and goes into rather more depth, showing you alternative ways of proceeding and more advanced features. The remaining chapters in the *Reference* part of the manual provide a systematic reference to the ImageSource software.

Part 2

Getting Started

Getting Started with ImageSCI

This chapter gives a quick introduction to using your ImageSCI system, taking you through the processes of starting up, capturing an image and opening the image in ImageAide for analysis.

The final section of the chapter gives some hints on using ImageSCI.

There are other ways to carry out the operations described in this chapter, providing powerful and time-saving alternatives – for full details of these and the many other features offered by ImageSource, see *Using ImageSource*, Chapter 3, and the other reference chapters following it.

Switching on

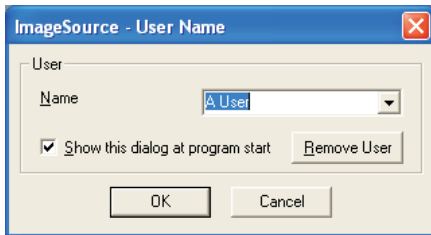
To switch on the ImageSCI:

- 1 Make sure the power leads are connected to a live supply.
- 2 Turn on the main ImageSCI power switch – this is a rocker switch just above the power input socket on the back of the ImageSCI.
- 3 Press the processor on/off button for a couple of seconds – looking at the back of the ImageSCI, this is a black push button switch at the top right-hand corner of the back panel.
- 4 Turn on the monitor.

The ImageSCI will take a little time to start up while it loads Windows and then ImageSource.

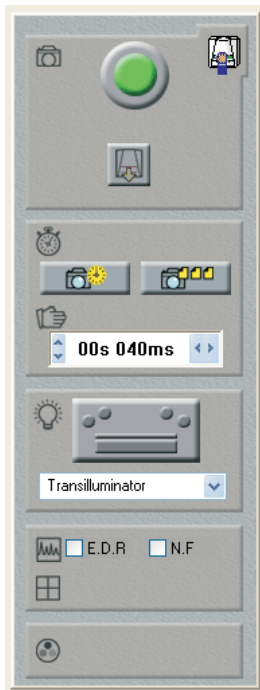
Getting Started with ImageSCI

When ImageSource starts up the first time, you will be asked to log on:



- 1 Type in your name. If you have opened ImageSource before and entered your name, you will be able to select it from the drop-down list.
- 2 Press **OK** to open ImageSource.

The main ImageSource Application window (see Chapter 4), will open with the Image Capture toolbox displayed on its left-hand side:



Capturing an image from the camera

This section shows you how to carry out some typical procedures for capturing images. You will learn how to:

- Capture an image using an automatic exposure – see page 2-4.
- Capture an image from live video – see page 2-5.
- Capture a single image with a long exposure – see page 2-7.
- Capture a series of images – see page 2-8.
- Capture an image with Extended Dynamic Range – see page 2-11.

Note You can apply neutral field correction with the first three of these methods, but not in combination with EDR – see *Using Neutral Field correction (NF)*, page 3-11, for details.

Once you have understood these examples, you will be able to choose and, if necessary, modify the technique that best suits your own requirements and the samples you are using.

Whichever technique you use, the first task is to insert the sample. Since this procedure is common to all the capture techniques, it is described before the separate procedures.

Inserting the sample

To insert the sample:

- 1 Prepare the sample.
- 2 If you have just switched on the ImageSCI, the sample drawer at the bottom of the ImageSCI will be unlatched and you should open it by pulling it towards you.

Note Keep hold of the drawer and pull carefully to avoid pulling the drawer completely out of the ImageSCI.

If the sample drawer is closed, this will be shown on the graphic in the Image Capture toolbox:



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and the Open drawer button will be enabled:



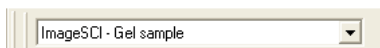
Press Open drawer button to release the drawer and then open it by pulling it towards you – see note above.

Note If you have purchased the optional white light converter drawer and you want to capture an image using transmitted white light, make sure it is fitted in place of the normal drawer.

- 3 Place the sample in the drawer, and push it closed until it is latched by the magnetic catch. The buttons in the Image Capture toolbox will become enabled.

If you want the wells to appear at the top of the image, place the gel in the drawer with the well line on the left-hand side. It is not essential to have the wells at the top of the image since ImageAide will analyze gels in any orientation. However, gel images are normally shown with this orientation, so it is usually convenient to maintain this convention.

- 4 Choose the **Gel sample** Configuration from the drop-down list box in the Configuration bar at the top of the ImageSource window:



Note This is one of the System default configurations supplied with ImageSource – see *Working with Configurations*, page 3-1, to learn more about using Configurations.

The system is now ready to capture an image using one of the techniques in the following sections.

Capturing an image using automatic exposure

To carry out an image capture using an automatic exposure:

- 1 Follow the procedure in *Inserting the sample* (see page 2-3) to prepare the system for capturing an image.



- 2 Press the Automatic exposure button in the Image Capture toolbox.

Note You can press the Automatic exposure button when the image is live or frozen.

Note These instructions have shown you how to capture an image using the settings saved in the **Gel sample** Configuration. If you want to use other settings, you can choose a different configuration or change the settings or options manually before carrying out Step 2.

ImageSource determines the correct exposure by grabbing a series of images starting with the minimum exposure, and then with increasing exposures until an image is grabbed that has some saturated areas. The exposure is then reduced by one step and the image captured and displayed in an Image window, ready for further processing, annotation or analysis, as required.

The UV light inside the darkroom will be switched off automatically after the final exposure and the sample drawer will be released so that you can replace the sample.

Capturing an image from live video

To capture an image manually from live video:

- 1 Follow the procedure in *Inserting the sample* (see page 2-3) to prepare the system for capturing an image.
- 2 If a live image is not currently displayed, press the (green) Freeze/Go live/Snap image button in the Image Capture toolbox to display a live image in an Image window.

Provided the drawer is closed, the lighting control will show that the UV illumination has come on:



(If **No Light** is selected in the lighting control, select **Transilluminator** to turn the UV illumination on.)

Getting Started with ImageSCI

- 3 To set the exposure time:
 - a Select the value (hours, minutes, seconds or milliseconds) that you want to change by clicking in it, or by clicking on the scroll arrows at the right-hand end of the control:



- b Type the new value over the numbers or click on the up or down spin arrow at the left-hand end of the control to increase or decrease the number:



Note You can also increase or decrease the exposure time by pressing the up or down arrow keys on the keyboard, or, if you are using a wheel mouse, by turning the wheel.

As you increase or decrease the exposure time the live image will become lighter or darker – adjust the exposure time to get a reasonably bright image of the gel without saturating any part of it.

Note Only certain values of exposure time are allowed – if you type a non-allowed value directly into the box it will be corrected to the next allowed value.

- 4 Press the (red) Freeze/Go live/Snap image button in the Image Capture toolbox.

The image will be captured (frozen) in the Image window, ready for further processing, annotation or analysis, as required.

The UV light inside the darkroom will be switched off automatically after the exposure and the sample drawer will be released so that you can remove the sample.

Capturing a single image with an exposure longer than five seconds

To capture a single image with a long exposure:

Note Because it can be difficult to estimate the best exposure setting in advance if the exposure is long, ImageSource also allows you to capture a series of images with different exposures so that you can choose the best one after the images have been captured – see the next section for details.

- 1 Follow the procedure in *Inserting the sample* (see page 2-3) to prepare the system for capturing an image.
- 2 If the image is live, press the (red) Freeze/Go live/Snap image button in the Image Capture toolbox to freeze the image – the button will turn green.

Note You cannot set the exposure to more than 5 seconds when the image is live.

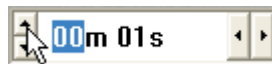
- 3 To adjust the exposure time:

Note The Freeze/Go live/Snap image button turns blue when the exposure is set longer than 5 seconds.

- a Select the value (hours, minutes, seconds or milliseconds) that you want to change by clicking in it, or by clicking on the scroll arrows at the right-hand end of the control:



- b Type the new value over the numbers or click on the up or down spin arrow at the left-hand end of the control to increase or decrease the number:



Note You can also increase or decrease the exposure time by pressing the up or down arrow keys on the keyboard, or, if you are using a wheel mouse, by turning the wheel.

Getting Started with ImageSCI

Note Only certain values of exposure time are allowed – if you type a non-allowed value directly into the box it will be corrected to the next allowed value. The values allowed depend on the system you are using.

- 4 Press the (blue) Freeze/Go live/Snap image button in the Image Capture toolbox to capture the image – the button will turn gray while the image is captured.

The captured image will be shown in a new Image window.

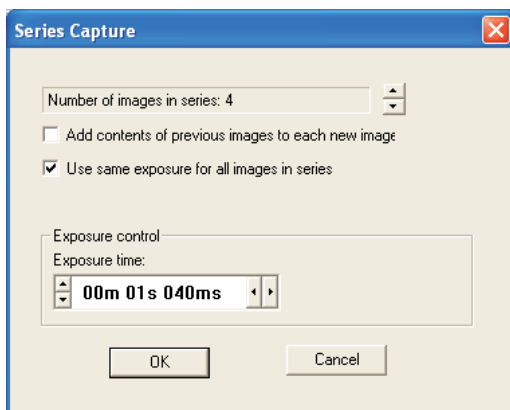
Capturing a series of images

To capture a series of images from a sample:

- 1 Follow the procedure in *Inserting the sample* (see page 2-3) to prepare the system for capturing an image.



- 2 Press the Image series button in the Image Capture toolbox to display the **Series Capture** dialog box:



- 3 Set the number of images you want to capture in the series by clicking on the arrow buttons next to the **Number of images in series** spin box – you can choose from 1 to 100 inclusive.
- 4 Check **Add contents of previous images to each new image** if you want the results to be cumulative: each new image is the result of adding the new exposure to the previous image in the series.

Uncheck **Add contents of previous images to each new image** if you want all images in the series captured with the set exposure.

- 5 Check **Use same exposure for all images in series** if you want to set a single exposure for all images – go to Step 5.

Note If you check both **Use same exposure for all images in series** and **Add contents of previous images to each new image**, the exposure time for the first image will be the set exposure, for the second image the effective exposure time will be 2× the set exposure, for the third it will be 3× the set exposure, and so on.

Uncheck **Use same exposure for all images in series** if you want to set a separate exposure for each of the images – go to Step 6.

- 6 If you have checked **Use same exposure for all images in series**, you can adjust the exposure time as follows:
 - a Select the value (hours, minutes, seconds or milliseconds) that you want to change by clicking in the exposure time control, or by clicking on the scroll arrows at the right-hand end of the control:



- b Type the new value over the numbers or click on the up or down spin arrow at the left-hand end of the control to increase or decrease the number:

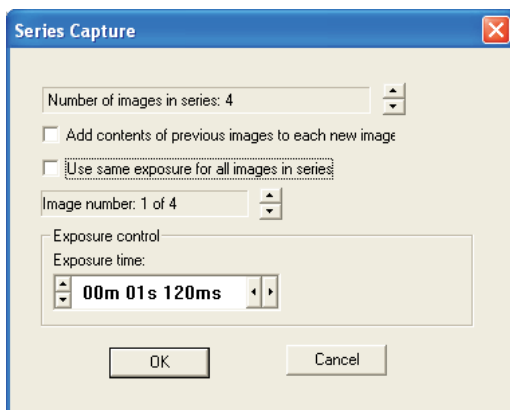


Note You can also increase or decrease the exposure time by pressing the up or down arrow keys on the keyboard, or, if you are using a wheel mouse, by turning the wheel.

Note Only certain values of exposure time are allowed – if you type a non-allowed value directly into the box it will be corrected to the next allowed value.

Getting Started with ImageSCI

- 7 If you have unchecked **Use same exposure for all images in series**, an additional **Image number** spin box is displayed in the **Series Capture** dialog box:



To set the exposure for each image:

- a Click on the up or down arrows next to the **Image number** spin box to choose an image number.
- b Follow the procedure given in Step 6 for setting the exposure time.

Note If you have checked **Add contents of previous images to each new image**, the exposure time for the first image will be the exposure set for the first image, for the second image the effective exposure time will be the exposure time set for the first image plus the exposure time set for the second image, for the third image it will be the sum of the exposure times set for the first three images, and so on.

- 8 Press **OK** to confirm your selections, close the dialog box and start the image capture.

The captured images will be shown in separate Image windows.

By taking a series of exposures of different lengths, you can 'bracket' the expected exposure with longer and shorter exposure times and then choose the best image from the series.

You can now inspect the captured images and select the best one for further processing, annotation or analysis, as required.

Capturing an image with Extended Dynamic Range

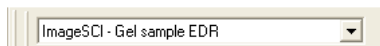
ImageSource allows you to extend the dynamic range of the ImageSCI camera to give it 16-bit performance so that you can capture details in the darkest part of the image without having to over-expose the brightest parts of the image and lose detail there by saturating them.

Note An important feature of the EDR process is that the validity of quantitative measurements taken from EDR images is maintained.

You can use EDR with any of the capture methods described above except Auto exposure.

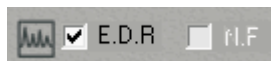
To use EDR with one of the capture methods above, either:

Choose an EDR Configuration after Step 1:



Or:

Check **EDR** in the Image Capture toolbox:



See *Using EDR – Extended Dynamic Range*, page 3-10, for more information about EDR.

Note EDR is not suitable for use with chemiluminescence samples because of the long exposures required due to the low levels of light they emit.

Analyzing the image

The next step after capturing an image is to analyze it – to do this you will use ImageAide.

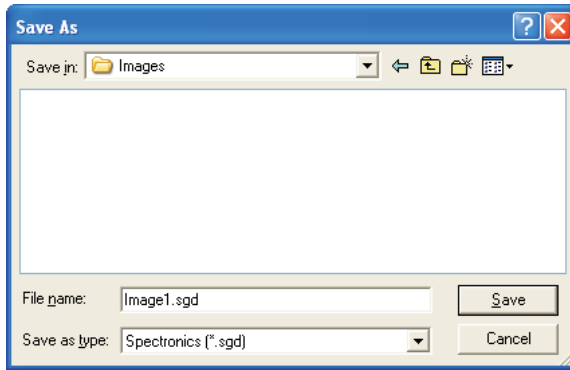
To start up ImageAide to analyze the image in the selected Image window:



- 1 Press the Send to ImageAide button.

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A standard Windows **Save As** dialog box will open so that you can save the image file:



- 2 Select a folder to hold the image file from the **Save in** drop-down list and the file list box below it.
- 3 Enter a name for the image file in the **File name** box.
- 4 Press **Save** to save the image with the new name.

Once you have saved the image, ImageAide will open with the image loaded ready for you to analyze it – see your ImageAide documentation for how to use ImageAide.

Hints

This section gives a few further hints to help you start working with ImageSCI.

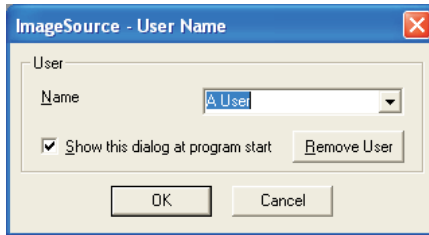
Starting ImageSource

ImageSource starts automatically when you turn on the PC. However, if you close it for any reason, you can restart it without having to restart the PC by double-clicking on the ImageSource icon on the Windows Desktop:



Logging in

If you do not want to display the log in dialog box automatically when the program starts, uncheck the **Show this dialog box at program start** box:



The last user will be logged in automatically when the program starts. You can use **User name** in the **Extras** menu to log in a different user and/or choose to display the log in dialog box on program start up again.

Displaying the Image Capture toolbox

To display the Image Capture toolbox if it is not displayed:



Press the camera button in the Standard toolbar.

Image display

Depending on the display mode of the PC, the Image window may only show a restricted number of gray shades, even though the captured 16-bit image contains much more information. This means that you may need to adjust the display in the image window to view the detail you require – see *Adjusting display conditions* (page 3-15) for details. It is important to note that this does not change the information that has been captured, just the way it is viewed.

Saturation detection

If you overexpose an image (exposure time too long), the lighter parts of the image may be completely white and show no 'highlight' details – this is called saturation. On the other hand, if you underexpose an image (exposure time too short), dark parts of the image may be all black without any 'shadow' details. The Show saturated areas button allows you to check whether an image contains any saturated areas – areas of the image

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that are saturated to white are shown in red and any that are saturated to black are shown in blue.

Saturation mode is particularly useful when you are viewing a live image and adjusting the exposure time to get the correct exposure – in order to get the best results you should choose an exposure that avoids important parts of the image saturating and losing detail.

Note It is important to make sure that the image brightness and contrast controls are set to their default positions before adjusting the exposure time – see the note at the start of *Adjusting display conditions* (page 3-15) for more details.

To check for image saturation:



Press the Show saturated areas button in the image control bar at the right-hand edge of the image window.

When saturation mode is on, any areas of the image that are saturated to white are shown in red and any that are saturated to black are shown in blue. This enables you to determine whether any details in important areas of the image are being lost because of saturation.

Note It is important to make sure that the image brightness and contrast controls are set to their default positions before using saturation mode to decide whether you need to adjust the exposure time – see the note at the start of *Adjusting display conditions* (page 3-15) for more details.

When saturation mode is on, the Show saturated areas button is shown as depressed. To switch saturation mode off:



Press the Show saturated areas button again.

You can also judge the degree of saturation by displaying the Histogram window.

To display the Histogram window:



Choose **Histogram** from the **View** menu to view the Histogram window:



Provided the distribution lies within the range of the histogram, without saturating at either end, you will be able to carry out a quantitative image analysis with confidence.

You can also use the Histogram window to adjust the display conditions in the Image window (see page 3-16) and highlight saturated areas of the image using a button on the Image window's image control bar (see page 3-15).

Moving on

ImageSource provides many other powerful features to help you work with captured images – for details, see *Using ImageSource*, Chapter 3, and the other reference chapters following it.

Part 3

Reference

Using ImageSource

This first chapter in the *Reference* part of the manual extends the *Getting Started* chapters with instructions for using ImageSource to carry out a variety of common operations.

Working with Configurations

ImageSource allows you to create and save ‘Configurations’ containing default settings. You can then change quickly from one type of work to another by selecting the appropriate Configuration to set the required lighting, EDR, NF and exposure time settings at the same time. However, if required, you can change these settings individually for each exposure.

User and system default Configurations

ImageSource is supplied with a number of ‘system default Configurations’ with appropriate default settings for different types of analysis. Any user on the PC can select any of the system default Configurations, but they cannot edit or delete them.

Note You can change the settings from the system default Configuration values for use with an individual exposure, but you cannot save the changes in the system default Configuration for use at a later time. You can, however, save the changes in a user Configuration – see the next paragraph.

In addition to system default Configurations, you can create your own ‘user Configurations’. When you create and save a user Configuration (see *Creating and saving Configurations*, page 3-2), it is saved on the PC for you individually (you are identified by your login name – see page 6-27). Each user on a PC has their own individual set of user Configurations, which they can select, and if required, edit and resave, at any time. You cannot select a user Configuration saved by another user on the PC (unless they have promoted it to be a system default Configuration – see the next paragraph).

You can promote one of your own user Configurations to be a system default Configuration so that it can be used by other users logged in on the PC (see *Promoting*

Using ImageSource

a user Configuration, page 3-4, for how to create system default Configurations). However, once you have promoted one of your user Configurations, you will not be able to edit it.

Selecting a Configuration

Note You cannot change the Configuration while ImageSource is displaying a live image.

To select a new Configuration and set the current capture settings to the values saved in the Configuration:

Choose the required Configuration from the drop-down list box in the Configuration toolbar:

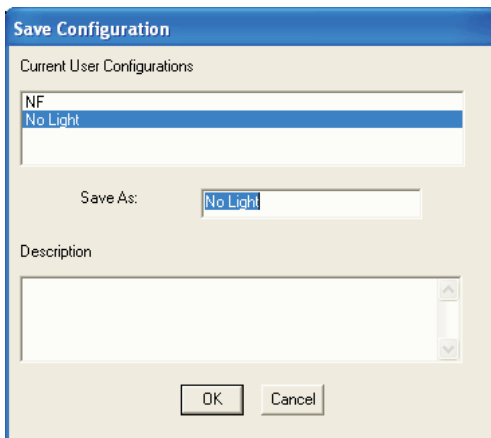


Note The drop-down list box lists all your user Configurations together with any system default Configurations on the PC (see *User and system default Configurations*, page 3-1).

Creating and saving Configurations

To create and save a new user Configuration containing the current capture settings, or save changes in an existing user Configuration:

- 1 Choose **Save Configuration As** from the **Extras** menu to display the **Save Configuration** dialog box:



Note The list box at the top of the dialog box shows all your **Current User Configurations** – the list does not include any system default Configurations on your PC (see *User and system default Configurations*, page 3-1).

- 2 The **Save As** box shows the name of the current Configuration. Either:

Leave the existing name unchanged if you want to update the current Configuration to the current capture settings.

Or:

Enter a new name if you want to create a new Configuration with the current capture settings.

Note If the original Configuration was a system default Configuration, you must enter a new name – you cannot save changes to a system default Configuration.

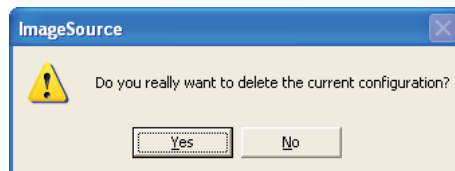
- 3 Enter or edit the **Description** to document the Configuration.
- 4 Press **OK** to close the dialog box and save the changes to the existing Configuration or create a new user Configuration with the current capture settings.

Deleting a Configuration

To delete a user Configuration (you cannot delete a system default Configuration):

- 1 If the Configuration you want to delete is not the current Configuration, select it using the Configuration list in the Configuration bar.
- 2 Choose **Delete Configuration** from the **Extras** menu.

You will be asked to confirm that you want to delete the Configuration:



- 3 Press **Yes** to delete the Configuration.

Using ImageSource

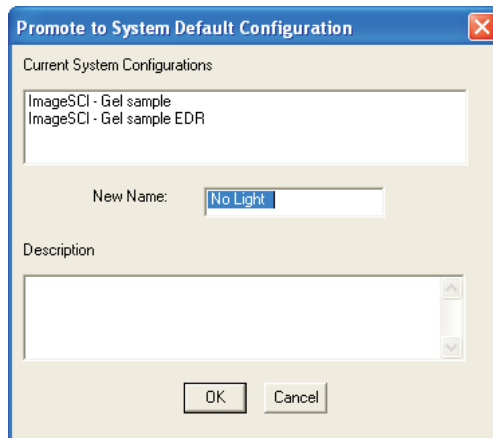
Promoting a user Configuration

To promote a user Configuration to be a system default Configuration:

- 1 If the Configuration you want to promote is not the current Configuration, select it using the Configuration list in the Configuration bar.

Note If you make any changes to the capture settings after selecting the Configuration you want to promote, the changed settings, not the original ones, will be saved in the promoted Configuration.

- 2 Choose **Promote Configuration** from the **Extras** menu to display the **Promote to System Default Configuration** dialog box:



Note The list box at the top of the dialog box shows all the **Current System Configurations** – the list does not include your user Configurations.

- 3 If you want to change the name of the Configuration when it is promoted, edit the name in the **New Name** box.

Note The original user Configuration will be removed even if you enter a new name for the promoted Configuration.

- 4 If required, edit the **Description**.
- 5 Press **OK** to confirm that you want to promote the Configuration.

Once you have promoted a user Configuration to be a system default Configuration it will be available to all users on the PC.

You cannot delete or edit a system default Configuration using ImageSource.

Note You can change the capture settings while you are using a system default Configuration, but if you then try to save the Configuration, you will have to enter a new name, and it will be saved as a new *user* Configuration.

Capturing images from the camera

You use the Image Capture toolbox to capture images.

To display the Image Capture toolbox if it is not displayed:



Press the camera button in the Standard toolbar.

See the chapters in the *Getting Started* part of this manual for more information about how to prepare the system for image capture.

You can capture:

- a single image from live video
- a single image if the exposure is set to more than 5 seconds
- a series of one or more images with identical or individually set exposures
- a single image using Auto Exposure.

These processes are described in the following subsections.

You can use the Extended Dynamic Range (EDR) feature with the first three of these procedures – see *Using Extended Dynamic Range (EDR)*, page 3-10, for details.

You can apply neutral field correction with all these methods except series capture, but not in combination with EDR – see *Using Neutral Field correction (NF)*, page 3-11, for details.

Using ImageSource

Capturing an image from live video

Note You can only capture an image from live video if the exposure time is set to less than 5 seconds.

To capture a single image from live video:

- 1 Choose the required Configuration from the Configuration toolbar's drop-down list box.
This sets the lighting, EDR setting and exposure time to the values saved in the Configuration. However, you can change these settings individually for each exposure if required.
- 2 Press the (green) Freeze/Go live/Snap image button at the top of the Image Capture toolbox.
The button will turn red, live video will be displayed in an Image window (a new Image window will be opened if necessary) and the lens controls will be displayed below the Freeze/Go live/Snap image button in the Image Capture toolbox.
- 3 Adjust the exposure as required – see the *Getting Started* chapter of this manual for more information.
- 4 Press the (red) Freeze/Go live/Snap image button in the Image Capture toolbox.

Capturing a single image

Note This procedure only applies if the exposure is set to more than 5 seconds.

To capture a single image:

- 1 Choose the required Configuration from the Configuration toolbar's drop-down list box.
This sets the exposure time to the value saved in the Configuration. However, you can change this setting for an individual exposure if required.



- 2 Press the (blue) Single exposure button.

The button will turn gray while the image is being captured.

Capturing images using Series Capture

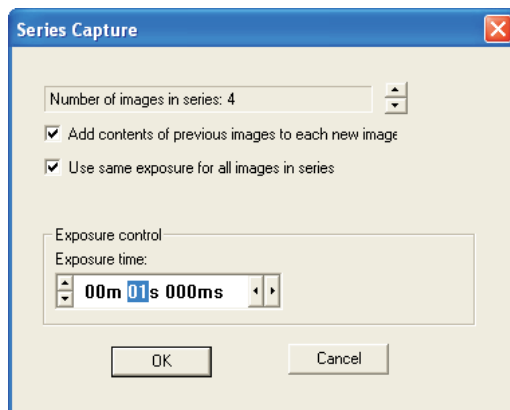
To capture a series of one or more images with the same or individually set exposures:

- 1 Choose the required Configuration from the Configuration toolbar's drop-down list box.
This sets the lighting, EDR and NF setting and exposure time to the values saved in the Configuration. However, you can change these settings individually for each exposure if required.

Note If **EDR** is checked, an EDR exposure will be carried out for each image in the series – see *Using Extended Dynamic Range (EDR)*, page 3-10, for details. Neutral field correction cannot be applied during series capture.



- 2 Press the Image series button in the Image Capture toolbox to display the **Series Capture** dialog box:



- 3 Set the number of images in the series by clicking on the arrow buttons next to the **Number of images in series** spin box – you can choose from 1 to 100 inclusive.

Using ImageSource

- 4 Check **Add contents of previous images to each new image** if you want the results to be cumulative: each new image is the result of adding the new exposure to the previous image in the series.
Uncheck **Add contents of previous images to each new image** if you want all images in the series captured with the set exposure.
- 5 Check **Use same exposure for all images in series** if you want to set a single exposure for all images – go to Step 6.

Note If you check both **Use same exposure for all images in series** and **Add contents of previous images to each new image** the exposure time for the first image will be the set exposure, for the second image the effective exposure time will be 2× the set exposure, for the third it will be 3× the set exposure, and so on.

Uncheck **Use same exposure for all images in series** if you want to set a separate exposure for each of the images – go to Step 7.

- 6 If you have checked **Use same exposure for all images in series**, you can adjust the exposure time as follows:
 - a Select the value (hours, minutes, seconds or milliseconds) that you want to change by clicking in it, or by clicking on the scroll arrows at the right-hand end of the control:



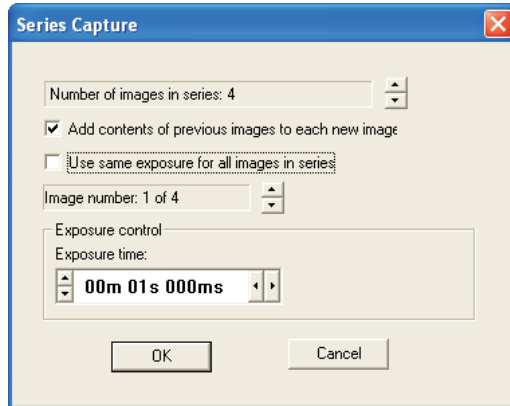
- b Type the new value over the numbers or click on the up or down spin arrow at the left-hand end of the control to increase or decrease the number:



Note You can also increase or decrease the exposure time by pressing the up or down arrow keys on the keyboard, or, if you are using a wheel mouse, by turning the wheel.

Note Only certain values of exposure time are allowed – if you type a non-allowed value directly into the box it will be corrected to the next allowed value.

- 7 If you have unchecked **Use same exposure for all images in series**, an additional **Image number** spin box is displayed in the **Series Capture** dialog box:



To set the exposure for each image:

- a Click on the up or down arrows next to the **Image number** spin box to choose an image number.
- b Follow the procedure in Step 6 for setting the exposure time.

Note If you have checked **Add contents of previous images to each new image**, the exposure time for the first image will be the exposure set for the first image, for the second image the effective exposure time will be the exposure time set for the first image plus the exposure time set for the second image, for the third image it will be the sum of the exposure times set for the first three images, and so on.

- 8 Press **OK** to confirm your selections, close the dialog box and start the image capture.

The captured images will be shown in separate Image windows so that you can select the best one for further analysis and/or printing.

Using ImageSource

Capturing images using auto exposure

Note The auto exposure procedure may take an unacceptably long time for images requiring long exposures. In particular, you should *not* use auto exposure to capture chemiluminescence images.

Note You cannot perform an EDR exposure when using auto exposure – the Automatic exposure button is disabled in the Image Capture toolbox if **EDR** is selected.

To grab a single frame using the current lens settings and an automatically determined exposure:



Press the Automatic exposure button in the Image Capture toolbox.

ImageSource determines the correct exposure by grabbing a series of images starting with the minimum exposure, and then with increasing exposures until an image is grabbed that has some saturated areas. The exposure is then reduced by one step and the image captured and displayed in an Image window – if there is an Image window connected to the camera, the captured image will be displayed in it, otherwise, a new Image window will be opened to display the captured image.

Using EDR – Extended Dynamic Range

ImageSource's patented Extended Dynamic Range (EDR) feature allows you to extend the dynamic range of the system's camera. In particular, it increases the detail in low intensity areas of the image allowing you (and analysis software like ImageAide) to distinguish features in dark parts of the object that would otherwise be undetectable without saturating the lighter areas.

When you carry out an EDR exposure, ImageSource grabs a series of four images at increasing (doubling) exposure times. ImageSource then combines the results to form a 16-bit EDR image. An important feature to note is that the exposures are combined linearly to ensure the validity of quantitative measurements taken from the EDR image.

When ImageSource carries out an EDR capture, it first performs an exposure at the set exposure time. Provided there are no saturated (maximally white) areas in the image, ImageSource will then capture three more images, doubling the exposure time for each. The results of the four captures will then be combined into a single 16-bit image, which will be displayed in an Image window (a new Image window will be opened if required).

However, if the first capture produces an image with saturated areas, ImageSource will carry out another capture but with a shorter exposure time, repeating this procedure if necessary until the captured image contains no saturated areas. ImageSource then uses this exposure time as the basis for taking three more exposures with doubling exposure times.

Note If EDR is set for a series exposure (see page 3-7), this procedure will be repeated for each image in the series. Because of the long exposure times required, you are recommended not to use a series capture with EDR for chemiluminescence applications.

Using neutral field correction (NF)

ImageSource allows you to compensate for the effects of any uneven illumination by applying “neutral field correction”.

Some other systems attempt to correct for uneven illumination by allowing you to capture an image without the gel and then subtract the results from the gel image. However, this “flat field correction” is not compatible with “Good Laboratory Practice” since there is no guarantee that the correcting image was actually taken in the same conditions as the gel image.

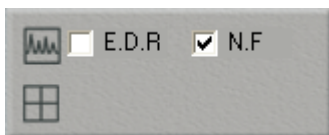
The neutral field correction implemented in ImageSource provides a more valid correction than a simple image subtraction, and, moreover, is fully compatible with GLP. ImageSource achieves this by ensuring that the correcting image is captured under the same lighting conditions as the gel image. ImageSource retains the correcting image after a gel capture, and will let you apply it to following exposures provided you do not change the lighting conditions. However, if you do change the lighting conditions, you will be required to capture a new correcting image. Similarly, ImageSource does not retain the correcting image when you exit the program, so you will need to capture a new correcting image for the first exposure when you restart the program, even if you are using the same lighting conditions.

Note You cannot apply neutral fielding correction to an EDR exposure or during Series capture.

Using ImageSource

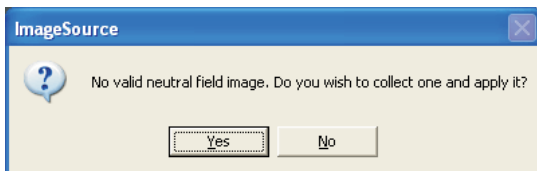
To apply neutral field correction during an exposure:

Check **NF** in the Image capture toolbox:



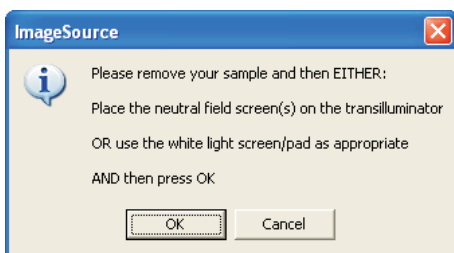
When you capture an image for the first time in a session with **NF** checked, or after you have changed the lighting conditions, ImageSource will first capture the gel image (from live video, as a single capture or with auto exposure, depending on your selection). Then:

- 1 ImageSource will unlatch the drawer and display the following dialog box:



Press **Yes** to apply neutral field correction.

- 2 The following dialog box will be displayed:



If you used UV light to capture the gel image:

- a Open the drawer.
- b Remove the gel.

- c Place the blue neutral field screen on the glass in the drawer.
- d Place the frosty neutral field screen on top of the blue screen.
- e Close the drawer.
- f Press **OK** to close the dialog box.

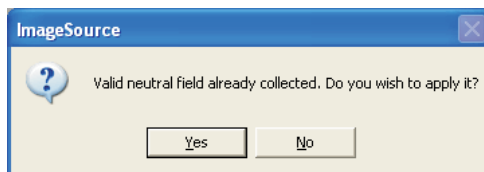
If you used the white light drawer to capture the gel image using white light:

- a Open the drawer.
- b Remove the gel from the drawer.
- c Close the white light drawer.
- d Press **OK** to close the dialog box.

ImageSource will capture the correcting neutral field image using automatic exposure, and then apply it to the gel image.

If you have already captured an image using neutral field correction in this session, and you have not changed the lighting conditions, when you next capture an image with **NF** checked:

- 1 ImageSource will unlatch the drawer and display the following dialog box:

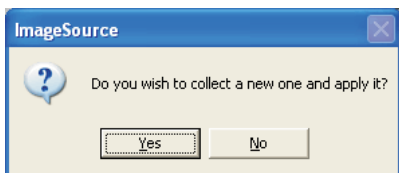


Press **Yes** to apply the existing correcting neutral field image to the gel image – ImageSource will close the dialog box, apply the correction and you are done.

Press **No** if you do not want to apply any neutral field correction, or if you want to create a new correcting neutral field image – go to the next step.

Using ImageSource

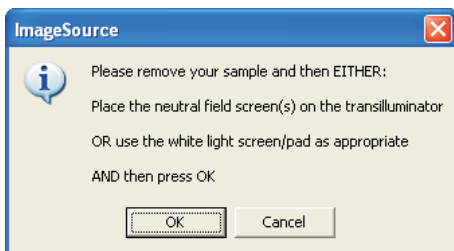
- 2 If you pressed **No** in Step 1, ImageSource will display the following dialog box:



Press **No** if you do not want to apply any neutral field correction to the image – the dialog box will close, no correction will be applied and you are done.

Press **Yes** if you do want to apply neutral field correction – go to the next step.

- 3 If you pressed **Yes** in Step 2, ImageSource will display the following dialog box:



Follow the instructions in Step 2 starting on page 3-12.

Note The algorithms used to apply neutral field correction may result in the corrected image having a greater dynamic range than the raw image – for example, 16-bit instead of 8-bit.

Adjusting display conditions

Note The adjustments described in this section only affect the display of the images; they have no effect on the actual image values. This may cause problems when you are setting the exposure time to get the best exposure. For example, if you increase the brightness of the image display of a correctly exposed image, the light parts of the image will get lighter and eventually become saturated (and be shown in red if the Show saturated areas button is depressed). However, increasing the brightness control setting has no effect on the image itself, and if you were tempted to decrease the exposure, the image may become underexposed. To avoid these problems, always make sure that the image controls are reset to their default positions before deciding whether you need to adjust the exposure time.

You can adjust the display conditions for an individual Image window using:

- the display controls on the Image window
- the Histogram window.

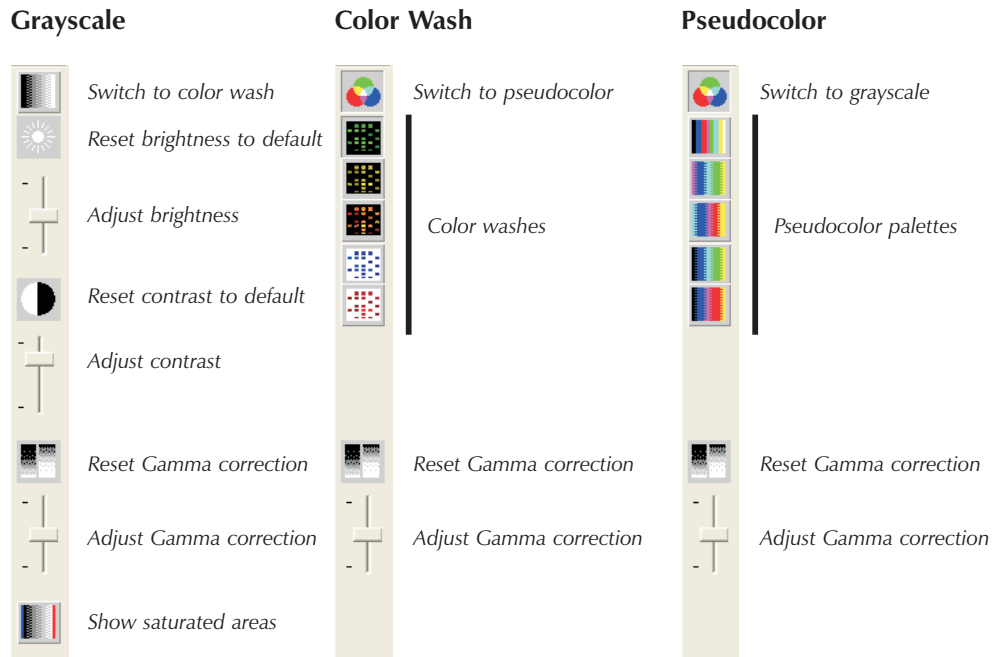
These are described separately in the following subsections.

Using the Image window display controls

When you display an image in an image window (either from a camera or a saved image), you can use the display controls attached to the right-hand edge of the window to adjust the display brightness and contrast, to apply a color wash (color washes tint the images to replicate the effect of stains) or to use a pseudocolor palette (with a pseudocolor palette, intensities in the image are represented by different colors).

Using ImageSource

The following pictures show the function of each of the controls:



The 'Show saturated areas' button at the bottom of the grayscale control allows you to display any areas in the image that have saturated on black or white in blue and red, respectively – this can help you optimize the exposure setting to use the largest range without saturation.

Note Gamma correction allows you to adjust the midtones in an image without changing the lightest and darkest tones – it determines the shape of the response curve between the black and white points, which are fixed by the brightness and contrast settings.

Using the Histogram window to control the image display

You can use the Histogram window to control the image display.

To view the Histogram window:

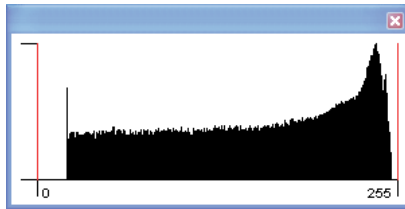


Choose **Histogram** from the **View** menu.

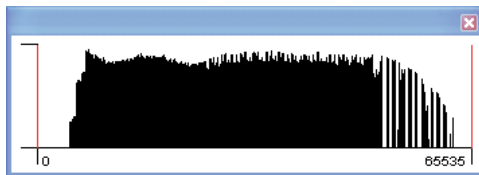
To hide the Histogram window:

Click on the close button at the top right-hand corner of the Histogram window.

The Histogram window shows the distribution of intensities in the selected Image window. It also shows the range of the image display using two vertical red cursor lines:



The picture above shows the Histogram window for an 8-bit image. With a 16-bit EDR image, the range is much wider, for example:



The left-hand cursor shows the image intensity that is displayed as black in the Image window and the right-hand cursor shows the image intensity that is displayed as white. Any parts of the image with intensities to the left of the left-hand cursor or to the right of the right-hand cursor will be displayed as black or white, respectively.

When the Histogram window is displayed, the status bar shows the position of the left-hand (**Black**) and right-hand (**White**) cursors instead of the brightness and contrast.

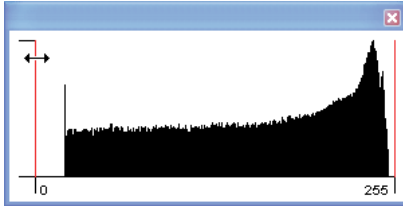
Note If you adjust the brightness and contrast of the image display using the image controls with the Histogram window displayed, you can see the cursors move in response to any adjustments you make to the image controls.

In the previous examples, the cursor lines are at the minimum and maximum positions and lie outside the actual distribution, so no parts of the image display will be fully black or fully white (in other words, the display will have low contrast).

Using ImageSource

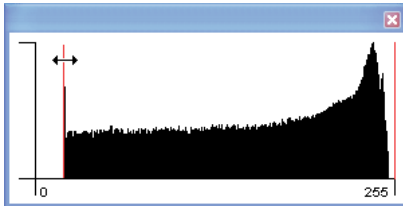
To adjust the image display using the cursors in the Histogram window:

- 1 Move the pointer over the cursor you want to adjust. The pointer will change to a two-headed arrow showing that you can drag the cursor:



(The example shows the Histogram window with an 8-bit image; you use exactly the same procedure for a 16-bit image.)

- 2 Press the mouse button and drag the cursor to its new position:



- 3 Release the mouse button to drop the cursor in its new position.

To reset the cursor lines to the minimum and maximum values:

Double-click in the Histogram window.

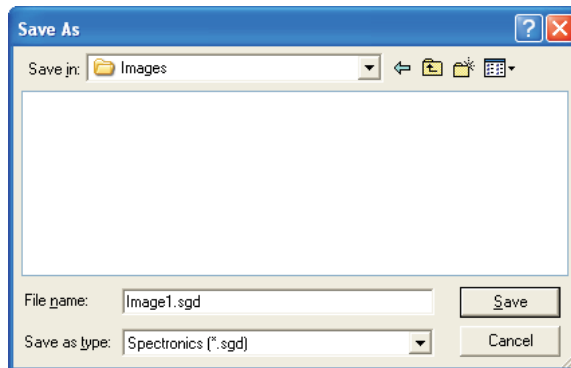
Note You can also use the Histogram window to judge whether the exposure of an image could be improved: for example whether a large amount of information is being lost because it is saturating. See *The Histogram window* in *The ImageSource Application Window* chapter (page 4-16) for details.

Saving and loading image files

To save the image in the active Image window to a new image file:

Note See *Exporting images and engraving, saving and merging annotations*, page 3-46, for how to save the image in a format other than as a secure image file (.sgd).

- 1 Choose **Save Image As** from the **File** menu to display a standard Windows **Save As** dialog box:



- 2 Select a folder to hold the image file from the **Save in** drop-down list and the file list box below it.
- 3 Enter a name for the image file in the **File name** box.
- 4 Press **Save** to save the image with the new name.

Note If you have processed the image in any way (see *Manipulating images* on page 3-24 for details), both the Processed and Original images will be saved, together with any annotations you have placed on them (see *Placing annotations on an image* on page 3-30 for details). If you reopen the image in ImageSource, you will be able to use **View Original** or **View Processed** in the **View** menu to choose which version to view, and the annotations will still exist as separate objects that can be moved or edited as required.

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If the image has not been saved before, an alternative to Step 1 above is:



- 1 Choose **Save Image** from the **File** menu.

The remaining steps are then the same. However, if the image has been saved before, **Save Image** will save the image in the existing file and will not prompt you to enter a new file name.

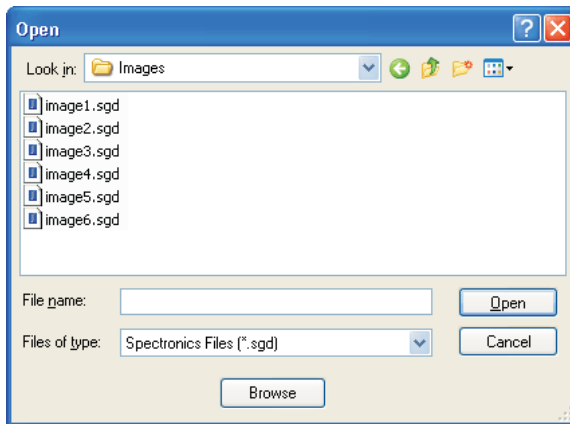
Loading image files

You can load previously saved .sgd secure image files or non-secure files such as tiff, bmp and JPEG files.

To load a previously saved .sgd secure image file:



- 1 Choose **Open Image** from the **File** menu to display a standard Windows **Open** dialog box:



- 2 Select the folder holding the image file using the **Look in** drop-down list and the file list box below it.
- 3 Select the required file by clicking on it in the file list box.
- 4 Press **Open** to open the image file in a new Image window.

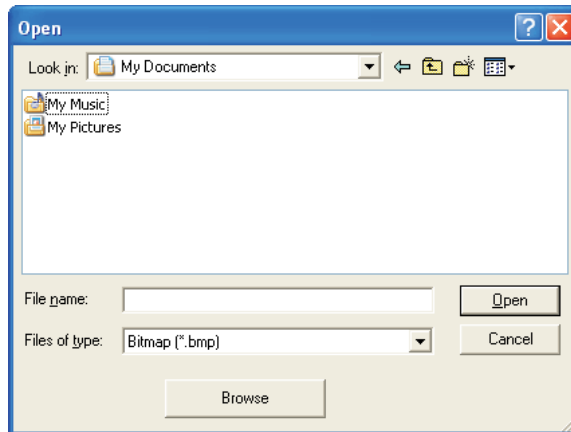
If the image had been processed in any way (see the following section) before it was saved, both the Processed and Original images will be opened – choose **View Original** or **View Processed** from the **View** menu to choose which version to view.

If there were any annotations on the image when it was saved, the annotations will still exist on the image as separate objects that can be moved or edited as required.

Note You can also load secure images using the Browser – see page 4-21 for details.

To load a non-secure image file:

- 1 Choose **New Image from File** from the **File** menu to display a standard Windows **Open** dialog box:



- 2 Choose the type of image file from the **Files of type** drop-down list box.
- 3 Use the **Look in** drop-down list box to select the folder containing the image file.
- 4 Click on the file in the list box to select it – the name of the file will appear in the **File name** box.
- 5 Press **Open** to close the dialog box.

Note You can also load non-secure images using the Browser – see page 4-21 for details.

Using ImageSource

The non-secure image will be opened in a new image window and converted to secure image format. However, in accordance with Good Laboratory Practice, the Capture properties (see *Properties*, page 6-20 for how to view image properties) of images loaded from non-secure files will show them as coming from a non-GLP source and, for example, this fact will be noted in printouts.

Creating a composite image (multiplexing)

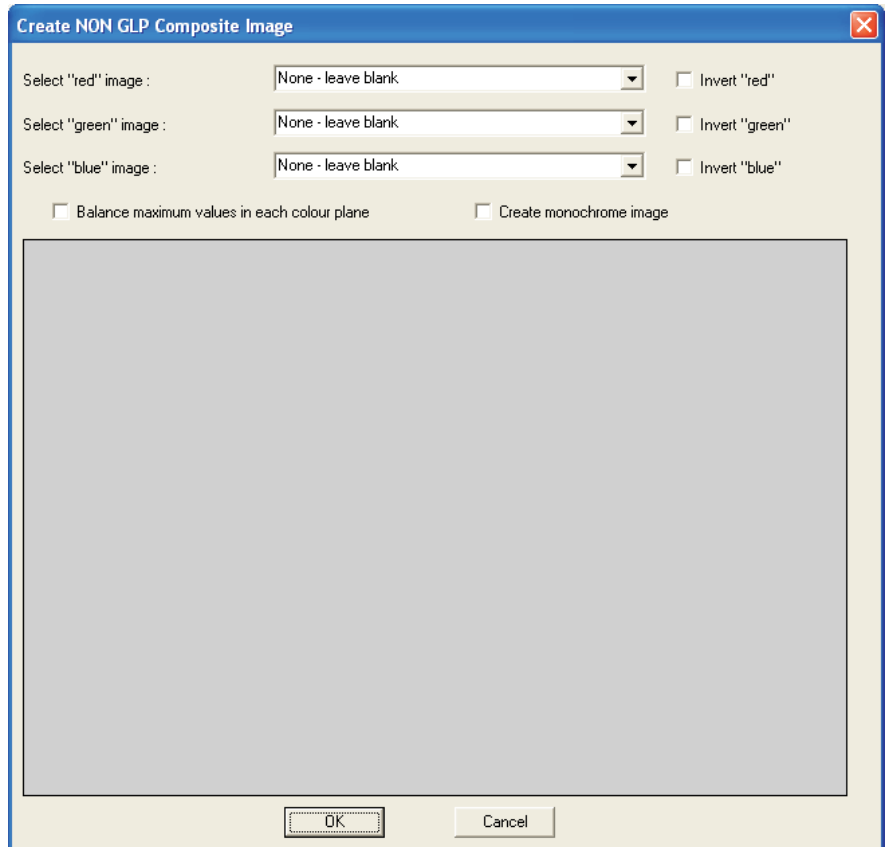
Sometimes different parts of a gel require different types of illumination. For example, a chemiluminescence sample, requiring no illumination, with a non-chemiluminescent molecular weight standard track, requiring white light. ImageSource allows you to cope with this situation by capturing images under different illumination conditions and then combining them to form a composite image, which can be analyzed in exactly the same way as if it were a single exposure.

To create a new composite image from two or three other images:

- 1 Capture or open the images you want to superimpose. (The **Create new composite image** command is disabled unless two or more images are open in ImageSource.)

Note Take care not to move the gel between captures.

- 2 Choose **Create new composite image** from the **File** menu to display the **Create NON GLP Composite Image** dialog box:



The three ‘color’ drop-down list boxes at the top of the dialog box each list the currently open images, together with the **None - leave blank** item.

- 3 Select the two or three images you want to superimpose from the ‘color’ drop-down list boxes.
When you select the first image, it will be displayed in the dialog box in the list box color. When you select the second (and third) image, it will be superimposed on the first image(s) in its list box color.
- 4 If you want to add one (or more) of the images as a negative (inverting light and dark in the image), check the corresponding **Invert** check box(es).

Using ImageSource

- 5 Check **Create monochrome image** if you want the composite image to be monochrome rather than color (so that it appears similar to a normal captured image). The composite image will be displayed in monochrome in the dialog box if you check the box.
- 6 Check **Balance maximum values in each color plane** to weight the contributions of each image according to the maximum values in each – see next paragraph for details of why you may want to do this.

If you do not select this option, when ImageSource creates a composite image it takes equal contributions from each component image. However, this can cause problems if one of the images is much lighter or darker than the other(s), or if the images are a mixture of EDR (16-bit) and non-EDR (8-bit) images. Balancing the maximum values in each color plane avoids these problems.

- 7 Press **OK** to create the composite image.

The new composite image will be created and displayed in a new Image window. You can apply any of ImageSource's operations to the composite image in the same way as for a captured image. In particular, you can save the composite image and analyze it in ImageAide.

Note Image files created using the **Create new composite image** command do not satisfy the conditions required for Good Laboratory Practice – this fact is noted in the composite image's Capture properties (see *Properties*, page 6-20 for how to view image properties).

Manipulating images

Note This section describes how to process images in a number of ways for presentation purposes. In order to maintain 'good laboratory practice', the processing is performed on a copy of the original image and when you save the image, both the original and processed images are saved in the image file. If you load the image file into ImageAide for analysis, the original image will be analysed, not the processed one.

This section shows you how to use ImageSource to:

- Sharpen or smooth the image – see page 3-26.
- Invert the image (swap black and white on a gray scale image, or use the complementary colors on a color image) – see page 3-27.
- Emboss the image – see page 3-27.
- Flip the image horizontally or vertically – see page 3-27.
- Crop the image – see page 3-28.

Note ImageSource does not contain a function allowing you to rotate the image by a user-defined angle. This is because each of the pixels in the new image would overlap several pixels in the original image. So the value in each new pixel would need to be calculated in some way from the values in the overlapped original pixels. This recalculation process would then bring into question the validity of any analysis.

Note You can also add annotations over an image – see page 3-30 for details.

Note When you make major changes to an image (in particular, when you smooth, sharpen, flip, invert or emboss it), ImageSource maintains a copy of the processed image before it makes the change. This allows you to choose **Undo** from the **Edit** menu to revert to the copy. See *Undo*, page 6-16, for more details.

Image toolbar

All of the operations described in this section (except embossing) can be carried out using tools in the Image toolbar.

To display the Image toolbar if it is not already displayed:



Choose **Image** from the **Tools** menu.

Image is checked in the **Tools** menu when the Image toolbar is displayed.

Note Displaying the Image toolbar automatically hides the annotation toolbars.

Choose **Image** from the **Tools** menu.

Using ImageSource

If you do not want to display the Image toolbar, there are menu equivalents for all the operations.

Original and Processed images

ImageSource protects your original images by applying manipulations to a copy of the 'Original' image – the *Processed* image. You can then apply further manipulations to this Processed image.

You can choose whether to display the Original or the Processed image in an Image window.

To display the Original or Processed image in the active image window:

Choose **View Original** or **View Processed** from the **View** menu (**View Processed** is disabled if there is no Processed image).

When the Processed image is displayed, the name of the image shown in the Image window's title bar is followed by a hyphen and a number showing the number of processing actions that have been performed on the image.

Note If you choose one of the image manipulation commands when an Original image is displayed, the change will be applied to a new Processed image – the new change will replace any existing ones. However, if a Processed image is displayed, the change will be applied to the existing Processed image – the new change will be added to any existing ones.

When you save an image using **Save Image** or **Save Image As**, the resulting file will contain both the Original and Processed images. If you want to save the Processed image only in a standard graphics format file, display the Processed image in the Image window and choose **Export Image** from the **File** menu (see page 6-7).

Sharpening and smoothing images

To sharpen the image (make the boundaries between areas sharper) in the active Image window:



Choose **Sharpen** from the **Image** menu.

The effect of sharpening an image is to increase the fine detail in the image (the high spatial frequencies) by adding the difference between the original image and a locally averaged version.

To smooth the image (make the boundaries between areas less sharp) in the selected image window:



Choose **Smooth** from the **Image** menu.

The smooth operation is carried out by calculating a local average for each pixel in the image.

When you sharpen or smooth an image there is a loss of image information.

Inverting images

To invert an image (swap black and white for a gray scale image, or use the complementary colors for a color image):



Choose **Invert** from the **Image** menu.

There is no loss of image information when you invert an image.

Embossing an image

ImageSource allows you to produce a 3-D 'embossed' view of the image emphasizing the boundaries between regions.

To emboss the image:

Choose **Emboss** from the **Image** menu.

When you emboss an image there is a loss of image information.

Flipping an image

To flip an image vertically (swap top and bottom) or horizontally (swap left and right):



Choose **Flip Vertical** from the **Image** menu.

Using ImageSource



Choose **Flip Horizontal** from the **Image** menu.

There is no loss of image information when you flip an image.

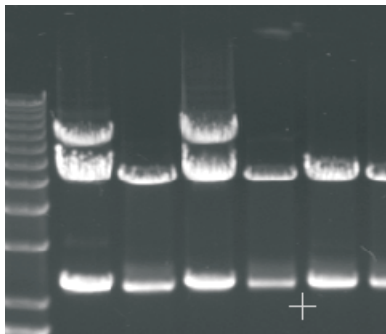
Cropping an image

To crop an image to a region of interest:

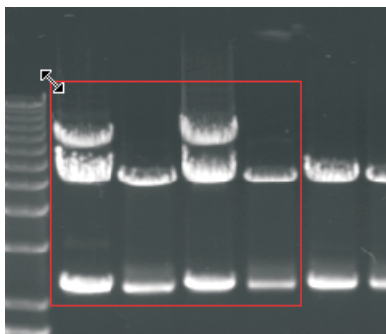


- 1 Choose **Define Region of Interest** from the **Image** menu.

When you move the pointer over the image, it changes to a cross-hair:



- 2 Press and hold down the mouse button, then drag out the region that you want to crop to:



- 3 If required, move or reshape the region of interest after you have placed it on the image – see instructions later in this section.



- 4 Choose **Crop to Region** from the **Image** menu.

Note If you print a cropped image using a Sony UPD895 thermal printer, the cropped area will be magnified to fill the page.

When you crop an image there is a loss of image information.

Reshaping the region of interest

To reshape the region of interest:

- 1 Click in the region of interest to select it – drag handles will appear at its corners and the middle of each side.
- 2 Reshape the rectangle by dragging the relevant handle – the pointer changes shape when it is over a handle, showing that you can drag it.

Moving the region of interest

To move the region of interest:

- 1 Move the pointer into the region of interest.
- 2 Press the mouse button and drag the region of interest to its new position.
When you press the mouse button the region of interest becomes selected (drag handles appear at its corners) and the pointer changes to a four-headed arrow showing that you can drag the region to a new position.

Deleting the region of interest

To delete the region of interest:

- 1 Click in the region of interest to select it – drag handles will appear at its corners and the middle of each side.
- 2 Press **DEL**.

Placing annotations on an image

Note The procedures in this section describe how to place annotations on an image. The annotations are stored separately from the image and do not affect the information stored in the image. You can apply annotations separately to the Original and Processed images. When you export an image to a standard graphics file, you can choose whether to include the annotations – if you do, they will be ‘engraved’ on the image, in other words, the annotation will become part of the graphic itself, replacing any underlying image information (see *Exporting images and engraving, saving and merging annotations* on page 3-46 for details).

Annotate toolbar

The operations described in this section for placing annotations on an image are carried out using tools in the Annotate toolbar:



To display or hide the Annotate toolbar (together with the Color and Line Style toolbars):



Choose **Annotate** from the **Tools** menu.

Annotate is checked in the **Tools** menu when the annotation toolbars are displayed.

Note Displaying annotation toolbars automatically hides the Image toolbar.

There are no menu equivalents for the operations carried out using the Annotate toolbar.

Showing and hiding annotations

To show or hide the annotations on an image:

Choose **Annotation** from the **View** menu – the command is checked in the menu when annotations are shown.

Selecting the default color and line style for annotations

You can choose the default color and line styles to be used for new annotations by pressing buttons in the Color toolbar:



and Line Style toolbar:



Note It is often better to use black or white annotations if you are going to print on a black and white printer, since coloured annotations may not stand out clearly.

You can also change the color and line style used for existing annotations by selecting them and pressing the appropriate buttons in the toolbar – see page 3-43 for how to select annotations.

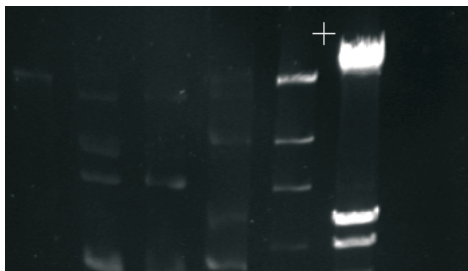
There are no menu equivalents for the operations carried out using the Color and Line Style toolbars.

Drawing a line

To draw a line annotation on an image:

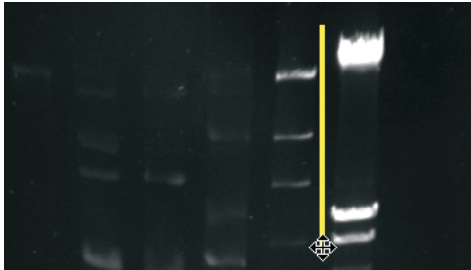


- 1 Press the Draw Line button.
- 2 Move the pointer to the position where you want to place one end of the line. When the Draw Line tool is selected, the pointer changes to a cross-hair when it is over the image:



Using ImageSource

- 3 Press and hold down the mouse button, then drag to the position where you want to place the other end of the line:



- 4 Release the mouse button to place the line on the image.

If you select the line annotation using the Select tool, drag handles will appear on the ends of the line so that you can move or reshape the line.

Note You can select the Select tool when the Draw Line tool is selected by pressing the Select button on the **Annotate** toolbar.

Drawing a rectangle

To draw a rectangle annotation on an image:



- 1 Choose whether to draw a filled or hollow rectangle – press the Hollow/Filled Shape button if the Draw Rectangle button shows the wrong sort of rectangle.



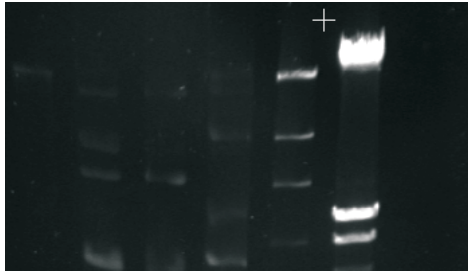
- 2 Press the Draw Hollow Rectangle button

or

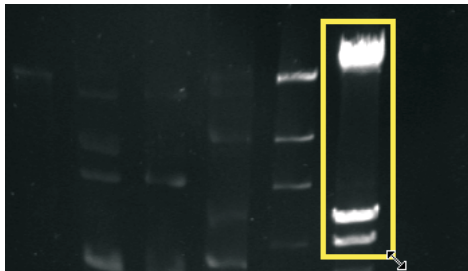


Press the Draw Filled Rectangle button.

- 3 Move the pointer to the position where you want to place one corner of the rectangle. When the Draw Rectangle tool is selected, the pointer changes to a cross-hair when it is over the image:



- 4 Press and hold down the mouse button, then drag the pointer to the opposite corner of the rectangle:



If you select the rectangle annotation using the Select tool, drag handles will appear on its corners and in the middle of its sides so that you can move or reshape the rectangle.

Note You can select the Select tool when the Draw Rectangle tool is selected by pressing the Select button on the **Annotate** toolbar.

Drawing an ellipse

To draw an ellipse or circle annotation on an image:



- 1 Choose whether to draw a filled or hollow ellipse – press the Hollow/Filled Shape button if the Draw Ellipse button shows the wrong sort of ellipse.



- 2 Press the Draw Hollow Ellipse button

Using ImageSource

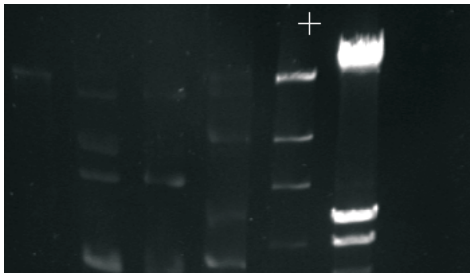
or



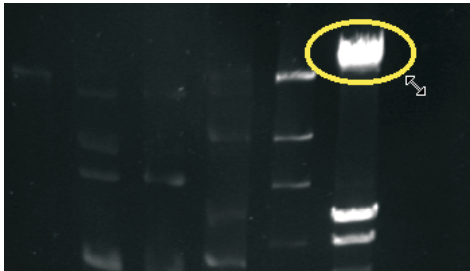
Press the Draw Filled Ellipse button.

You will draw the ellipse by dragging out the bounding rectangle for it on the image.

- 3 Move the pointer to the position where you want to place one corner of the ellipse's bounding rectangle. When the Draw Ellipse tool is selected, the pointer changes to a cross-hair when it is over the image:



- 4 Press and hold down the mouse button, then drag the pointer to the opposite corner of the ellipse's bounding rectangle:



If you select the ellipse annotation using the Select tool, drag handles will appear on the corners and in the middle of the sides of its bounding rectangle so that you can move or reshape the ellipse.

Note You can select the Select tool when the Draw Ellipse tool is selected by pressing the Select button on the **Annotate** toolbar.

Drawing a freehand shape

To draw a freehand shape annotation on an image:



- 1 Choose whether to draw a filled or hollow freehand shape – press the Hollow/Filled Shape button if the Draw Freehand Shape button shows the wrong sort of freehand shape.



- 2 Press the Draw Hollow Freehand Shape button

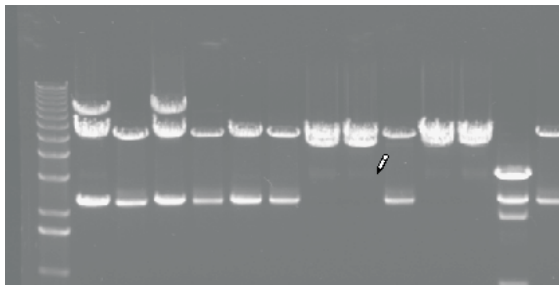
or



- Press the Draw Filled Freehand Shape button.

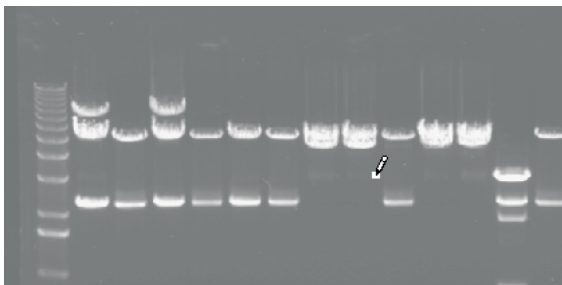
Note You can draw a freehand shape as a series of straight line segments or completely freehand, or as a mixture of the two. As an example, the following instructions show you how to draw a freehand shape by drawing a series of straight line segments, followed by a freehand section and finishing with a final straight line segment back to the start point.

- 3 Move the pointer to the position where you want to start the freehand shape. When the Draw Freehand Shape tool is selected, the pointer changes to a pencil when it is over the image:

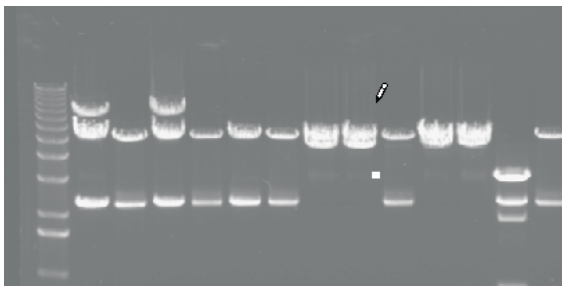


Using ImageSource

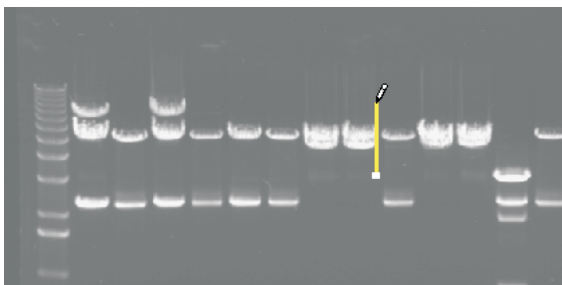
- 4 Click to place the start of the first line segment in the freehand shape (it will be marked by a light-blue square):



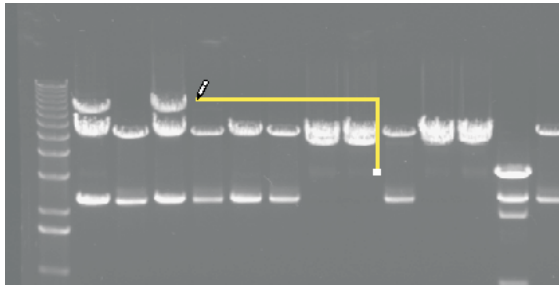
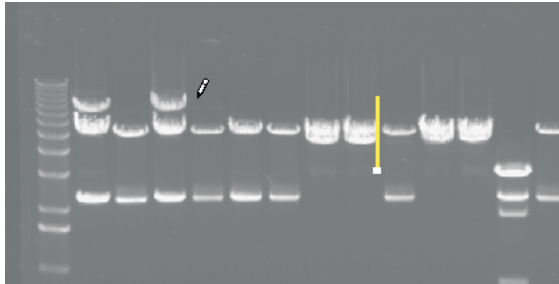
- 5 Move the pointer to the place you want the first line segment to end:



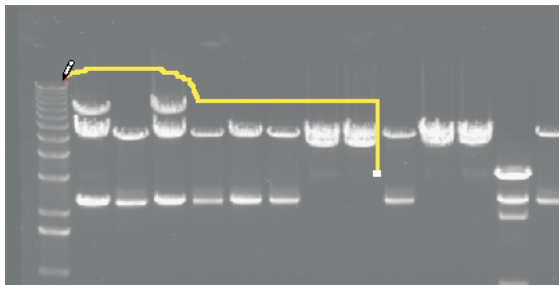
- 6 Click to place the first line segment on the image:



- 7 Repeat Steps 5 and 6 to add any further straight line segments required:

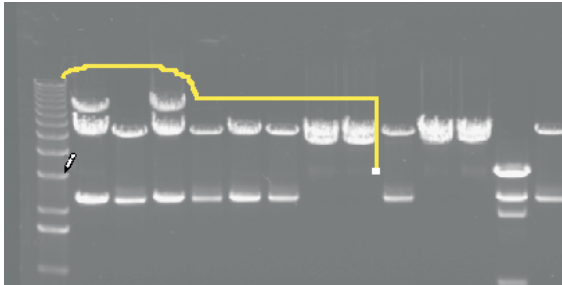


- 8 To add a curved section to the line, press and hold the mouse button down and drag out the section:

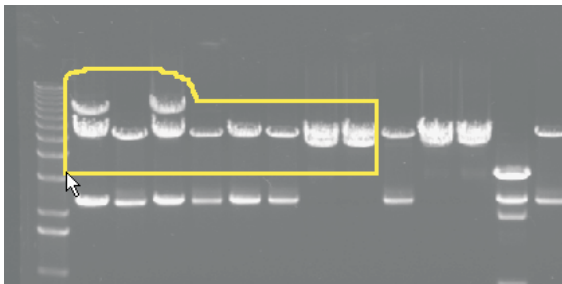


Using ImageSource

- 9 To finish the freehand shape, move the pointer to the place you want to put the last corner:



- 10 Double-click to place the corner and add two line segments to close the freehand shape:



If you select the freehand shape annotation using the Select tool, drag handles will appear where the edges change direction so that you can move or reshape the freehand shape.

Note You can select the Select tool when the Draw Freehand Shape tool is selected by pressing the Select button on the **Annotate** toolbar.

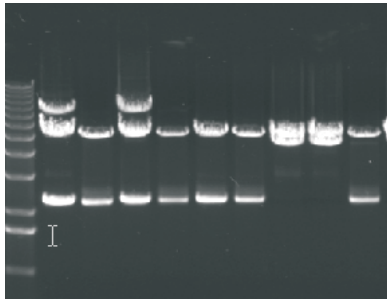
Placing text on an image

To place a text annotation on an image:

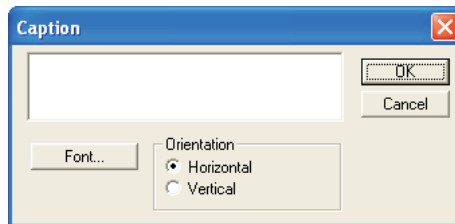


- 1 Press the Draw Text button.

After you have pressed the button, the pointer changes shape when it is over the image.

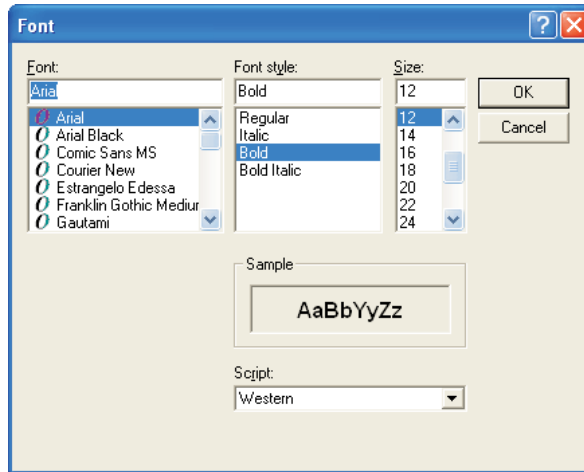


- 2 If you want to change the text orientation and/or font from the current defaults, double-click on the image to display the **Caption** dialog box (otherwise go straight to Step 3):



- a Click on a radio button to choose whether the text should be **Horizontal** or **Vertical** (with the text rotated by 90).

- b Press **Font** to display the **Font** dialog box:



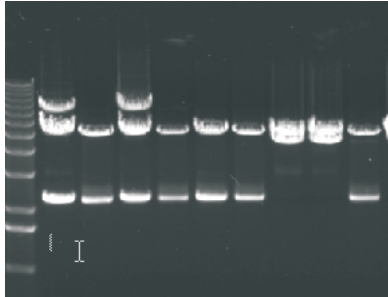
This is a standard Windows **Font** dialog box.

- c Choose the required typeface from the **Font** list.
- d Click on a style for the text from the **Font style** list.
- e Select a font size from the **Size** list, or type a value into the edit box.
- f If relevant, select a script from the **Script** drop-down list box – some fonts come in different scripts such as Western, Greek, Turkish or Cyrillic.
- g Press **OK** to close the dialog box and return to the **Caption** dialog box.
- h Press **OK** in the **Caption** dialog box.

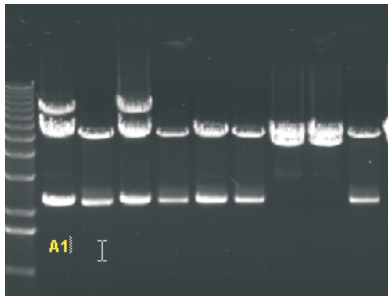
Note You can type the required text into the **Caption** dialog box (when you close the dialog box the text will be placed on the image at the point you double-clicked). However, you can also add text by typing directly on the image – see the remaining instructions.

Note Changes to the default text orientation and font are not saved when you close ImageSource – the original defaults will be restored when you restart the program.

- 3 Move the pointer to the place you want to enter the text and click to place a flashing cursor on the image:



- 4 Type the required text directly onto the image:



The Draw Text tool remains selected after you have added text, ready for you to place some other text on another part of the image.

See *Editing text annotations*, page 3-45, for how to edit text annotations.

Drawing an arrow

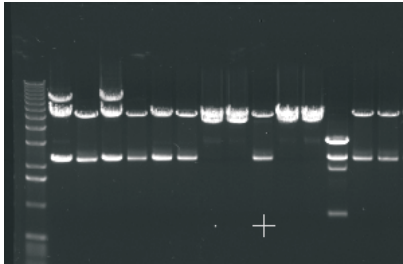
To draw an arrow annotation on an image:



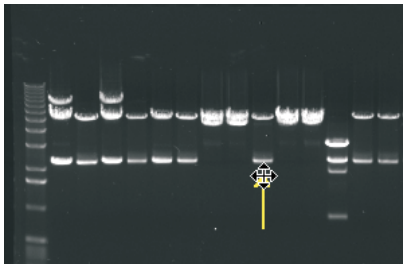
- 1 Press the Draw Arrow button.

Using ImageSource

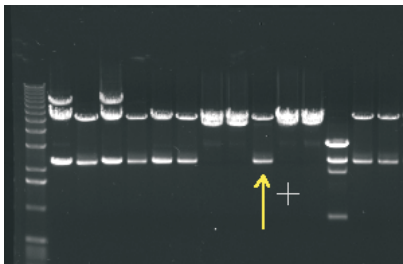
- 2 Move the pointer to the position where you want to place the tail of the arrow. When the arrow drawing tool is selected, the pointer changes to a cross-hair when it is over the image:



- 3 Press and hold down the mouse button, then drag to the position where you want to place the head of the arrow:



- 4 Release to place the arrow head on the image:



If you select the arrow annotation using the Select tool, drag handles appear on the head and tail of the arrow so that you can move or reshape the arrow.

Note You can select the Select tool when the Draw Arrow tool is selected by pressing the Select button on the **Annotate** toolbar.

Changing annotations

Selecting annotations

To select an individual annotation:



- 1 If it is not already selected, select the Selector tool from the Image toolbar.
- 2 Click on the annotation.

To select a group of annotations:



- 1 If it is not already selected, select the Selector tool from the Image toolbar.
- 2 Press and hold down the mouse button, then drag a rectangle around the annotations.

Any annotations with some part inside the rectangle will be selected.

To add an annotation to a group of selected annotations, or remove one from the group:

 -click on the annotation with the Selector tool selected.

Moving annotations

To move one or more annotations:

- 1 Select the annotation(s) – see the previous section.
- 2 Move the pointer over the edge of one of the annotations, avoiding any drag handles/control points if only one annotation is selected.
- 3 Press and hold down the mouse button, then drag the annotation(s) to the new position.

Aligning annotations

To align a group of annotations:

- 1 Select the annotations.
- 2 Right-click in the image at the position you want to align the annotations. A pop-up menu will be displayed:



- 3 Choose the required option.

Reshaping annotations


Note The instructions in this section do not apply to text annotations.

To reshape an annotation:

- 1 Click on the annotation to select it – drag handles/control points will appear on the annotation.
- 2 Move the pointer over the drag handle/control point you want to move.
- 3 Press and hold down the mouse button, then drag the handle/control point to its new position.


Deleting annotations

To delete an annotation:

- 1 Click on the annotation to select it.
- 2 Press .

Copying annotations

To copy one or more annotation(s) to the same image:

- 1 Select the annotation(s) – see page 3-43.
- 2  -click on an annotation.

Copies of all of the selected annotations will be created on top of the originals.

To copy one or more annotation(s) to the same or another image:

- 1 Select the annotation(s).
- 2 Choose **Copy** from the **Edit** menu.
- 3 Select the Image window that you want to copy to.
- 4 Choose **Paste** from the **Edit** menu.

The copied annotation(s) will be pasted in the same position(s) on the image as the original(s).

Editing text annotations

To edit the text in a text annotation:

- 1 Click on the annotation to select it – drag handles/control points will appear around the text to show it is selected.

Note You can select the text annotation with either the Selector tool or Draw Text tool.

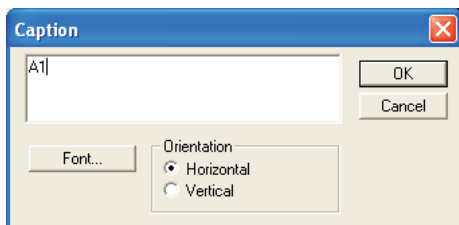
- 2 Click again to place a flashing cursor in the text.
- 3 Edit the text using the keyboard.

To change the text orientation and/or font in a text annotation:

- 1 Double-click on the annotation to select it (drag handles/control points will appear around the text to show it is selected) and display the **Caption** dialog box.

Using ImageSource

Note You can double-click the text annotation with either the Selector tool or Draw Text tool.



The edit box shows the text in the selected annotation – you can edit the annotation text here if required.

- 2 Use the **Caption** dialog box to change the text orientation and or font as required – see page 3-39 for further details of how to use the **Caption** dialog box.

Exporting images and engraving, saving and merging annotations

The annotations you place on an image exist as separate objects from the image. This means that adding an annotation leaves the image data unchanged, and it means that you can move, edit or delete the annotations independently of the image. When you save an image using **Save Image** or **Save Image As**, any annotations on the Original and, if it exists, Processed images are also saved in the image file, but as separate objects so you can still move, edit or delete the annotations when you reopen it. See *Saving and loading image files* (page 3-19) for details.

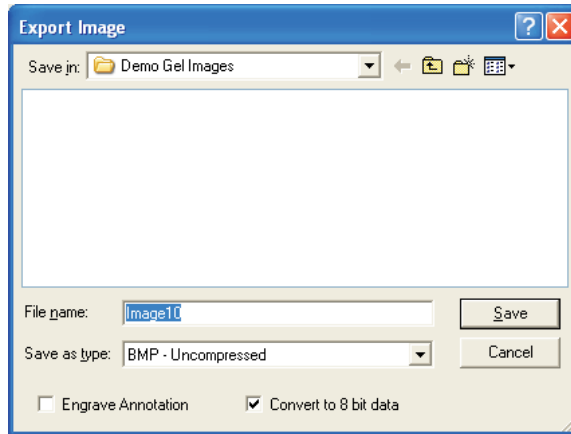
This section shows you how to:

- Export images, with or without annotations, to standard graphics format files
- Save annotations into a separate annotations file
- Merge annotations from a separate annotations file with the annotations on an image.

To export the image or save the annotations on the image in the active Image window:

- 1 Choose **View Original** or **View Processed** from the **View** menu, depending on whether you want to export the Original or Processed image, or the annotations on the Original or Processed image.

- 2 Choose **Export Image** from the **File** menu to display the **Export Image** dialog box:



Note The **Convert to 8 bit data** check box is disabled for non-EDR images, since the images are already 8-bit.

- 3 Select a folder to hold the exported image or annotations from the **Save in** drop-down list and the file list box below it.
- 4 Enter a name for the exported image or annotations file in the **File name** box.
- 5 For 16-bit (EDR) images, check **Convert to 8bit data** if you want the image saved as an 8-bit image.
- 6 Select the format for saving the file from the **Save as type** box – you can save images in a wide variety of image formats or just save the annotations in a .ann file (you will be able to add the saved annotations to images in ImageSource at a later time using **Merge Annotation**).
- 7 For an image export, check **Engrave Annotation** if you want to export the image with any annotations; leave it unchecked if you want to export the image only.

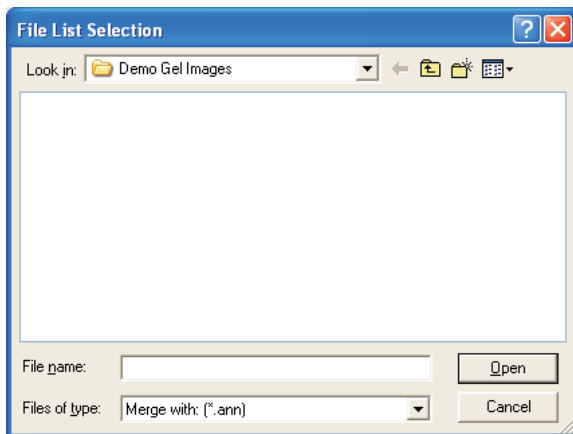
Note If you choose to export the image with annotations, the annotations will become part of the exported image (engraved) and the underlying parts of the original image will be permanently obscured in the exported image.

Using ImageSource

- 8 Press **Save** to save the image or annotations with the new name.

To add the annotations saved in an annotation file to the annotations (if any) already on the image in the selected Image window:

- 1 Choose **Merge Annotation** from the **File** menu to display the **File List Selection** dialog box:



This is a standard Windows Open dialog box, similar to the **Open** dialog box displayed when you choose **Open Image** from the **File** menu (see page 6-3).

- 2 Use the dialog box to select the required annotation file.
- 3 Press **Open** to close the dialog box and place the annotations on the image.

The annotations will be placed on the image as separate objects, which you can move, reshape, delete and recolor independently.

The ImageSource Application Window

The ImageSource Application window can contain the following components:

- **Menu bar** The menu bar is always displayed – see chapter 6, *Menus*, for details.
- **Toolbars** You can display or hide a variety of toolbars containing buttons (and in one case a drop-down list box) for carrying out operations in ImageSource. Some tools are shortcuts for menu commands, but others provide the only method of carrying out some operations. See Chapter 5, *Toolbars*, for how to hide, show and arrange toolbars and for a description of each toolbar and toolbar button.
- **Status bar** You can choose to display or hide the Status Bar at the bottom of the ImageSource Application window. The Status Bar displays a variety of information – see the next section for details.
- **Image windows** Image windows are standard Windows document windows, which you can minimize, restore, move and resize in the normal way. You can use commands in the **Window** menu to tile the non-minimized Image windows (and Browser if it is not minimized), cascade them, and if they are minimized, arrange their icons. See page 4-9 for more information about using Image windows.
- **Image Capture toolbox** By default, the Image Capture toolbox is docked to the left-hand side of the ImageSource Application Window. However, you can make it float freely on the desktop or dock it to another edge of the window. The Image Capture toolbox is not affected by the tiling or cascading commands and if it overlaps an Image window, it is always displayed on top.
- **Histogram window** The Histogram window can be shown, hidden, moved and resized, but not minimized. The Histogram window is not affected by the tiling or cascading commands and if it overlaps an Image window, it is always displayed on top. See page 4-16 for more information about using the Histogram window.
- **Browser** The Browser allows you to preview and open saved image files. If it is non-minimized, the Browser will be tiled and cascaded with the non-minimized Image windows by the tiling and cascading commands. See page 4-21 for more information about using the Browser.

Status Bar

You can choose to display or hide the Status Bar at the bottom of the ImageSource Application window by choosing **Status Bar** from the **View** menu.

The left-hand end of the Status Bar shows the text **LIVE** when a live image is being displayed.

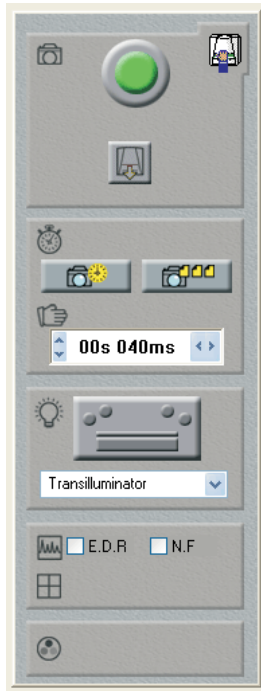
Other information is shown in a number of boxes in the Status Bar. From left to right they display:

- The leftmost box is always blank.
- In brackets, the X and Y position of the pointer over a captured image followed by the intensity of the image pixel at the pointer – the box does not show any information for a live image.
- With the Histogram window hidden:
 - The **Brightness**, **Contrast** and **Gamma** settings.

With the Histogram window displayed:

- The image intensity represented by **Black** in the image display (this is the position of the left-hand cursor if the Histogram window is displayed), the image intensity represented by **White** in the image display (this is the position of the right-hand cursor if the Histogram window is displayed) and the **Gamma** setting.
- The size (in pixels) and grayscale depth (in number of bits) of the image.
- The magnification of the selected image window.
- The exposure time.

Image Capture toolbox



Note The Resolution and Filter wheel controls at the bottom of the Image Capture toolbox are permanently disabled for ImageSCI.

To display the Image Capture toolbox if it has been hidden:



Press the camera button in the Standard toolbar.

The ImageSource Application Window

Docking and floating the Image Capture toolbox

By default, the Image Capture toolbox is docked on the left-hand side of the ImageSource Application Window. However, you can make it float freely on the desktop or dock it to another edge of the window.

To float the Image Capture toolbox:

- 1 Move the pointer over the drag bars at the edge of the Image Capture toolbox:



- 2 Drag the toolbox away from the edge.

Note You can also float the Image Capture toolbox by double-clicking on the drag bars – it will be restored to the position it held when it was last floating.

Note When the Image Capture toolbox is floating you can close it by clicking on the close button at its top right-hand corner – see the previous section for how to display it again.

To dock the Image Capture toolbox against an edge of the ImageSource Application Window:

Drag the Image Capture toolbox by its title bar and drop it on the edge.

Note You can also dock the Image Capture toolbox by double-clicking on its title bar – it will be docked on the same edge as when it was last docked.

Drawer icon

The icon at the top right-hand corner of the Image Capture toolbox shows whether the drawer is:

Closed



Open



Freeze/Go live/Snap image

The Freeze/Go live/Snap image button is:

- Green when no Image window is showing a live image and the exposure time is set to less than 5 seconds.
- Blue when the exposure time is set to more than 5 seconds.
- Red when the selected Image window is showing a live image.
- Gray when an unselected Image window is showing a live image or you are capturing a single image.

To display a live image:



Press the (green) Freeze/Go live/Snap image button in the Image Capture toolbox.

Note You can only display a live image if the exposure time is set to less than 5 seconds.

If there is an open Image window that is currently connected to the camera and selected, it will be made live, otherwise, a new Image window will be opened showing a live image.

Note If an Image window showing a live image is frozen, it remains connected to the camera unless the image is processed in any way (see *Original and Processed View modes*, page 4-15) or another Image window is opened to show a Live image. Once an Image window has been disconnected from the camera, it cannot be reconnected.

To freeze a live image:

- 1 Select the Image window displaying the live image.



- 2 Press the (red) Freeze/Go live/Snap image button in the Image Capture toolbox.

The ImageSource Application Window

To capture a single image if the exposure time is set to more than 5 seconds:



Press the (blue) Freeze/Go live/Snap image button in the Image Capture toolbox.

The button turns gray during the exposure and back to blue once the exposure is complete.

Open drawer

To open the sample drawer:



Press the Open drawer button in the Image Capture toolbox.

The sample drawer is opened automatically when image capture is complete and when the ImageSCI is switched off.

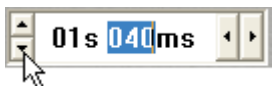
Exposure time

To set the exposure time:

- 1 Select the value (hours, minutes, seconds or milliseconds) that you want to change by clicking in it, or by clicking on the scroll arrows at the right-hand end of the control:



- 2 Type the new value over the numbers or click on the up or down spin arrow at the left-hand end of the control to increase or decrease the number:



Note You can also increase or decrease the exposure time by pressing the up or down arrow keys on the keyboard, or, if you are using a wheel mouse, by turning the wheel.

Note Only certain values of exposure time are allowed – if you type a non-allowed value directly into the box it will be corrected to the next allowed value.

Automatic exposure

To capture an image from the camera using an automatically determined exposure:



Press the Automatic exposure button in the Image Capture toolbox.

See page 3-10 for further details.

Image series

To capture a series of images from the camera using identical or individually set exposures:



Press the Image series button in the Image Capture toolbox.

See page 3-7 for further details.

Lighting control



To select which lighting to use in the Darkroom:

Select the required option from the Lighting drop-down list box.

You can select:

- **No light**
- **Transilluminator**

The operation of the lighting is completely automatic. For example, the selected lighting is turned on automatically when you create a new Image window showing a live image, or when you press the Freeze/Go live/Snap image button to display a live image. The

The ImageSource Application Window

lighting is then turned off automatically when you freeze the image. Similarly, the lighting is turned on (if necessary) and off automatically when you perform an automatic exposure or image series capture.

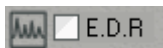
Note As a safety measure, the UV lighting will only turn on if the ImageSCI drawer is closed.

ImageSource will turn the lights off automatically if a live image is left displayed for more than ten minutes – a dialog box will be displayed warning you and giving you the option to turn the lights back on.

When the lighting is turned on (to show a live image or during an automatic exposure or image series capture), the lighting graphic in the Image capture toolbox is 'lit up' appropriately – for example:



Extended Dynamic Range (EDR) control



To use an extended dynamic range (16 bits) when capturing images:

Check **E.D.R.**

When EDR is selected, the automatic exposure button is disabled.

See page 3-10 for more information about using EDR.

Neutral field correction (NF) control



Note The **NF** control is disabled when **EDR** is selected.

To apply neutral field correction when capturing images:

Check **NF**.

See *Using neutral field correction (NF)*, page 3-11, for more information.

Image windows

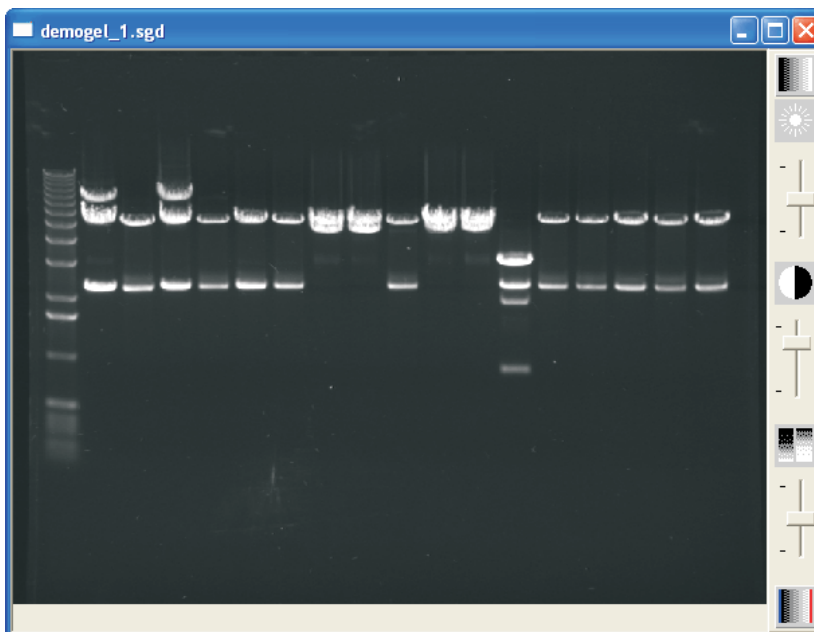


Image windows can show live video images from a camera, captured images, or images loaded from files.

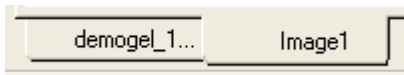
Image windows are standard Windows document windows, which you can minimize, restore, move and resize in the normal way. You can use commands in the **Window** menu to tile the non-minimized Image windows (and Browser if it is not minimized –

The ImageSource Application Window

see page 4-20 for more about the Browser), cascade them, and if they are minimized, arrange their icons.

You can select an Image window (or the Browser) in the usual way by clicking in it, if it is visible, or by selecting its name from the list of open windows at the bottom of the **Window** menu.

You can also select an Image window (but not the Browser) by clicking on its tab at the bottom of the Application window (there is a tab corresponding to each open Image window):



Zooming and scrolling Image windows

By default, images are automatically resized so that they fit the Image window – if you adjust the size of the Image window, the image will be resized to fit it. The procedures described later in this section show you how to zoom an image to produce magnified views. However, you can switch back to autosizing mode at any time.

To reset an Image window to autosizing mode:

- 1 Select the window.
- 2 Press the Zoom to Fit button.



The Zoom to fit button is disabled when the selected Image window is in autosizing mode.

You can use the commands in the **View** menu (see page 6-18) or buttons in the Zoom toolbar (see page 5-6) to adjust the magnification of the display.

You can also adjust the magnification of the display using the wheel on a wheel mouse, as follows:

- 1 If the display is in autosizing mode, choose one of the zoom commands from the **View** menu (see page 6-18) or press one of the buttons in the Zoom toolbar (see page 5-6) to switch to fixed magnification mode.

- 2 Move the pointer over the image to the point about which you want to adjust the magnification (this point will stay in view, whatever the magnification).
- 3 Roll the mouse wheel forwards (to increase the magnification) or backwards (to decrease the magnification); you can hold CTRL or SHIFT down as you roll the wheel to zoom in smaller steps.

Note For a non-live image, if the image is larger than the window an overview pane will be displayed as you zoom using a mouse wheel – see below for how to use this pane to scroll the image.

If the image is larger than the window, the window will have a vertical and/or horizontal scroll bar. You can scroll the window in the usual ways by dragging the scroll button, clicking in the scroll bar either side of the scroll button, or by clicking the arrow buttons at the ends of the scroll bar.

However, you can also scroll the window by dragging, as follows:

- 1 Move the pointer over the image.
- 2 Press the right-hand mouse button – the pointer will change to show that you can drag the image:



The ImageSource Application Window

Also, unless the image is live, an overview pane will be displayed on the image showing the whole image and an outline showing the part displayed in the image:

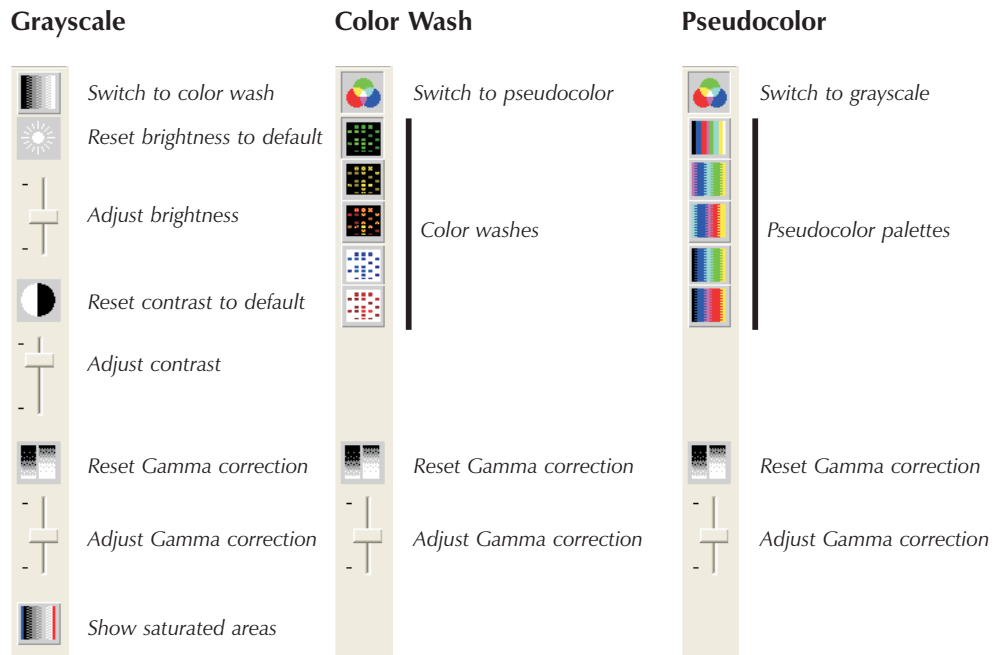


- 3 Either drag the image in the main pane or drag the outline in the overview pane – dragging the outline scrolls the image faster.
The overview pane will disappear a few seconds after you stop scrolling.

Image controls

The image controls at the right-hand edge of Image windows control the display of the image in the window.

The following pictures show the function of each of the controls:



The 'Show saturated areas' button at the bottom of the controls switches Saturation Mode on or off. If saturation mode is on, any pixels with the maximum value will be shown in red and any pixels with the minimum value will be shown in blue. With saturation mode on, you can adjust the exposure so that the brightest and darkest parts of the image almost saturate.

Gamma correction allows you to adjust the midtones in an image without changing the lightest and darkest tones – it determines the shape of the response curve between the black and white points, which are fixed by the brightness and contrast settings.

The ImageSource Application Window

Note The image controls only affect the display of the image – they do not affect the actual intensity values in the image. This may cause problems when you are setting the exposure time to get the best exposure. For example, if you increase the brightness of the image display of a correctly exposed image, the light parts of the image will eventually become saturated (and be shown in red if the Show saturated areas button is depressed). This may tempt you to decrease the exposure time, which would lead to underexposure. To avoid these problems, always make sure that the image controls are reset to their default settings when you are adjusting the exposure time setting to get the best exposure.

Note You can also adjust the brightness and contrast of the image display using the cursors in the Histogram window – see page 4-16.

Three-dimensional view

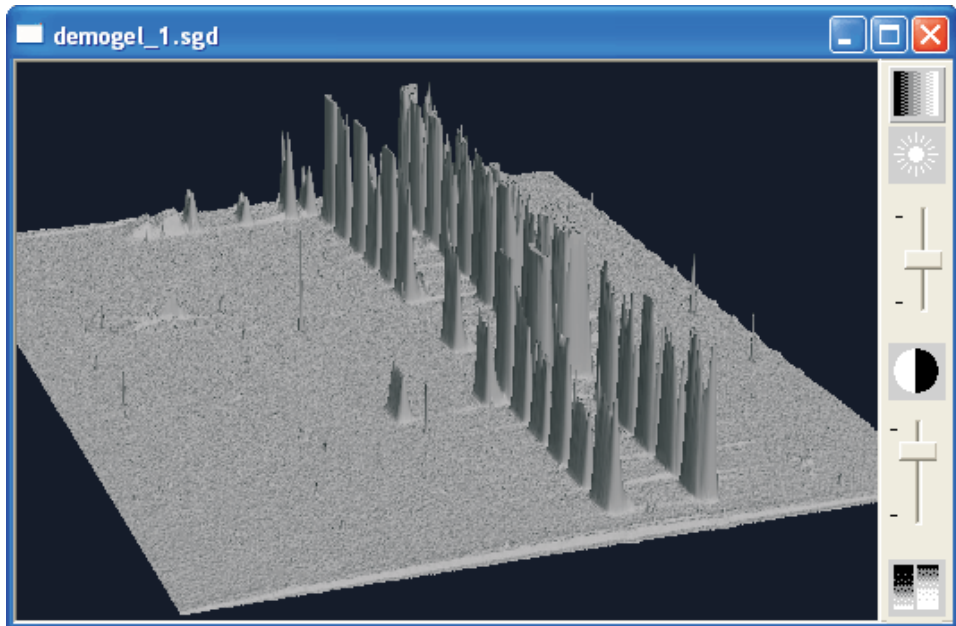
You can display a three-dimensional plot of the image with image intensity plotted along the vertical axis – the brighter a point in the image the higher it is plotted above the axis plane.

Note If you have a gel with dark bands or spots against a light field, you should invert the image (using **Invert** in the **Image** menu) when using the three dimensional view otherwise the bands or spots will appear as holes in the plane.

To view a three-dimensional plot of an image:



Choose **3D View** from the **View** menu (choose the command again to return to normal view).



To change the point of view onto the three-dimensional plot:

Drag the mouse in the image window.

Original and Processed View modes

In order to protect your data, ImageSource does not allow you to change the image values in the original image. Therefore, when you carry out an operation that changes the image values, ImageSource makes a copy of the 'Original' image and changes the values in the copy. This Processed image is then displayed in the Image window in place of the original. However, the Original image is still associated with the image window and you can choose between showing the Processed image or the Original image in the Image window.

The ImageSource Application Window

To switch the selected Image window to View Original mode:

Choose **View Original** from the **Image** menu.

To switch the selected Image window to View Processed mode:

Choose **View Processed** from the **Image** menu.

(The command is disabled if there is no Processed image associated with the selected Image window.)

If you carry out another operation that changes the image values:

- if the Image window is in View Processed mode, the Processed image will be processed further
- if the Image window is in View Original mode, a copy of the Original image will be processed.

In both cases, the new Processed image will replace any existing one.

When you choose **Save** or **Save As** from the **File** menu to save an image, both the Original image and the Processed image will be saved in a single file – if you reopen the image, you will be able to display either the Original or Processed image in the usual way. If you want to save the Processed image only in a standard graphics format file, display the Processed image in the Image window and choose **Export Image** from the **File** menu (see page 6-7).

The Histogram window

Showing and hiding the Histogram window

To show or hide the Histogram window:



Choose **Histogram** from the **View** menu.

Note When the Histogram window is floating (see next section), you can also hide the Histogram window by clicking on the close button at its top right-hand corner.

Docking and floating the Histogram window

By default, the Histogram window is docked below the Image Capture toolbox on the left-hand side of the ImageSource Application Window. However, you can make it float freely on the desktop or dock it to another edge of the window.

To float the Histogram window:

- 1 Move the pointer over the drag bars at the edge of the Histogram window:



- 2 Drag the window away from the edge.

Note You can also float the Histogram window by double-clicking on the drag bars – it will be restored to the position it held when it was last floating.

To dock the Histogram window against an edge of the ImageSource Application Window:

Drag the Histogram window by its title bar and drop it on the edge.

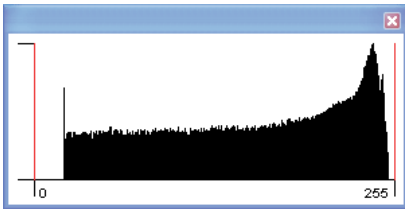
Note You can also dock the Histogram window by double-clicking in its title bar – it will be docked on the same edge as when it was last docked.

The ImageSource Application Window

Using the Histogram window

The Histogram window shows the distribution of intensities in the image in the selected Image window from 0 to fully saturated:

For 8-bit images this is 0 to 255:



For 16-bit images (EDR images) this is 0 to 65535:



You can use the Histogram window to ensure there is no loss of information because of saturation. The following sections give examples of how the histogram can be used to analyze various image conditions and suggestions for how to improve the capture settings.

Note The histogram does not update while you are viewing a live image – it will be updated when you capture the image.

Image too dark



You should increase the exposure time.

Image too light



You should decrease the exposure time.

Note The adjustments to the exposure time described above are made before you recapture the image and affect the amount of information that is captured. You can also use the Histogram to control the way the information is displayed, but this has no effect on the amount of information captured – see the following section.

Histogram window cursors

The Histogram window shows the distribution of intensities present in the image in the selected Image window. It also shows the range of the image display using two vertical red cursor lines:



The left-hand cursor shows the image intensity that is displayed as black in the Image window and the right-hand cursor shows the image intensity that is displayed as white. Any parts the image with intensities to the left of the left-hand cursor or to the right of the right-hand cursor will be displayed as black or white, respectively.

Note When the Histogram window is displayed, the status bar shows the position of the left-hand (**Black**) and right-hand (**White**) cursors instead of the brightness and contrast.

In the example above, the cursor lines are at the minimum and maximum positions and lie outside the actual distribution, so no parts of the image display will be fully black or fully white (in other words, the display will have low contrast).

The ImageSource Application Window

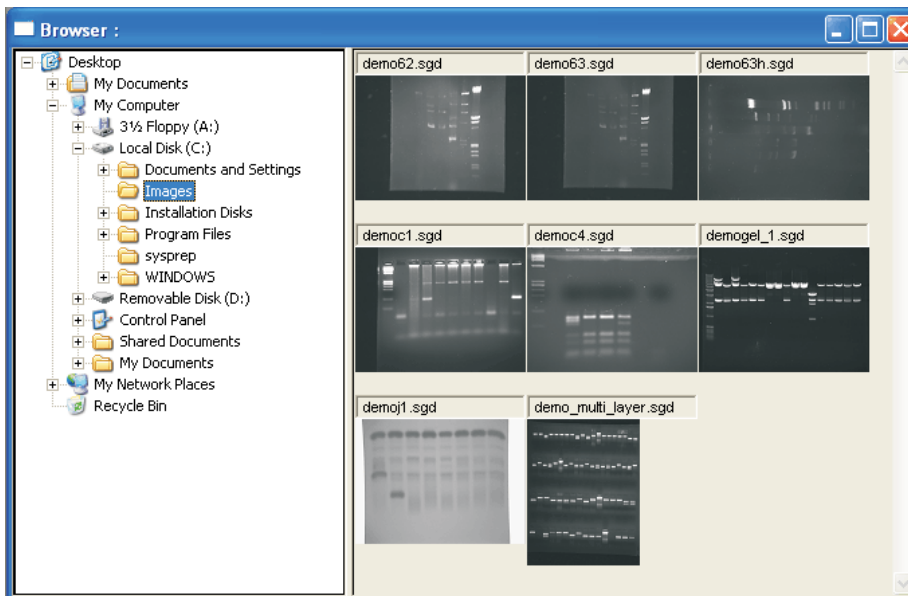
Controlling the image display

You can adjust the image display by dragging the cursors in the Histogram window – see *Using the Histogram window to control the image display* (page 3-16) in the *Using ImageSource* chapter for details.

Browser

To display the Browser:

Choose **Browse** from the **File** menu.



Note You can also display the Browser by pressing **Browse** in the **Open** dialog box – see page 6-3.

The Browser is displayed in the ImageSource Application window document area with any open Image windows – when you first display it, it will be maximized and will cover any open Image windows. The Browser can be maximized, minimized, restored and moved in the same way as Image windows. It is also tiled, cascaded and arranged with the Image windows using commands in the **Window** menu. However, unlike Image windows, there is no tab for the Browser at the bottom of the ImageSource

Application window document area – you can select it by choosing it from the list of open windows at the bottom of the **Window** menu or by clicking in it.

To open an existing image file using the Browser:

- 1 Use the left-hand pane in the Browser in exactly the same way as you use the left-hand pane in Windows Explorer to select the folder containing the required image.

The right-hand pane in the Browser will show a preview of all the images in the selected folder.

- 2 Double-click on the image that you want to open.

The ImageSource Application Window

Toolbars

The ImageSource Application window has the following toolbars:

- **Image** – for processing the image for presentation purposes to make it sharper, smoother, inverted (negative image), flipped or cropped.
- Annotation toolbars – for adding and setting the properties of annotations. There are three annotation toolbars, which are displayed or hidden together:
 - **Annotate** – for adding text and graphics as an overlay to the image.
 - **Color** – for setting the color of new or existing annotations.
 - **Line Style** – for setting the width/style of lines used for a new or existing line, arrow or hollow or filled shape annotations.
- **Zoom** – for displaying a magnified or reduced view of the image, or resetting it to the original size or setting autosizing mode.
- **Standard** – for creating a new Image window showing the camera image, loading, saving or printing an image file, displaying the Image Capture toolbox, displaying or hiding the annotation and Image toolbars, displaying or hiding the Histogram window, displaying a three-dimensional view, starting ImageAide to analyze an image, or displaying on-screen Help for a window component.
- **Configuration** – for choosing which Configuration to use.

Displaying and hiding toolbars

You can choose to hide or display the Zoom and Standard toolbars independently by choosing the command in the **Tools** menu with the same name as the toolbar. The command is checked in the menu when the toolbar is displayed. You can also choose commands in the **Tools** menu or press buttons in the Standard toolbar to display *either* the Image toolbar or the annotation toolbars (Annotate, Color and Line Style). The Configuration toolbar is always displayed.

Toolbars

Arranging toolbars

All the toolbars are displayed in the toolbar area below the menu bar at the top of the ImageSource Application window. You can drag the toolbars by the drag bars at their left-hand edge to move or rearrange them, except that the Image and annotation bars always appear below the other toolbars.

Image



Sharpen



Pressing the Sharpen button is equivalent to choosing **Sharpen** from the **Image** menu (see page 6-33) to make the boundaries between regions in the image sharper.

Smooth



Pressing the Smooth button is equivalent to choosing **Smooth** from the **Image** menu (see page 6-34) to make the boundaries between regions in the image smoother.

Speckle Correction



Press the Speckle Correction button to process an image by removing speckles.

If the Image window was in **View Original** mode when you chose the command, a copy of the Original image will be speckle corrected. This Processed image will then replace any existing Processed image, and the Image window will switch to **View Processed** mode. If you switch back to **View Original** mode, the Original image will be displayed.

If the Image window was in **View Processed** mode, the Processed image will be speckle corrected.

When you speckle correct an image there may be a loss of image information.

Speckle correction is intended to remove the effects of rogue (defective) cells in CCD cameras being used for low light integration. During speckle correction each pixel value

is compared with the average of the eight adjacent pixels. If it is larger than the average by more than a threshold value (which is 64 by default), it is replaced by the average value.

There is no menu command equivalent to pressing this button.

Invert



Pressing the Invert button is equivalent to choosing **Invert** from the **Image** menu (see page 6-35) to invert the image display (reverse black and white for a monochrome image, or replace colors by their complementary colors for a color image).

Flip Horizontal



Pressing the Flip Horizontal button is equivalent to choosing **Flip Horizontal** from the **Image** menu (see page 6-35) to flip the image from left to right.

Flip Vertical



Pressing the Flip Vertical button is equivalent to choosing **Flip Vertical** from the **Image** menu (see page 6-35) to flip the image from top to bottom.

Define Region



Pressing the Define Region button is equivalent to choosing **Define Region of Interest** from the **Image** menu (see page 6-37) to define a region of the image to crop to.

Crop to Region



Pressing the Crop to Region button is equivalent to choosing **Crop to Region** from the **Image** menu (see page 6-38) to crop the image to the region of interest defined using **Define Region of Interest** in the **Image** menu (see page 6-37) or the Define Region button.

Annotate



Note The rectangle, ellipse and freehand shape icons may appear hollow (as above) or filled on the toolbar depending on whether hollow or filled shapes is selected.

Select



Press the Select button to select the Selector tool so that you can select an annotation or Region of Interest (see page 6-37) by clicking on it.

You can also select the Selector tool by clicking in an Image window if one of the annotation tools is selected and you are not part way through drawing the annotation.

There is no menu command equivalent to pressing this button.

Draw Line



Press the Draw Line button to draw a line annotation on an image – see page 3-31 for details.

There is no menu command equivalent to pressing this button.

Draw Rectangle



Press the Draw Rectangle button to draw a hollow or filled rectangle annotation on an image – see page 3-32 for details.



There is no menu command equivalent to pressing this button.

Draw Ellipse



Press the Draw Ellipse button to draw a hollow or filled ellipse annotation on an image – see page 3-33 for details.



There is no menu command equivalent to pressing this button.

Draw Freehand Shape



Press the Draw Freehand Shape button to draw a hollow or filled freehand shape annotation on an image – see page 3-35 for details.



There is no menu command equivalent to pressing this button.

Draw Text



Press the Draw Text button to place a text annotation on an image – see page 3-39 for details.

There is no menu command equivalent to pressing this button.

Draw Arrow



Press the Draw Arrow button to draw an arrow annotation on an image – see page 3-41 for details.

There is no menu command equivalent to pressing this button.

Hollow/Filled Shapes



Press the Hollow/Filled Shapes button to switch the Draw Rectangle, Draw Ellipse and Draw Freehand Shape buttons between fill and hollow modes – the Draw buttons show which mode is selected.

There is no menu command equivalent to pressing this button.

Color



Press a color button to set the default color for new annotations and change the color of the selected annotation, if there is one.

There are no menu commands equivalent to pressing these buttons.

Line Style



Press a style button to set the default line style for new annotations and change the line style of the selected annotation, if there is one. The line style affects lines, arrows and the borders of hollow and filled shapes, though the effect on filled shapes is only noticeable if you select the dashed or dotted line style.

There are no menu commands equivalent to pressing these buttons.

Zoom



Zoom In



Pressing the Zoom In button is equivalent to choosing **Zoom In** from the **View** menu to produce a more magnified view of the image.

Zoom Out



Pressing the Zoom Out button is equivalent to choosing **Zoom Out** from the **View** menu to produce a less magnified view of the image.

Zoom (1:1)



Pressing the Zoom (1:1) button is equivalent to choosing **Normal (1:1)** from the **View** menu to return to an unmagnified view of the image.

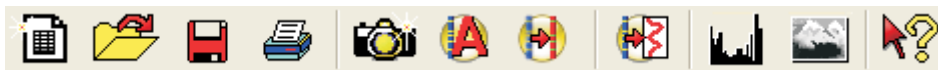
Zoom to Fit



Press the Zoom to Fit button to adjust the magnification of the image in the selected Image window so that it is the largest possible without any parts of it being hidden. When you press the Zoom to Fit button for an Image window, it stays depressed for that Image window until you press one of the other zoom buttons or select one of the zoom commands from the **View** menu. If you adjust the size of an Image window while the Zoom to Fit button is depressed, the magnification of the image will be changed to fit the new window size.

There is no menu command equivalent to pressing this button.

Standard



New



Pressing the New button is equivalent to choosing **New Image (from camera)** from the **File** menu (see page 6-1) to open a new Image window showing a live image from the camera.

Open



Pressing the Open button is equivalent to choosing **Open Image** from the **File** menu (see page 6-3) to open a previously saved image in a new Image window.

Save



Pressing the Save button is equivalent to choosing **Save Image** from the **File** menu (see page 6-5) to save the image or annotations in the selected Image window.

Toolbars

Print



Pressing the Print button is equivalent to choosing **Print** from the **File** menu (see page 6-14) to print the contents of the selected Image window.

Image Capture Toolbox



Press the Image Capture toolbox button to display the Image Capture toolbox if it has been hidden – see page 4-3 for details.

There is no menu command equivalent to pressing this button.

Annotation Toolbars



Pressing the Annotation toolbars button is equivalent to choosing **Annotate** from the **Tools** menu (see page 6-26) to display or hide the annotation toolbars (Annotate, Color and Line Style).

Note Displaying the annotation toolbars automatically hides the Image toolbar.

Image Toolbar



Pressing the Image toolbar button is equivalent to choosing **Image** from the **Tools** menu (see page 6-26) to display or hide the Image toolbar.

Note Displaying the Image toolbar automatically hides the annotation toolbars.

Send to ImageAide

Note The Send to ImageAide button is hidden if ImageAide is not installed on the PC.



Press the Send to ImageAide button to start ImageAide with the image in the selected Image window loaded – if the image has not been saved, you will be prompted to save it first, using a **Save As** dialog box.

Note If you have processed the image in any way, the image file will contain a Processed image in addition to the Original image – in accordance with Good Laboratory Practice, ImageAide will always analyze the Original image.

There is no menu command equivalent to pressing this button.

Show Histogram Window



Pressing the Show Histogram Window button is equivalent to choosing **Histogram** from the **View** menu to view the Histogram window, which shows the distribution of intensities in the image in the selected Image window.

See page 4-16 for more information about the Histogram window.

3D View



Pressing the 3D View button is equivalent to choosing **3D View** from the **View** menu to display a three dimensional plot of the image in the selected Image window.

See page 4-14 for more information about the three dimensional view.

Context-sensitive Help



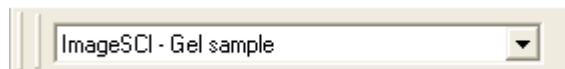
Pressing the Context-sensitive Help button changes the pointer into the Help pointer:



You can use this to select a menu command or click on an area of the window to display Help for the selected item.

There is no menu command equivalent to pressing this button.

Configuration



The Configuration toolbar contains a drop-down list box listing the Configurations that you can use. Selecting a Configuration from the list sets the current capture settings to the values saved in the Configuration.

Toolbars

Note You cannot change the Configuration while ImageSource is displaying a live image.

See *Working with Configurations*, page 3-1, for more information about working with Configurations.

Menus

File menu

New Image (from camera)	Ctrl+N
New Image from File...	
Open Image...	Ctrl+O
Browse	
Save Image	Ctrl+S
Save Image As...	
Close Image	
Export Image...	
<hr/>	
Merge Annotation...	
<hr/>	
Create new composite image...	
<hr/>	
Printer setup...	
Report Settings	
Print Preview	
Print...	Ctrl+P
<hr/>	
1 Image1.sgd	
2 Image2.sgd	
3 Image3.sgd	
4 Image4.sgd	
5 Image5.sgd	
<hr/>	
Exit	

Note Some **File** menu commands are hidden when no Image window is open.

New Image (from camera)

Note The **New Image** command is disabled if there is already an Image window showing a live image from the camera.

To open a new Image window showing an image from the camera:



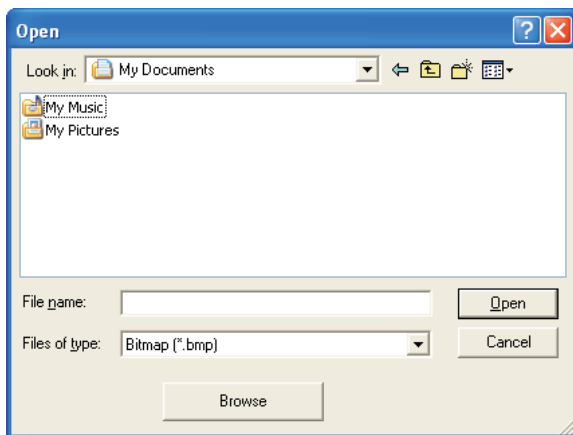
Choose **New Image (from camera)** from the **File** menu.

You can use **Initial Acquire State** in the **Extras** menu (see page 6-29) to choose whether a new Image window should be opened automatically showing a live image from the camera when ImageSource opens.

New Image from File

To create a new secure sample file (for example, from a non-secure .tif, .bmp or .jpg image file):

- 1 Choose **New Image from File** from the **File** menu to display a standard Windows **Open** dialog box:



- 2 Choose the type of image file from the **Files of type** drop-down list box.
- 3 Use the **Look in** drop-down list box to select the folder containing the image file.
- 4 Click on the file in the list box to select it – the name of the file will appear in the **File name** box.
- 5 Press **Open** to close the dialog box.

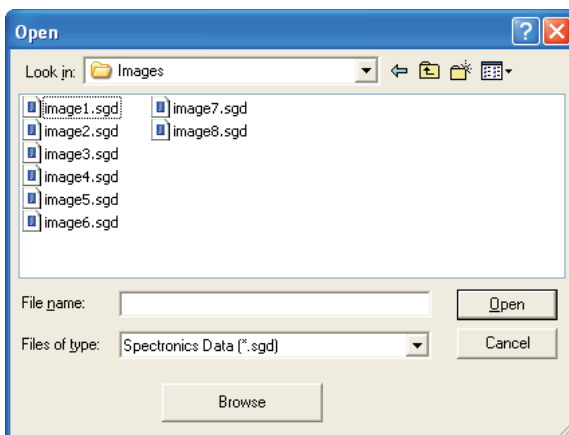
The non-secure image will be opened in a new image window and converted to secure image format. However, in accordance with Good Laboratory Practice, the Capture properties (see *Properties*, page 6-20 for how to view image properties) of images loaded from non-secure files will show them as coming from a non-GLP source and, for example, this fact will be noted in printouts.

Open Image

To open a previously saved secure image in a new Image window:



- 1 Choose **Open Image** from the **File** menu to display a standard Windows **Open** dialog box:



If you wish, you can press **Browse** to close the **Open** dialog box and display the file browser window instead – see the next command (**Browse**) for how to use the file browser window.

- 2 Select the folder holding the image file using the **Look in** drop-down list and the file list box below it.
- 3 Select the required file by clicking on it in the file list box.
- 4 Press **Open** to open the image file in a new Image window.

If the image had been processed in any way before it was saved, both the Processed and Original images will be opened – choose **View Original** or **View Processed** from the **View** menu to select which version to view.

If there were any annotations on the image when it was saved, the annotations will still exist on the image as separate objects that can be moved or edited as required.

Menus

Browse

To open an existing image file using the Browser:

- 1 Choose **Browse** from the **File** menu to display the Browser:



Note The picture shows the Browser in a free floating window – it can also be maximized in the ImageSource document area (see page 4-21 for more details of how to work with the Browser.)

- 2 Use the left-hand pane in the Browser in exactly the same way as you use the left-hand pane in Windows Explorer to select the folder containing the required image.

The right-hand pane in the Browser will show a preview of all the images in the selected folder.

- 3 Double-click on the image that you want to open.

Save Image

Note The **Save Image** command is disabled when the selected Image window is showing a live image from the camera.

To save the image in the selected Image window to an image file:



Choose **Save Image** from the **File** menu.

If the Image has been saved previously to an image file, the image will be saved again with that name. Otherwise, the command will behave as if you had selected **Save Image As** – see the next section.

If you have processed the image in any way, both the Processed and Original images will be saved together with any annotations you have placed on them. If you reopen the image in ImageSource, you will be able to use **View Original** or **View Processed** to view both versions, and the annotations will still exist as separate objects that can still be moved or edited as required.

Save Image As

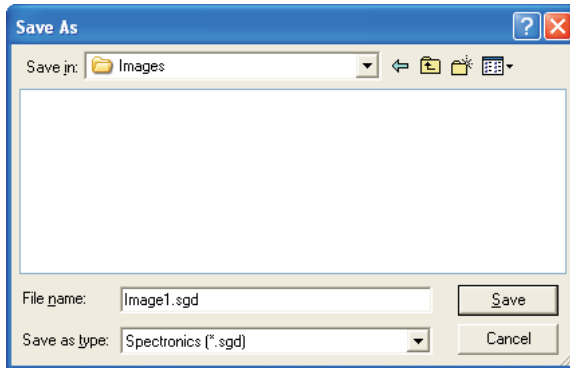
Note The **Save Image As** command is disabled when the selected Image window is showing a live image from the camera.

Note You use **Save Image As** to save the image in **ImageSource (*.sgd)** format for Good Laboratory Practice purposes – you can reopen images saved in this format in ImageSource using **Open Image**. You can save images in a wide range of other image formats using **Export Image** (see page 6-7) – you will be able to open these images in paint programs or place them in word processor documents. When you use **Export Image** to save an image, you can choose whether to save the image with its annotations engraved on it. Alternatively, you can use **Export Image** to save the image annotations in a separate file.

Menus

To save the image in the selected Image window to a new image file:

- 1 Choose **Save Image As** from the **File** menu to display a standard Windows **Save As** dialog box:



- 2 Select a folder to hold the image from the **Save in** drop-down list and the file list box below it.
- 3 Enter a name for the image file in the **File name** box.
- 4 Press **Save** to save the image with the new name.

If you have processed the image in any way, both the Processed and Original images will be saved together with any annotations you have placed on them. If you reopen the image in ImageSource, you will be able to use **View Original** or **View Processed** to view both versions, and the annotations will still exist as separate objects that can still be moved or edited as required.

Close Image

To close the selected Image window:

Choose **Close Image** from the **File** menu.

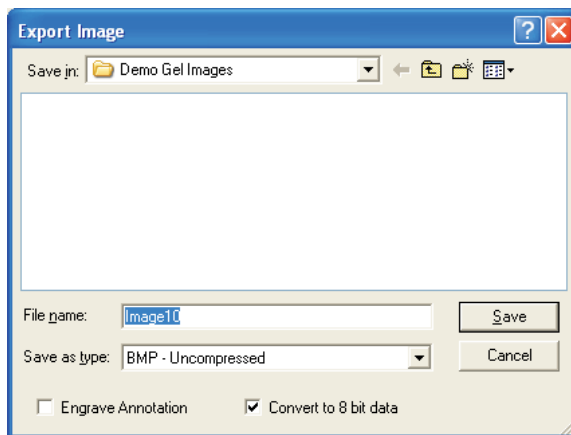
If the Image window contains an unsaved image grabbed from the camera, or if you have made any changes to it since it was last saved, you will be asked if you want to save the changes.

Export Image

Note You use **Save Image As** to save the image in ImageSource (*.sgd) format for Good Laboratory Practice purposes – you can reopen images saved in this format in ImageSource using **Open Image**. You use **Export Image** to save images in a wide range of other image formats – you will be able to open these images in paint programs or place them in word processor documents. When you use **Export Image** to save an image, you can choose to save the image with its annotations engraved on it or just the image. Alternatively, you can use **Export Image** to save the image annotations in a separate file.

To export the image or annotations in the selected Image window to a new image file:

- 1 Choose **View Original** or **View Processed** from the **View** menu, depending on whether you want to export the Original or Processed image (or the annotations on the Original or Processed image).
- 2 Choose **Export** from the **File** menu to display the **Export** dialog box:



Note The **Convert to 8 bit data** check box is disabled for non-EDR images, since the images are already 8-bit.

- 3 Select a folder to hold the exported image or annotations from the **Save in** drop-down list and the file list box below it.
- 4 Enter a name for the exported image or annotations file in the **File name** box.

Menus

- 5 For 16-bit (EDR) images, check **Convert to 8 bit data** if you want the image saved as an 8-bit image.
- 6 Select the format for saving the file from the **Save as type** box – you can save images in a wide variety of image formats or just save the annotations in a .ann file (you will be able to add the saved annotations to images in ImageSource at a later time using **Merge Annotation**).
- 7 For an image export, check **Engrave Annotation** if you want to export the image with any annotations; leave it unchecked if you want to export the image only.

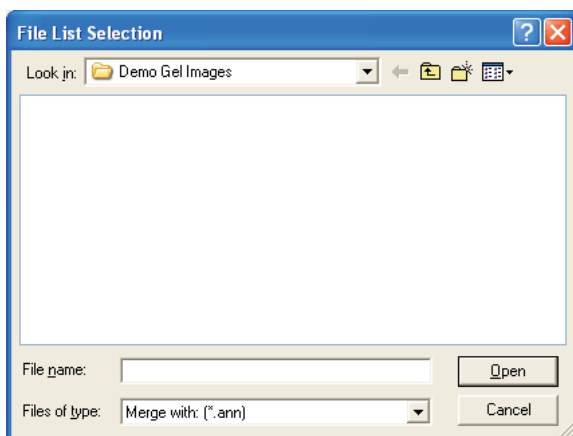
Note If you choose to export the image with annotations, the annotations will become part of the exported image (engraved) and the underlying parts of the original image will be permanently obscured in the exported image.

- 8 Press **Save** to save the image or annotations with the new name.

Merge Annotation

To add the annotations saved in an annotation file to the annotations (if any) already on the image in the selected Image window:

- 1 Choose **Merge Annotation** from the **File** menu to display the **File List Selection** dialog box:



This is a standard Windows Open dialog box, similar to the **Open** dialog box displayed when you choose **Open Image** from the **File** menu (see page 6-3).

- 2 Use the dialog box to select the required annotation file.
- 3 Press **Open** to close the dialog box and place the annotations on the image.

The annotations will be placed on the image as separate objects, which you can move, reshape, delete and recolor independently.

Create new composite image (multiplexing)

Note The **Create new composite image** command is disabled unless two or more images are open in ImageSource.

There are occasions when different parts of a gel may require different types of illumination. For example, you may have a chemiluminescence sample, for which you need no illumination, with a non-chemiluminescent molecular weight standard track, for which you need to use white light. ImageSource allows you to cope with this situation by capturing images under different illumination conditions and then combining them to form a composite image, which can be analyzed in exactly the same way as if it were a single exposure.

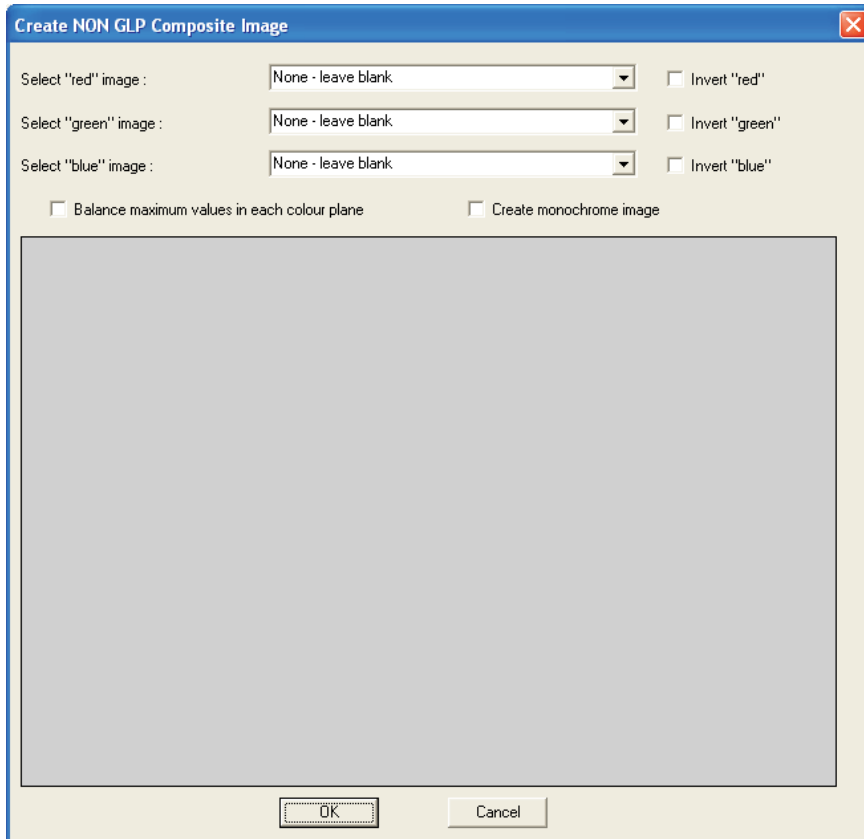
Note Image files created using the **Create new composite image** command do not satisfy the conditions required for Good Laboratory Practice – this fact is noted in the composite image’s Capture properties (see *Properties*, page 6-20 for how to view image properties).

To create a new composite image from two or three other images:

- 1 Capture or open the images you want to superimpose.
-

Note Take care not to move the gel between captures.

- 2 Choose **Create new composite image** from the **File** menu to display the **Create NON GLP Composite Image** dialog box:



The three 'color' drop-down list boxes at the top of the dialog box each list the currently open images, together with the **None - leave blank** item.

- 3 Select the two or three images you want to superimpose from the 'color' drop-down list boxes.

When you select the first image, it will be displayed in the dialog box in the list box color. When you select the second (and third) image, it will be superimposed on the first image(s) in its list box color.

- 4 If you want to add one (or more) of the images as a negative (inverting light and dark in the image), check the corresponding **Invert** check box(es).

- 5 Check **Create monochrome image** if you want the composite image to be monochrome rather than color (so that it appears similar to a normal captured image). The composite image will be displayed in monochrome in the dialog box if you check the box.

- 6 Check **Balance maximum values in each color plane** to weight the contributions of each image according to the maximum values in each – see next paragraph for details of why you may want to do this.

If you do not select this option, when ImageSource creates a composite image it takes equal contributions from each component image. However, this can cause problems if one of the images is much lighter or darker than the other(s), or if the images are a mixture of EDR (16-bit) and non-EDR (8-bit) images. Balancing the maximum values in each color plane avoids these problems.

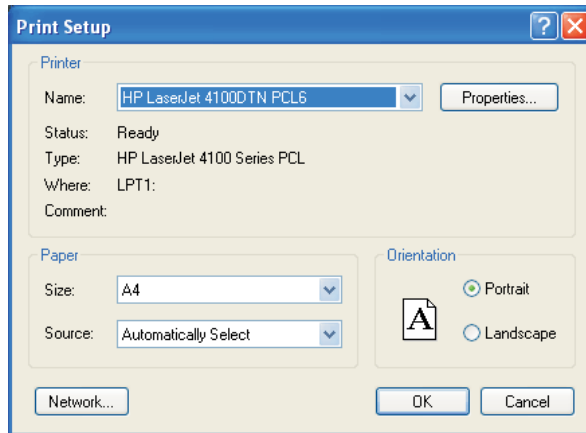
- 7 Press **OK** to create the composite image.

The new composite image will be created and displayed in a new Image window. You can apply any of ImageSource's operations to the composite image in the same way as for a captured image. In particular, you can save the composite image and analyze it in ImageAide. However, you should note that the results of analyzing a composite image do not satisfy the conditions required for Good Laboratory Practice.

Printer setup

To choose a new printer or change the settings for the existing one:

- 1 Choose **Printer setup** from the **File** menu to display the **Print Setup** dialog box:

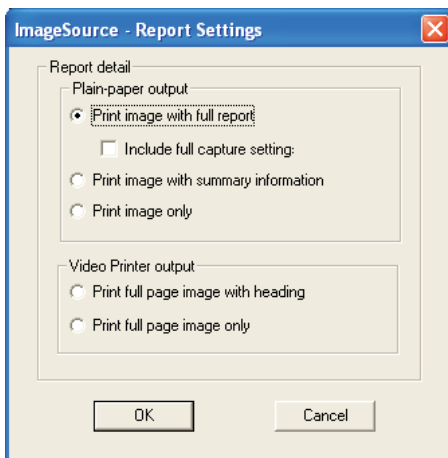


- 2 To select a different printer, choose it from the **Name** drop-down list box. The fields below the **Name** box show properties of the selected printer.
- 3 Press **Properties** to display a dialog box allowing you to choose options for the selected printer.
The options available depend on the printer – see your printer documentation for details.
- 4 Choose the paper **Size** and **Source** to use from the drop-down list boxes.
The options available depend on the printer – see your printer documentation for details.
- 5 Click on the **Landscape** or **Portrait** radio button to choose the paper orientation – the graphic in the **Orientation** box illustrates the selected orientation.
- 6 Press **OK** to save the settings and close the dialog box.

Report Settings

To choose what information to include in printed reports:

- 1 Choose **Report Settings** from the **File** menu to display the **ImageSource - Report Settings** dialog box:



- 2 Click on the radio button for the amount of detail you want to include in the report. For a full report you can choose to include full details of capture settings by checking the check box.

Note If you want to print to a thermal printer, select one of the **Video Printer output** options.

- 3 Press **OK** to confirm your choice and close the dialog box.

Note See **Report Titles** in the **Extras** menu (page 6-28) for how to set the text to appear at the top of *full* reports; see **Print** in the **File** (page 6-14) for how to print reports.

Print Preview

To preview a printout of the image in the selected image window:

Choose **Print Preview** from the **File** menu.

Menus

The Image window will switch to preview mode with a preview button bar at the top:



Press **Next Page** to preview the next page (if there is one).

Press **Prev Page** to preview the previous page (if there is one).

Press **Two Page/One Page** to change between previewing multiple page reports two pages or one page at a time.

Press **Zoom In** and **Zoom Out** to change the magnification of the preview (alternatively, click the left, respectively, right mouse button).

Press **Close** to return the Image window to normal mode.

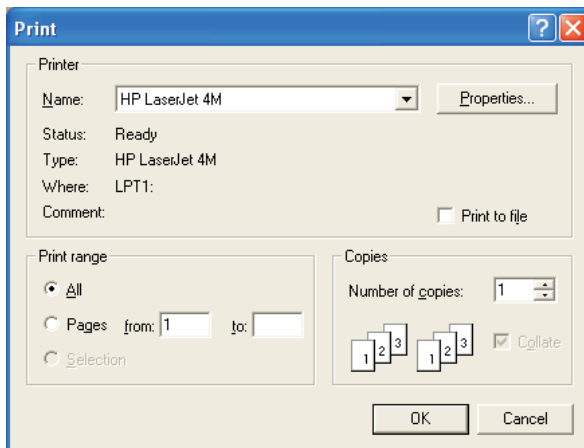
Press **Print** to send the printout to the printer and return the Image window to normal mode.

Print

To print the contents of the selected Image window:



- 1 Choose **Print** from the **File** menu to display a standard Windows **Print** dialog box:



- 2 If required, choose a different printer from the **Name** drop-down list box.

- 3 Press **Properties** to display a dialog box allowing you to set options for the selected printer. The options available depend on the specific printer selected – see your printer’s documentation for details.
- 4 Check **Print to file** if you want to send the printer output to a file rather than directly to a printer. If you choose this option you will be prompted to give a file name for the output when you press **OK**.
- 5 Select the **All** radio button if you want to print all the pages in the report; select the **Pages** radio button and enter the start (**from**) and end (**to**) pages if you only want to print a range of pages.
- 6 Enter the **Number of copies** of the report that you want to print.
- 7 Press **OK** to close the dialog box and send the output to the printer, or display a dialog box so that you can enter a name for the file if you are printing to a file.

Most recently used files

Near the bottom of the **File** menu there is a list of the files you have opened or saved most recently.

To reopen one of the most recently used files:

Choose its name from the **File** menu.

Exit

Note You cannot exit ImageSource while an Image window is showing a live image.

To exit ImageSource:

Choose **Exit** from the **File** menu.

If there are any Image windows containing unsaved grabbed images from the camera, or if you have made any changes to images since they were last saved, you will be asked if you want to save the changes.

Menus

Edit

Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Undo	Ctrl+Z

Cut

To copy the selected annotation to the Windows clipboard and remove it from the image:

Choose **Cut** from the **Edit** menu.

Copy

To copy the selected annotation to the Windows clipboard and leave it on the image:

Choose **Copy** from the **Edit** menu.

Paste

To place a copied annotation on the image in the selected Image window:

Choose **Paste** from the **Edit** menu.

The annotation will be pasted in the same position as it was copied from. This means that if you are pasting to the original image and you have not moved or removed the original annotation, it will be pasted on top of the original, so you may not notice any change. However, you will be able to drag the copy to move it away from the original.

Note If you copy an annotation from the bottom right-hand corner of a large image and paste it onto a smaller image, it will not appear if its original position was completely outside the image area of the smaller image.

Undo

When you make major changes to an image (in particular, when you smooth, sharpen, flip, invert or emboss it), ImageSource maintains a copy of the processed image before it makes the change. This allows you to undo the change by reverting to the copy.

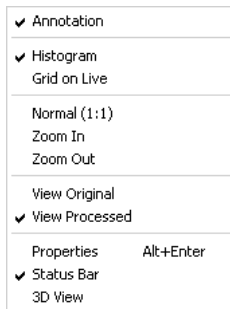
To undo the most recent major change to an image:

Choose **Undo** from the **Edit** menu.

Note If you save the image, you cannot undo a change that was made before saving the image.

Note Some changes (for example, moving an annotation) do not cause a copy to be saved. Choosing **Undo** reverts the image to its state before the last major change, so any minor changes made since then will also be undone.

View



Note The picture above shows the **View** menu when an Image window is selected. If no windows are open, the menu only contains the **Histogram** and **Status Bar** commands.

Annotation

To view or hide any annotations on the image in the selected Image window:

Choose **Annotation** from the **View** menu.

Annotation is checked in the menu when annotations are displayed on the selected Image window.

Note Annotations are not displayed in an Image window showing live video even if **Annotation** is selected.

Menus

Histogram

To view the Histogram window showing the distribution of intensities in the image in the selected Image window:



Choose **Histogram** from the **View** menu.

To hide the Histogram window:

Click on the close button at the top right-hand corner of the Histogram window.

See page 4-16 for more information about the Histogram window.

Grid on Live

To choose whether to show or hide a grid over live images:

Choose **Grid on Live** from the **View** menu.

Grid on Live is checked in the **View** menu when the option is selected.

Displaying a grid on a live image can help you adjust the position of the gel so that the tracks are parallel to the edges of the image – this makes it easier to apply annotation overlays to the image and can also make analysis more straightforward.

Normal (1:1)

To return the view of the image in the selected Image window to the normal (1:1 magnification) state:




Choose **Normal (1:1)** from the **View** menu.

Zoom In

To produce a more magnified view of the image:



Choose **Zoom In** from the **View** menu.

You can also zoom in to an image using a wheel mouse by holding  and spinning the wheel away from you.


See *Zooming and scrolling Image windows*, pages 4-10–4-12, for information about using the overview to scroll a zoomed image.

Zoom Out

To produce a less magnified view of the image:



Choose **Zoom Out** from the **View** menu.

You can also zoom out from an image using a wheel mouse by holding  and spinning the wheel towards you.

View Original

To switch the selected Image window to View Original mode:

Choose **View Original** from the **Image** menu.

See *Original and Processed View modes* (page 4-15) for further information.

View Processed

To switch the selected Image window to View Processed mode:

Choose **View Processed** from the **Image** menu.

The command is disabled if there is no Processed image associated with the selected Image window.

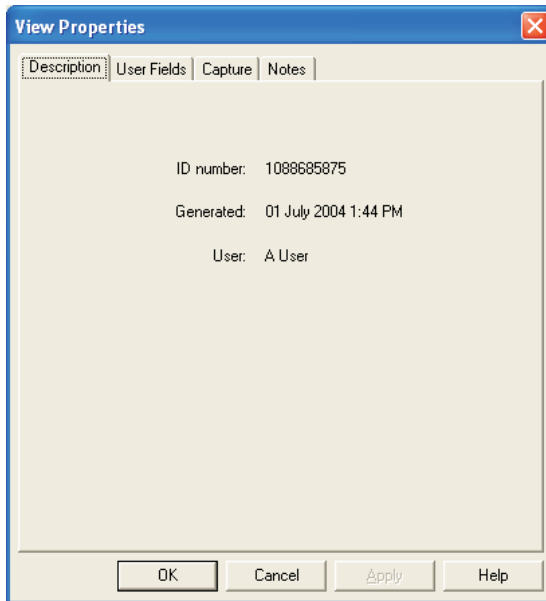
See *Original and Processed View modes* (page 4-15) for further information.

Menus

Properties

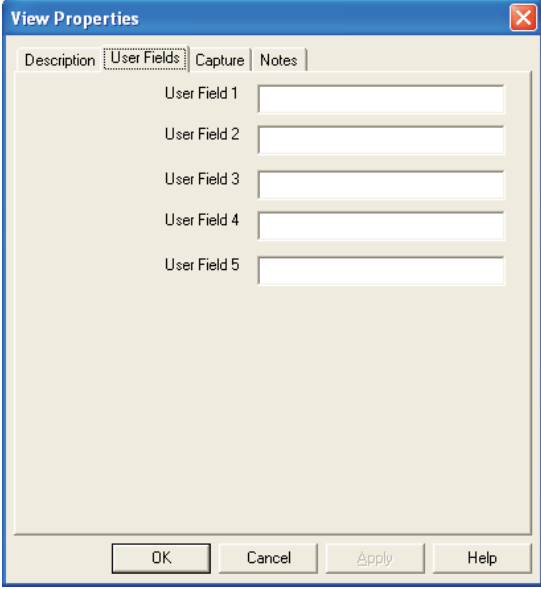
To view/edit the properties of the image in the selected Image window:

- 1 Choose **Properties** from the **View** menu to display the **View Properties** dialog box:



The **Description** page shows the unique image ID number, the time and date it was captured and by whom – you cannot change this information.

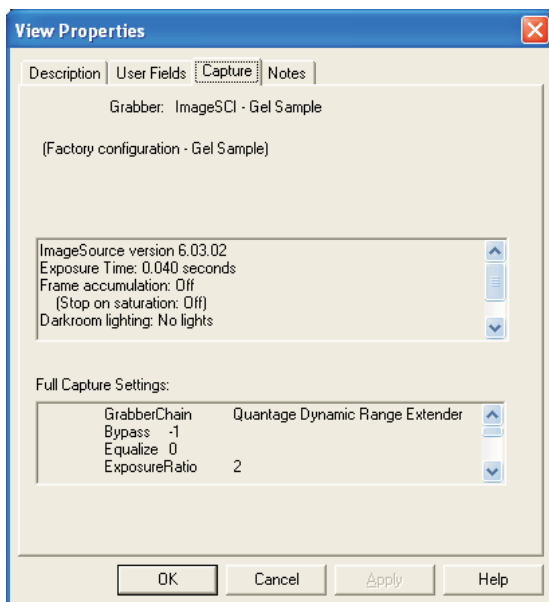
- 2 Click on the **User Fields** tab to display the **User Fields** page:



The screenshot shows a dialog box titled "View Properties" with a close button (X) in the top right corner. The dialog has four tabs: "Description", "User Fields", "Capture", and "Notes". The "User Fields" tab is selected and active. Inside the dialog, there are five text input fields, each labeled "User Field 1" through "User Field 5". At the bottom of the dialog, there are four buttons: "OK", "Cancel", "Apply", and "Help".

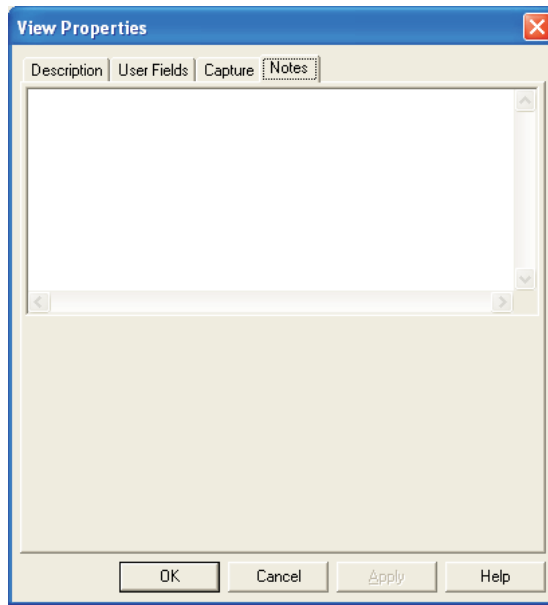
Enter or edit text in the **User Field** boxes to document the image – the text will be stored with this individual image and can be printed out with the image in a report.

- 3 Click on the **Capture** tab to display the **Capture** page:



The **Capture** page shows the capture settings when the image was captured - you cannot change this information.

- Click on the **Notes** tab to display the **Notes** page:



Enter or edit text on the **Notes** page to document the image – the text will be stored with this individual image and can be printed out with the image in a report

- Press **OK** to close the dialog box and save any additions or changes you have made.

Status Bar

To show or hide the Status Bar at the bottom of the ImageSource Application window:

Choose **Status Bar** from the **View** menu.

The command is checked in the menu when the Status Bar is shown.

Menus

3D View

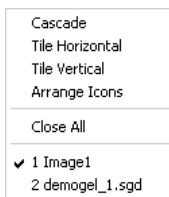
To display a three dimensional plot of the image in the selected Image window:



Choose **3D View** from the **View** menu.

See page 4-14 for more information about the three dimensional view.

Window



Note The **Window** menu is hidden when no Image window is open.

Cascade

To resize and arrange the open (non-minimized) Image and Browser windows so that they are overlapping with their title bars visible:

Choose **Cascade** from the **Window** menu.

Tile Horizontal

To arrange (and resize if necessary) the open (non-minimized) Image and Browser windows so that they are non-overlapping and one above the other:

Choose **Tile Horizontal** from the **Window** menu.

Tile Vertical

To arrange (and resize if necessary) the open (non-minimized) Image and Browser windows so that they are non-overlapping and side-by-side:

Choose **Tile Vertical** from the **Window** menu.

Arrange Icons

To tidy up the icons (title bars) representing minimized Image and Browser windows so that they are in a row along the bottom edge of the ImageSource Application window:

Choose **Arrange Icons** from the **Window** menu.

Close All

To close all of the open Image and Browser windows:

Choose **Close All** from the **Window** menu.

If any of the Image windows contain unsaved grabbed images from the camera, you will be asked if you want to save the changes.

Windows open in ImageSource

The Image and Browser windows currently open in ImageSource are listed at the bottom of the **Window** menu.

To select one of the open Image or Browser windows:

Select it from the list in the **Window** menu

or

Click in it.

Tools



Note The **Tools** menu is hidden when no Image window is open.

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Image

To display or hide the Image toolbar:



Choose **Image** from the **Tools** menu.

Image is checked in the **Tools** menu when the Image toolbar is displayed.

Displaying the Image toolbar automatically hides the annotation toolbars.

See the *Toolbars* chapter (Chapter 5) for general information about using toolbars and for a description of each of the buttons they contain.

Annotate

To display or hide the annotation toolbars (Annotate, Color and Line Style):



Choose **Annotate** from the **Tools** menu.

Annotate is checked in the **Tools** menu when the annotation toolbars are displayed.

Displaying the annotation toolbars automatically hides the Image toolbar.

The annotation toolbars contain tools for adding and formatting annotations to an image.

See the *Toolbars* chapter (Chapter 5) for general information about using toolbars and for a description of each of the buttons they contain.

Zoom

To display or hide the Zoom toolbar:

Choose **Zoom** from the **Tools** menu.

Zoom is checked in the **Tools** menu when the Zoom toolbar is displayed.

The Zoom toolbar contains tools for changing the magnification of the image.

See the *Toolbars* chapter (Chapter 5) for general information about using toolbars and for a description of each of the buttons they contain.

Standard

To display or hide the Standard toolbar:

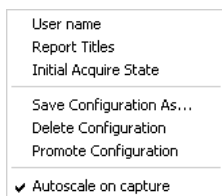
Choose **Standard** from the **Tools** menu.

Standard is checked in the **Tools** menu when the Standard toolbar is displayed.

The annotation toolbars contain tools for adding and formatting annotations to an image.

See the *Toolbars* chapter (Chapter 5) for general information about using toolbars and for a description of each of the buttons they contain.

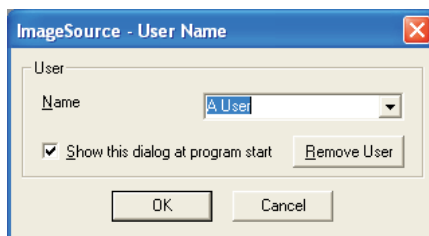
Extras



User name

To select a different user name, enter a new one and/or choose whether to display the **ImageSource - User Name** dialog box when ImageSource starts:

- 1 Choose **User name** from the **Extras** menu to display the **ImageSource - User Name** dialog box:



- 2 Select the required user name from the **Name** drop-down list box or type in a new name.

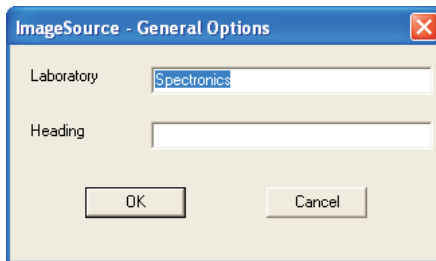
Menus

- 3 Check or uncheck the check box to specify whether you want this dialog box displayed each time you start ImageSource.

Report Titles

To enter data to appear at the beginning of *full* ImageSource reports (see **Report Settings** in the **File** menu (page 6-13) for how to choose whether to print full, summary or image only reports; see **Print** in the **File** menu (page 6-14) for how to print reports):

- 1 Choose **Report Titles** from the **Extras** menu to display the **ImageSource - General Options** dialog box:

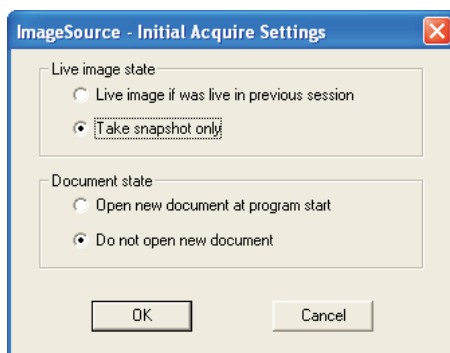


- 2 Enter a name to identify your **Laboratory**.
- 3 Enter any other text you want to appear in the report **Heading**.
- 4 Press **OK** to confirm the new settings and close the dialog box.

Initial Acquire State

To set the acquisition properties to be used when ImageSource is started up:

- 1 Choose **Initial Acquire State** from the **Extras** menu to display the **ImageSource - Initial Acquire Settings** dialog box:



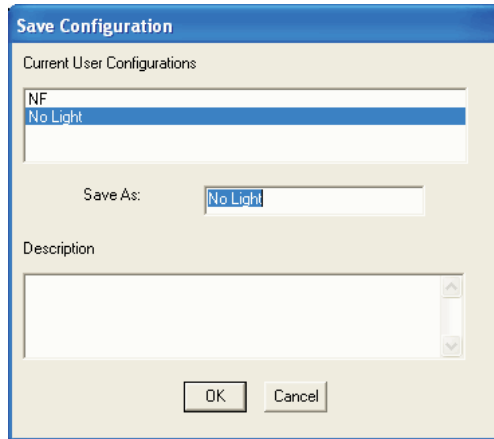
Note The **Take snapshot only** radio button *should be left selected* in the **Live Image state** box.

- 2 In the **Document state** box, click on a radio button to choose whether a new Image window showing the camera image should be opened automatically when you start up ImageSource.

Save Configuration

To create a new user Configuration with the current settings or to save any changes you have made since selecting the current Configuration:

- 1 Choose **Save Configuration As** from the **Extras** menu to display the **Save Configuration** dialog box:



Note The list box at the top of the dialog box shows all your **Current User Configurations** – the list does not include any system default Configurations on your PC (see **Promote Configuration** (page 6-31) for more information about system default Configurations).

- 2 The **Save As** box shows the name of the current Configuration (or **Type new config name here** if the current Configuration is a system default Configuration).

Either:

Leave the existing name unchanged if you want to update the current Configuration to the current capture settings.

Or:

Enter a new name if you want to create a new Configuration with the current capture settings.

Note If the original Configuration was a system default Configuration, you must enter a new name – you cannot save changes to a system default Configuration.

- 3 Enter or edit the **Description** to document the Configuration.
- 4 Press **OK** to close the dialog box and save the changes to the existing Configuration or create a new user Configuration with the current capture settings.

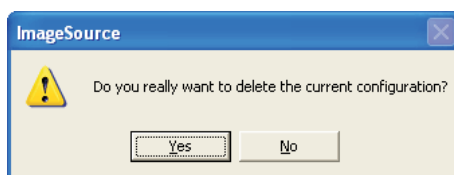
See *Working with Configurations*, page 3-1, for more information about ImageSource Configurations.

Delete Configuration

To delete a user Configuration (you cannot delete a system default Configuration in ImageSource):

- 1 If the Configuration you want to delete is not the current Configuration, select it using the Configuration list in the Configuration bar (see page 5-9).
- 2 Choose **Delete Configuration** from the **Extras** menu.

You will be asked to confirm that you want to delete the Configuration:



- 3 Press **Yes** to delete the Configuration.

Promote Configuration

Note Once you have promoted a user Configuration to be a system default Configuration you will not be able to edit or delete it.

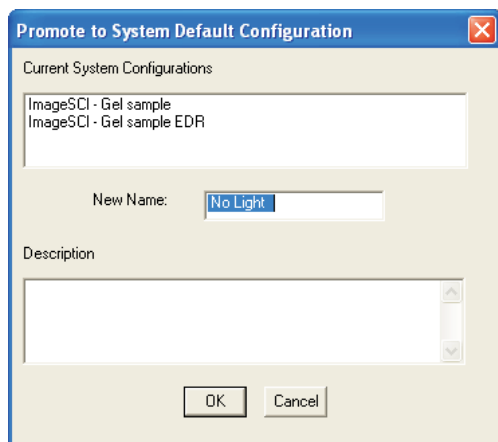
To promote a user Configuration to be a system default Configuration:

- 1 If the Configuration you want to promote is not the current Configuration, select it using the Configuration list in the Configuration bar (see page 5-9).

Menus

Note If you make any changes to the capture settings after selecting the Configuration you want to promote, the changed settings, not the original ones, will be saved in the promoted Configuration.

- 2 Choose **Promote Configuration** from the **Extras** menu to display the **Promote to System Default Configuration** dialog box:



Note The list box at the top of the dialog box shows all the **Current System Configurations** – the list does not include your user Configurations.

- 3 If you want to change the name of the Configuration when it is promoted, edit the name in the **New Name** box.

Note The original user Configuration will be removed even if you enter a new name for the promoted Configuration.

- 4 If required, edit the **Description** (the description of the selected Configuration is displayed in a tooltip when you hold the pointer over it in the Configuration toolbar).
- 5 Press **OK** to confirm that you want to promote the Configuration.

Once you have promoted a user Configuration to be a system default Configuration it will be available to all users on the PC.

Note You can change the capture settings while you are using a system default Configuration, but if you then try to save the Configuration, you will have to enter a new name, and it will be saved as a new *user* Configuration.

Autoscale on capture

To choose whether the new windows created when you capture an image should be in fixed magnification or autoscale (zoom to fit) mode:

Choose **Autoscale on capture** from the **Extras** menu.

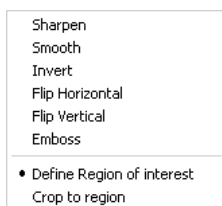
When the command is checked in the menu, new windows will be created in autoscale mode.

If you adjust the size of an Image window in autoscale mode, the magnification of the image will be changed to fit the new window size.

You can switch an autoscaling window to fixed magnification mode using the zoom commands from the **View** menu or the zoom buttons.

You can switch a fixed magnification mode window to autoscaling mode by pressing the Zoom to Fit button.

Image



Sharpen

To sharpen the image (make the boundaries between areas sharper) in the selected image window:



Choose **Sharpen** from the **Image** menu.

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If the Image window was in **View Original** mode when you chose the command, a copy of the Original image will be sharpened. This Processed image will then replace any existing Processed image, and the Image window will switch to **View Processed** mode. If you switch back to **View Original** mode, the original unsharpened image will be displayed.

If the Image window was in **View Processed** mode, the Processed image will be sharpened. If required, you can sharpen a Processed image repeatedly.

When you sharpen an image there is a loss of image information.

The effect of sharpening an image is to increase the fine detail in the image (the high spatial frequencies) by adding the difference between the original image and a locally averaged version.

Smooth

To smooth the image (make the boundaries between areas less sharp) in the selected image window:



Choose **Smooth** from the **Image** menu.

If the Image window was in **View Original** mode when you chose the command, a copy of the Original image will be smoothed. This Processed image will then replace any existing Processed image, and the Image window will switch to **View Processed** mode. If you switch back to **View Original** mode, the original unsmoothed image will be displayed.

If the Image window was in **View Processed** mode, the Processed image will be smoothed. If required, you can smooth a Processed image repeatedly.

When you smooth an image there is a loss of image information.

The smooth operation is carried out by calculating a local average for each pixel in the image.

Invert

To invert the image display (reverse black and white for a monochrome image, or replace colors by their complementary colors for a color image):



Choose **Invert** from the **Image** menu.

If the Image window was in **View Original** mode when you chose the command, a copy of the Original image will be inverted. This Processed image will then replace any existing Processed image, and the Image window will switch to **View Processed** mode. If you switch back to **View Original** mode, the original uninverted image will be displayed.

If the Image window was in **View Processed** mode, the Processed image will be inverted.

When you invert an image there is no loss of image information.

Flip Horizontal

To flip the image horizontally (swap left and right):



Choose **Flip Horizontal** from the **Image** menu.

If the Image window was in **View Original** mode when you chose the command, a copy of the Original image will be flipped. This Processed image will then replace any existing Processed image, and the Image window will switch to **View Processed** mode. If you switch back to **View Original** mode, the original unflipped image will be displayed.

If the Image window was in **View Processed** mode, the Processed image will be flipped.

When you flip an image there is no loss of image information.

Flip Vertical

To flip the image vertically (swap top and bottom):



Choose **Flip Vertical** from the **Image** menu.

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If the Image window was in **View Original** mode when you chose the command, a copy of the Original image will be flipped. This Processed image will then replace any existing Processed image, and the Image window will switch to **View Processed** mode. If you switch back to **View Original** mode, the original unflipped image will be displayed.

If the Image window was in **View Processed** mode, the Processed image will be flipped.

When you flip an image there is no loss of image information.

Emboss

ImageSource allows you to produce a 3-D 'embossed' view of the image emphasizing the boundaries between regions.

To emboss the image:

Choose **Emboss** from the **Image** menu.

If the Image window was in **View Original** mode when you chose the command, a copy of the Original image will be embossed. This Processed image will then replace any existing Processed image, and the Image window will switch to **View Processed** mode. If you switch back to **View Original** mode, the original unembossed image will be displayed.

If the Image window was in **View Processed** mode, the Processed image will be embossed.

When you emboss an image there is a loss of image information.

Define Region of Interest

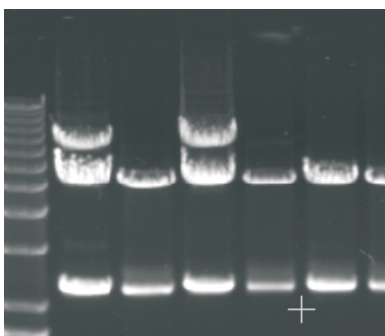
In order to crop an image, you need to define the region of interest first.

To define an area to crop to:

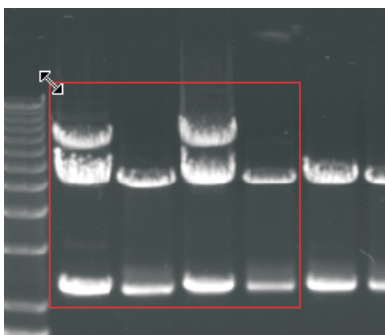


- 1 Choose **Define Region of Interest** from the **Image** menu.

When you move the pointer over the image, it changes to a cross-hair:



- 2 Press and hold down the mouse button, then drag out the region that you want to crop to:



When you release the mouse button, the region will be left selected (shown by the drag handles at the corners and the middle of the sides) and the

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pointer changes back to the selection pointer when it is not over a drag handle:

The region of interest is a selectable object, which you can select at a later time to move, reshape or delete – see page 3-29 for details.

Crop to Region

To crop the image to the region of interest:



Choose **Crop to Region** from the **Image** menu.

If the Image window was in **View Original** mode when you chose the command, a copy of the Original image will be cropped. This Processed image will then replace any existing Processed image, and the Image window will switch to **View Processed** mode. If you switch back to **View Original** mode, the original uncropped image will be displayed.

If the Image window was in **View Processed** mode, the Processed image will be cropped.

When you crop an image there is a loss of image information.

Help



Contents

To display the Contents tab for the Help System:

Choose **Contents** from the **Help** menu.

To display specific help for a command or area of the ImageSource Application window:



- 1 Press the context-sensitive help button in the Standard Toolbar (choose **Standard Toolbar** in the **View** menu to display the Standard Toolbar if it is hidden). The pointer will change to the Help pointer:



- 2 Select the command or click on an area of the window to display help for that item.

Index

To display the Index tab for the Help System:

Choose **Index** from the **Help** menu.

Using Help

To display help for using the Help System:

Choose **Using Help** from the **Help** menu.

Show Wizard

To display a Wizard to give you a quick tour of the program:

Choose **Show Wizard** from the **Help** menu.

Change Wizard

To change the animation character used for the Wizard:

- 1 Choose **Change Wizard** from the **Help** menu to display the **Character Properties** dialog box.
- 2 Press the **Next** and **Back** buttons to preview the different characters.

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- 3 When the required character is displayed, press **OK** to select the character and close the dialog box.

About ImageSource

To display the **About ImageSource** dialog box to view information about the version of ImageSource you are using:

Choose **About ImageSource** from the **Help** menu.

The **About ImageSource** dialog box shows the registered serial number of the copy of the program on your PC. It also has a link to the Spectronics Spectroline web site.

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