ChemoStar Touch

THE SMARTEST ECL & FLUORESCENCE WESTERNBLOT IMAGER

INTAS
SCIENCE IMAGING INSTRUMENTS

USER MANUAL

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Before installing and using the ChemoStar Imager you must read all safety instructions and warnings, including all the warning labels attached to the equipment, carefully.

Warning!

Do not use the ChemoStar Imager in any other way as described in this user manual.

Do not pour liquids on or inside the ChemoStar imaging system.

Do not use the Instrument in humidity above 70% RH or dusty environments.

Warning!

For safety, the power outlet used for powering the instrument must be accessible at all times. In case of emergency, you must be able to immediately disconnect the main power supply to the instrument. Allow adequate space between the wall and the equipment so the power cord can be disconnected in case of emergency.

Warning!

The instrument cannot be carried by one person.

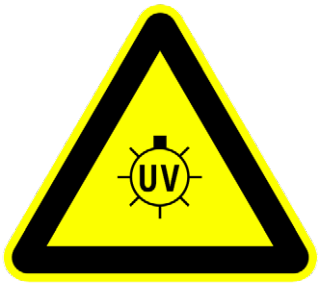
Do not place objects on top of the ChemoStar imaging system

Warning!

This instrument may include class 2 light emitting diodes (LED)

Do not stare directly into the LED light sources.

Warning!



This system may contain a strong UV lightsource. Avoid looking into UV-transilluminator.

May be harmful to unprotected eyes and skin.

Caution!

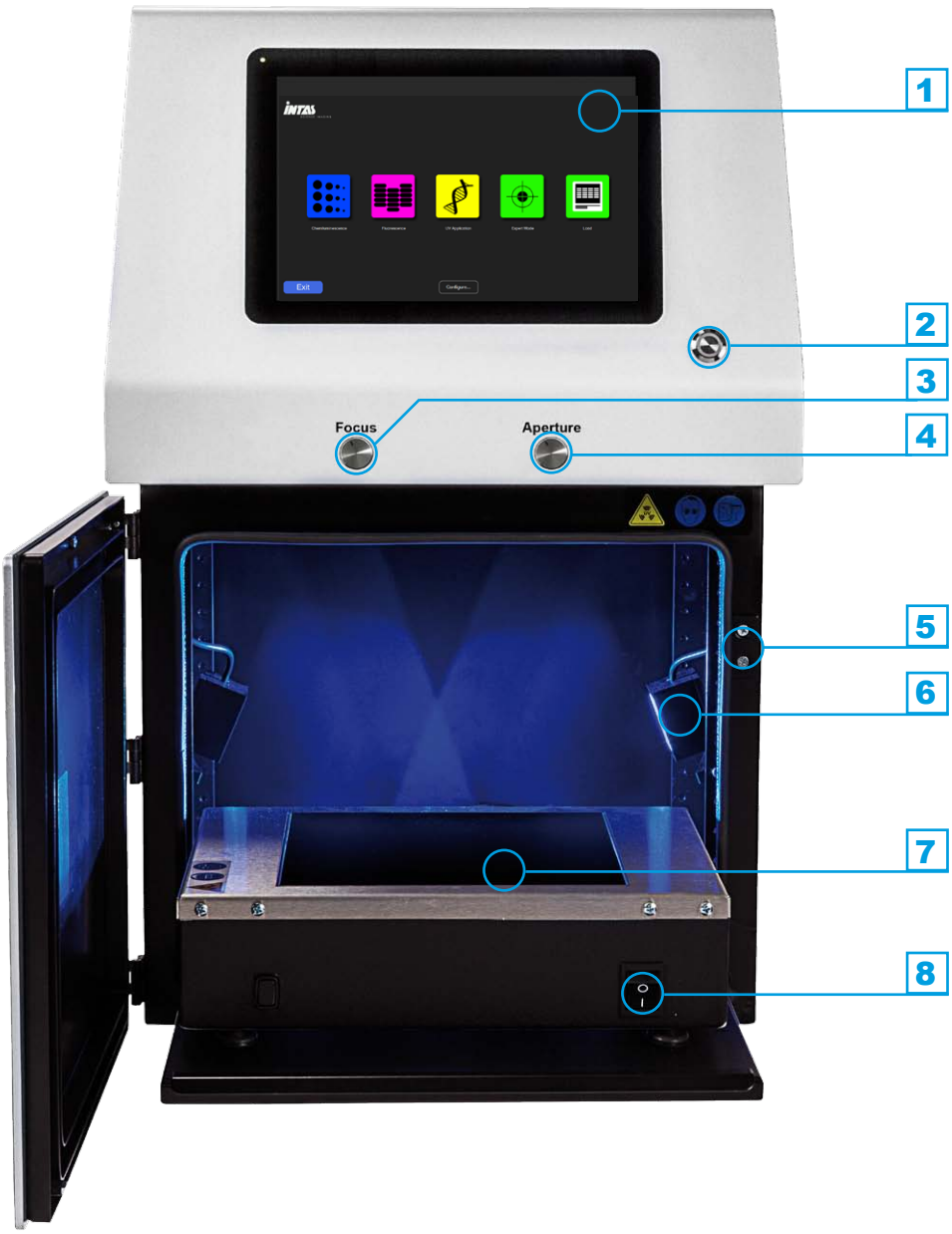
System door is secured by strong magnetic field. Interaction may produce pinch hazards. Magnetic field may interact with certain pacemakers.

Caution!

This instrument may contain a possibly hazardous source of optical radiation. Do not stare at operating lamp. May be harmful to the eye.

Table of Contents

Overview ChemoStar Imager



1.) **Computer touchscreen module**

2.) **Startup button**
Use this button to start the system. You can also use this button for shutting down the ChemoStar Imager.

3.) **Focus button**
Use this button to focus on your sample. Turn counter-clockwise if the sample is close to the lens and clockwise if it is far away.

4.) **Aperture button**
Use this button to open or close the aperture of the lens. Turn counter-clockwise until you reach the stop to fully open the aperture.

5.) **Magnetic door lock**
Please refer to security warnings on pages 2 and 3 for more information.

6.) **LED light cubes**
These are the lightsources for fluorescence illumination.
Optional equipment: will not be present in every unit.

7.) **Transilluminator**
Place your agarose gels onto this surface. Avoid cutting out bands directly on the glass surface. Warning, this is the source of UV hazards.
Optional equipment: will not be present in every unit.

8.) **Power switch transilluminator**
The transillumination unit has its own power switch, which needs to be turned on in order to be used correctly.

How to Install the ChemoStar Touch

Attach the power cable to the connector on the backside of the system. Turn the button to position “I“, as seen on the image to the left.
The ChemoStar imager is now ready for usage.

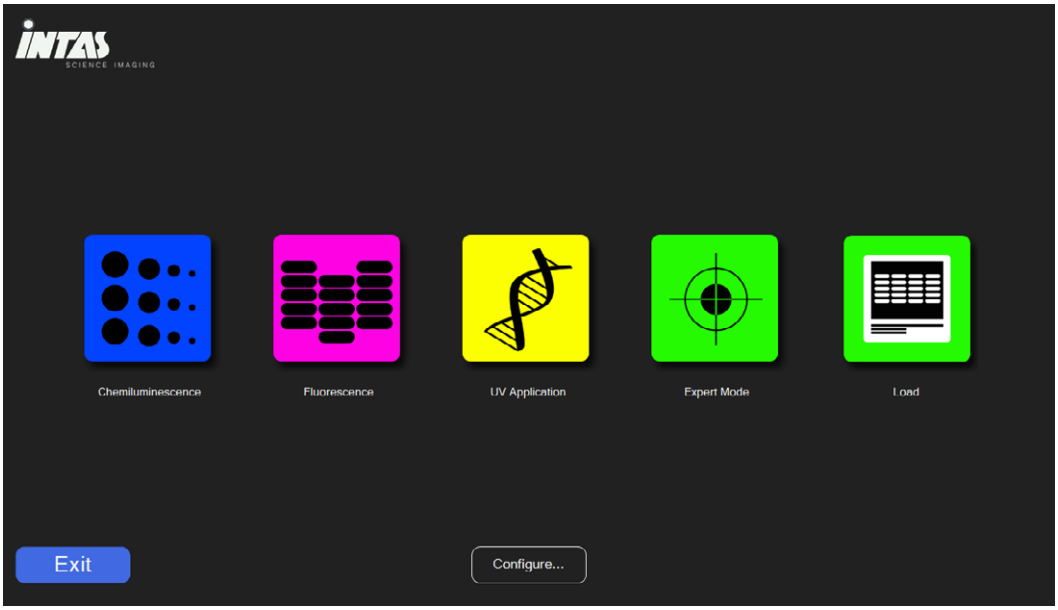
Press the startup button on the frontside of the system to start the internal computer. Image acquisition software can be started after Windows startup by double-clicking on the ChemoStarTS icon on the desktop.

Wiring and Connections

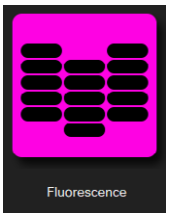
There are three USB A connectors on the backside of the system. You can use them for attaching mouse, keyboard and printer.
You will also find a RJ45 network adapter port for setting up a network cable connection.

On the right handside of the ChemoStar is an USB port for the connection of USB storage devices.

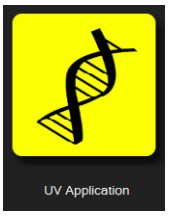
Home Screen Overview



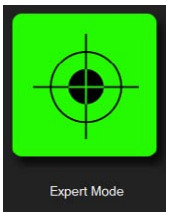
Chemiluminescence
Press this Button to start image acquisition in chemiluminescence mode. You will then get to the live mode window.
This mode is for acquiring images of e.g. Western Blots treated with ECL.



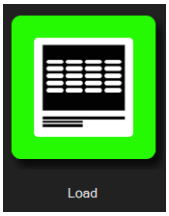
Fluorescence
With this Button you can start image acquisition in fluorescence mode. You will then get to the live mode window.
This mode is for acquiring images of e.g. Western Blots treated with fluorescently labelled antibodies.



UV-Application
Push this Button to get to the mode for acquiring images with a transilluminator.
This mode is for e.g. acquiring images of agarose gels with a UV-transilluminator.

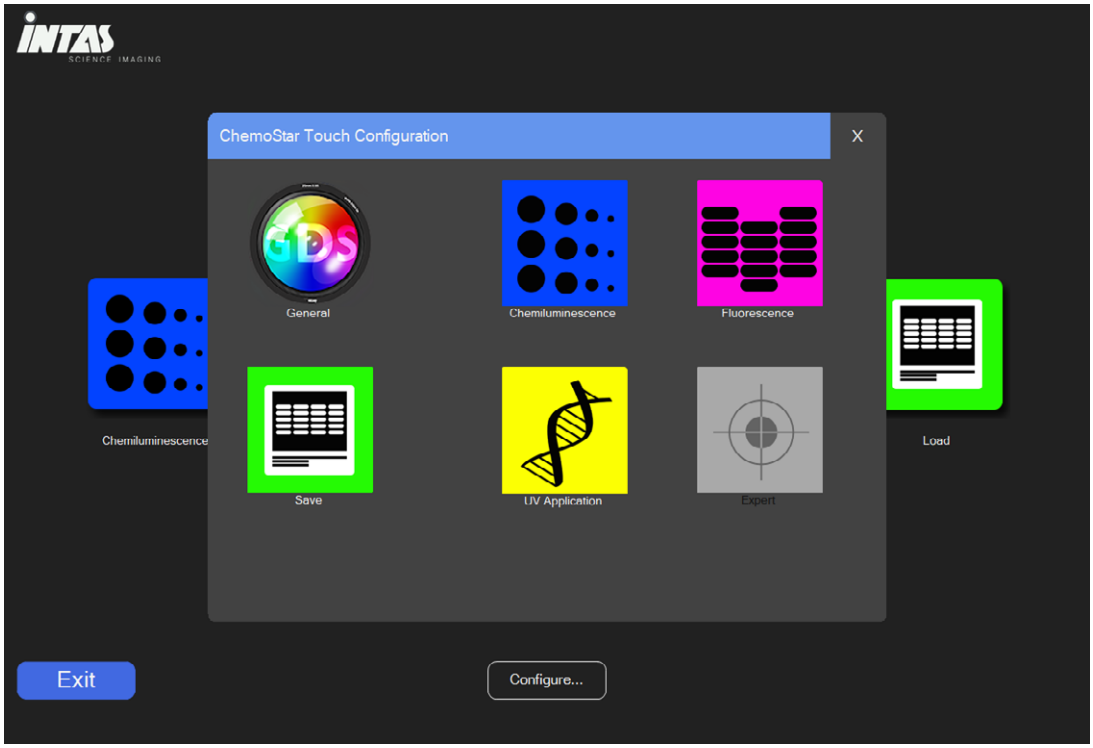


Expert Mode
In the expert mode you will be able to choose freely between different acquisition modes, light sources, filter settings and additional parameters.
This mode is recommended for expert users only.



Load Image
You can load previously generated raw data images using this button. This will enable you to change a variety of visualisation parameters and add annotations.

Configuration



General
The general settings include the activation of the smoothed image display setting for a better visualisation of your data.
If you want to have temporary files of your scans saved, you will have to have the corresponding box checked. These files will be deleted automatically if you save your files on your own, but will remain saved if the software somehow quits unplanned.
If you do not want to have an onscreen keyboard appear in the ChemoStar software, you can check the corresponding box.
Also you can activate the PGP data protection in this menu. Please refer to Intas customer service for more information on this mode.

Chemiluminescence
You can change the standard settings for the chemiluminescence mode.
The standard parameters for the chemiluminescence live mode are an exposure time of 10 ms and a binning of 4x4. Changing the binning will reduce the shown frames per second in live mode.

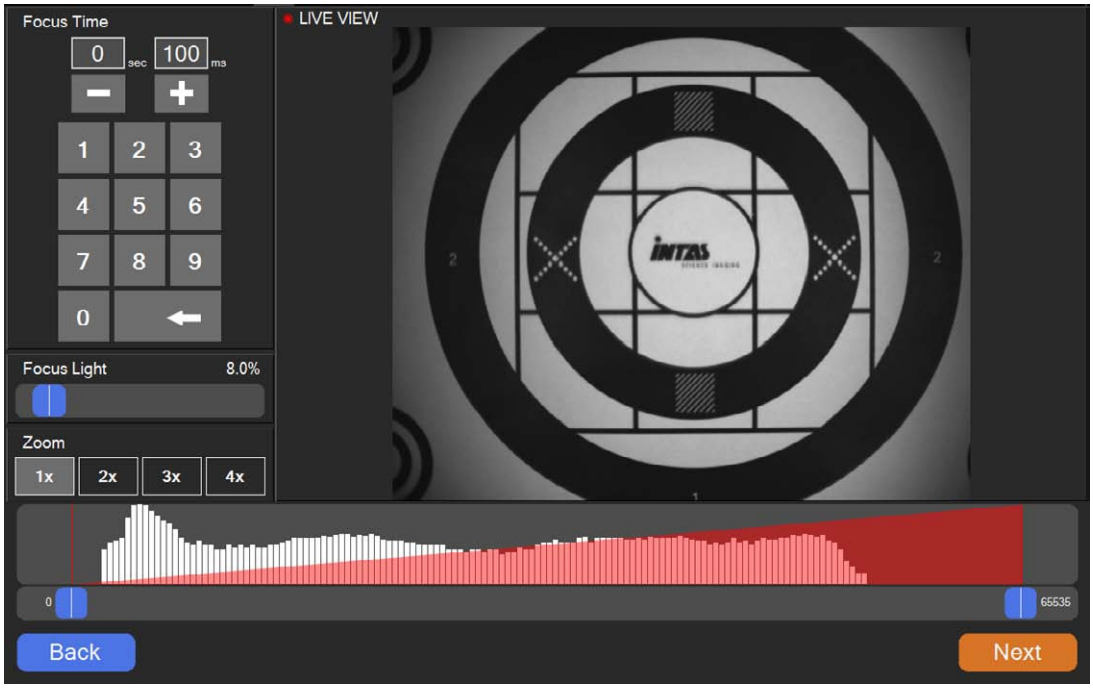
You can also change the settings for the automatic marker image generation.
The standard parameters are 30 ms with a light level of 12%. Increasing the light level or exposure time will result in brighter marker images.

Fluorescence
You can change the standard settings for the fluorescence live mode.
The standard parameters for the fluorescence live mode are an exposure time of 10 ms and a binning of 4x4. Changing the binning will reduce the shown frames per second.

Save
In this menu you can set a designated standard saving folder.
Also, you can choose if the saved values of your files should be the raw data values or the scaled values. Please note that if you change the settings to scaled values, your files will not contain actual raw data anymore.
Furthermore you can choose if an image will be saved the cropped way should you have applied a crop frame.

UV-Application
Here you will be able to change the exposure time and binning mode for the live view of the gel documentation mode. If your images are too bright or overexposed, you can lower the binning to reduce the intensity.
Changing the light source or the emission filter might lead to wrong sample excitation or incorrect filter settings.
Please make sure that the chosen light source and emission filter are the ones designated for this mode.

Live Image View



Live View
If you choose chemiluminescence or fluorescence mode, you will automatically get to the live view window. This mode will enable you to place your sample into the darkroom and align it correctly.
Use the focus button as seen on page 5 to focus on your sample. If using chemiluminescence, ensure that the aperture is fully open by turning the aperture button counter-clockwise until it stops.

Focus Time
You can change the focus time to adjust the light levels of the live image. Increasing the exposure time will reduce the transferred frames per second while increasing the image brightness. The minimal focus time is 10 ms.
You will be able to change the values with the buttons ‘+‘ and ‘-‘, the numeric pad below the focus time display, with the onscreen keyboard or with an attached keyboard.

Focus Light
You can change the light intensity inside the darkroom to adjust the light levels of the live image. Increasing the light intensity will increase the image brightness and vice versa.

Zoom
If your sample size is smaller than the actual field of view of the live mode image, you can use the digital zoom to enlarge it while also reducing the file size.

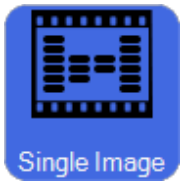
Histogram
The histogram shows you the amount of pixels with a certain saturation level. You can use the sliders to alter the contrast settings of the image:
Left slider: lower contrast level, reduces the background
Right slider: upper contrast level, increases the signal intensity

Back
By clicking on ‘back‘ you will get back to the home screen as seen on page 7.

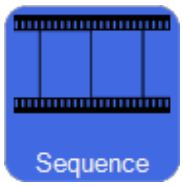
Next
By clicking on ‘next‘ you will get to the parameter settings window of the mode you chose on the home screen.

Chemiluminescence Overview

Automatic Mode
By choosing this mode you will start the automatic image acquisiton. The computer will automatically set the exposure time and will show you the resulting image afterwards.
This mode is the easiest and fastest way to get your image results.

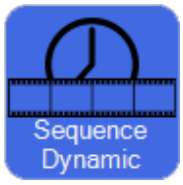


Single Image
With the single image mode you will be able to decide the exposure time on your own. Just type in the desired minutes [m], seconds [s] and miliseconds [ms] using the number pad or a keyboard. You can also choose an automated time.
You can also change the binning mode. The recomended binning mode is 1x1, changing this will reduce the image resolution and increase the sensitivity.



Sequence
The sequence mode will acquire a defined number of images, which can be determined by the user. All of these images will have the same exposure time, but signal intensity will be added up with every image.
A very high amount of images may increase the background levels, hence it is recomended not to do more than five images in one sequence.

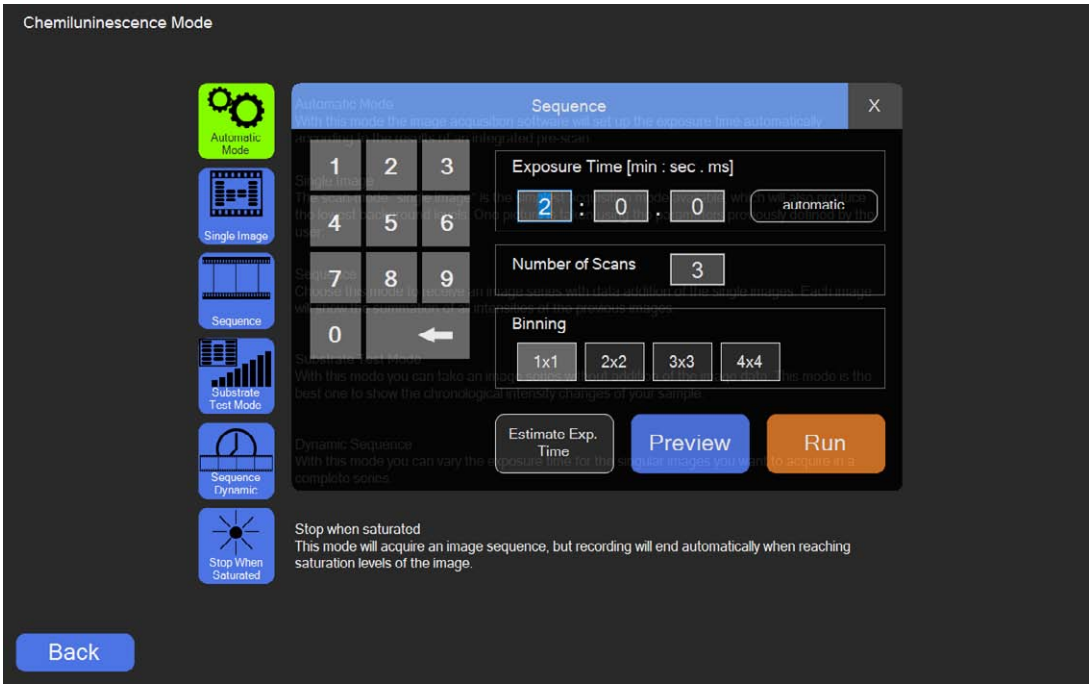
Substrate Test Mode
With this mode the user will be able to acquire a series of images, all having the same exposure time and without any addition of the image data.
Changes seen in the signal intensity in this mode will be due to a change of signal output on the used sample. This way it is possible to test for e.g. substrate stability and needed incubation time.



Sequence Dynamic
With sequence dynamic you will be able to get a series of images with different exposure times. You can set the time freely for up to ten images. Fields left with 0m 0s 0ms will not acquire images.
If you wish to add the signal with every image taken, you have to select 'Data Addition of Images'. A grey background in this button indicates activation.

Stop When Saturated
This mode works just the same way as the sequence mode, the only difference being that this mode automatically stops taking new images if one image reaches the saturation level, even if the number of images box indicated an overall higher number than have been taken already.

Chemiluminescence Overview



Exposure time selection
After choosing an image acquisition mode, you will be able to specify the exposure time. If you are uncertain of the exact exposure time needed for your sample, you can select automatic to use an automatically calculated time.

Number of Scans
If you are using a sequential mode, you can set the number of images to be acquired in this field. This amount of images will then be recorded, each image with the exposure time stated above.

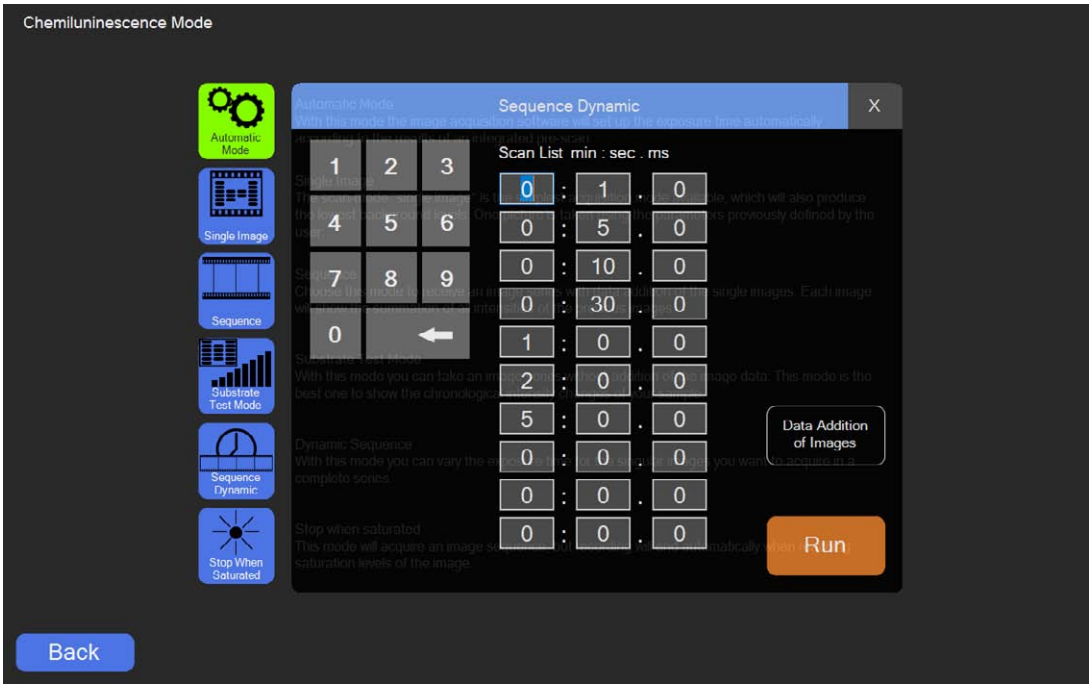
Binning
You can choose between four different binning modes. The recommended setting is 1x1 for maximum image quality. Using higher binning modes will reduce the image resolution drastically, but will also increase the sensitivity.

Estimate Exposure Time
If you want to calculate the optimal exposure time needed you can use this button. The calculated time will afterwards be shown in the Exposue Time dialog.

Preview
With this feature you can receive a preview of the resulting image with the current exposure time settings. the image acquisiton time for the preview image will be one sixteenth of the actual exposure time. You can also use the Histogram in the preview image. Close the preview by pressing on ‘X‘.

Run
Use this button to start the image acquisition process.

Chemiluminescence - Sequence Dynamic



Sequence Dynamic
In this image acquisition mode you can choose different exposure times for a set of up to ten images. These images will be recorded after you press the ‘run‘ button.

Should you wish to have the signal intensities added up with every image, you can activate the ‘Data Addition of Images‘ button. Activation is indicated by a grey background.

Image View

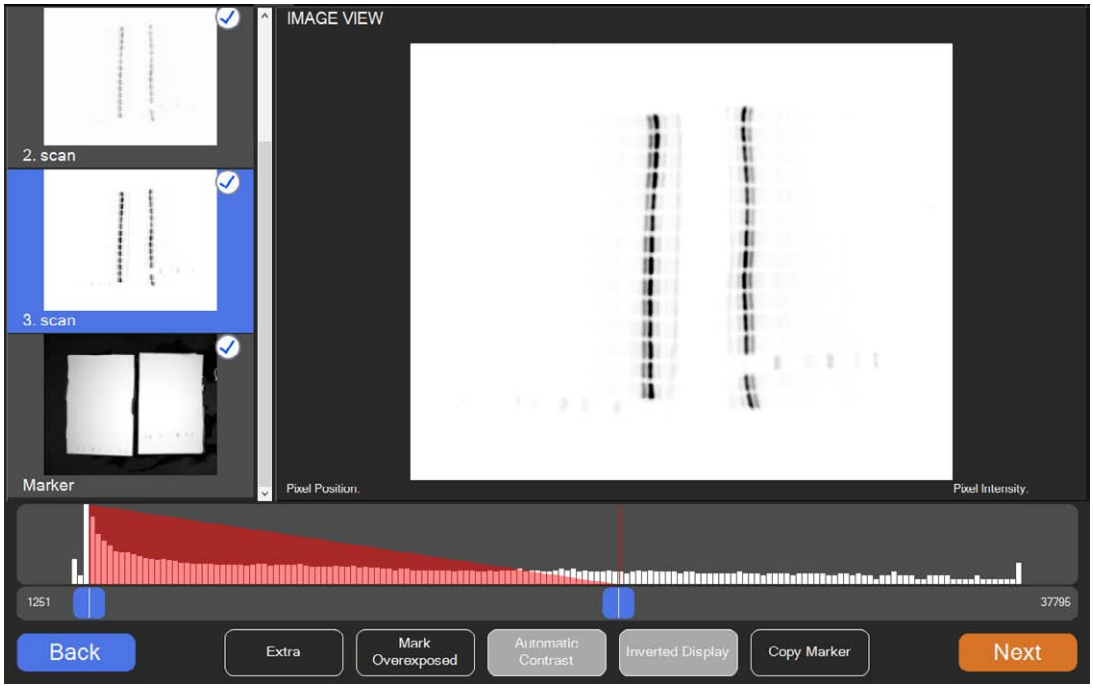
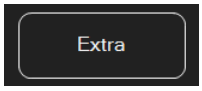


Image Gallery
On the left side of the software you will find the image gallery, presenting all of the acquired images. You can select different images, the selected image will be shown in the larger ‘Image View‘ window on the right.

Image View
On the right side there is the image view window, presenting the selected image. If you place your mouse cursor over the image or press the touchscreen, you will get the pixel position and pixel intensity values of that exact position.

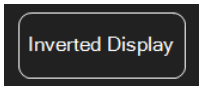
Histogram
The histogram shows you the amount of pixels with a certain saturation level. You can use the sliders to alter the contrast settings of the image:
Left slider: lower contrast level, reduces the background.
Right slider: upper contrast level, increases the signal intensity.
You can also click on the numbers on the left and the right side to define the borders directly.



Extra
This Button will enable you to perform a set of different features.
Despeckle: This feature will delete cosmic rays and speckles that occured during the image generation process.
Crop: For more information on cropping please refer to page 14
Annotation: For more information on how to annotate your image please refer to page 14

Mark Overexposed
If this button is activated (grey background), saturated pixels in your image will be marked red.

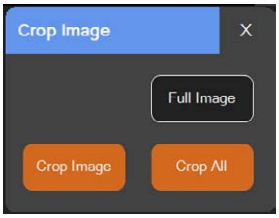
Automatic Contrast
This feature will set the contrast levels to automatically calculated values and will move the sliders of the histogram automatically.



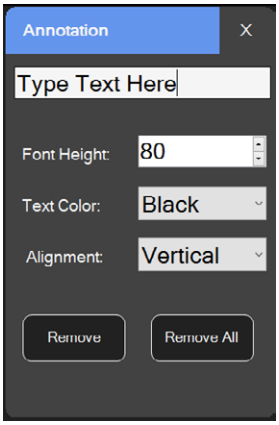
Inverted Display
With this function you can invert the black and white values of the image.

Copy Marker
For more information on how to copy a prestained marker from the ‘Marker‘ image please refer to page 14.

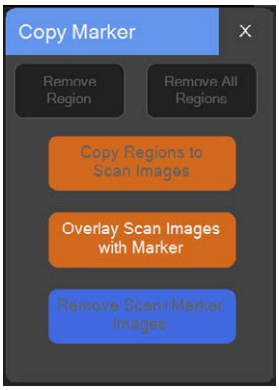
Image View



Crop
With this function you can decrease the size of the image and delete un-needed parts.
If you have clicked the button ‘Crop‘, a coloured frame will appear over your image. Click and hold the small squares in the corners of that frame to move and adjust it to the size you need it.
Select ‘Crop Image‘ to crop the image that was selected when you first entered the cropping mode.
Select ‘Crop All‘ to crop all of the existing images in the gallery.
If you click on ‘Full Image‘, you will readjust the coloured frame to the full image dimensions.
Press ‘X‘ to leave the cropping mode.

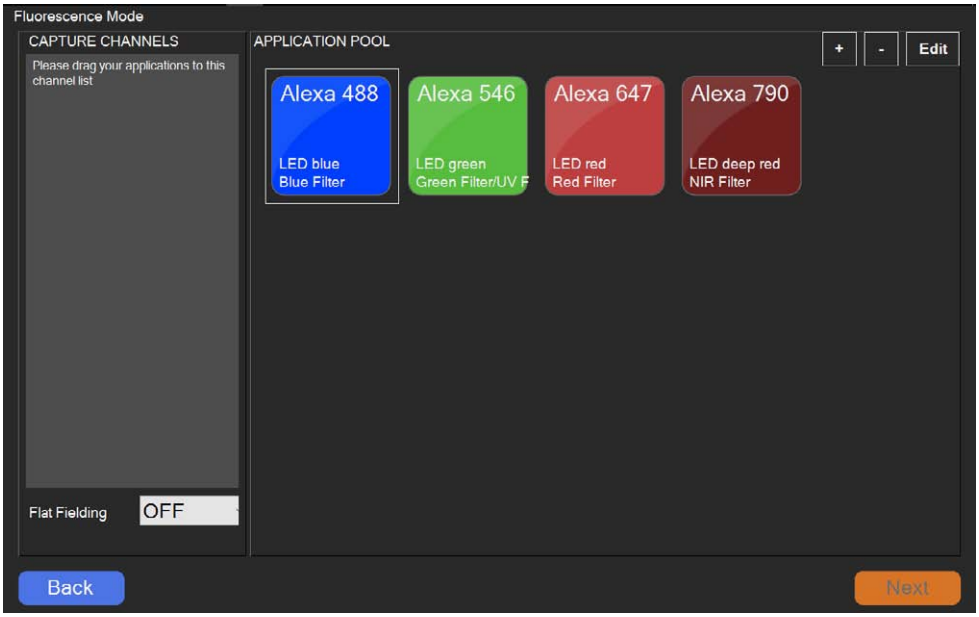


Annotation
This tool enables you to annotate your image directly. Please note that these annotations will not be saved to the raw data.
Type your annotation to the designated text field and place it by clicking directly to the spot where you need the annotation in your image. A field containing the text you entered will appear, marked with a frame. You can move this field, change the font size, text color and alignment if needed.
You can also select previously placed text fields by clicking on them.
‘Remove‘ will delete the selected text field.
‘Remove All‘ will delete all existing text fields.
Press ‘X‘ to leave the annotation mode.



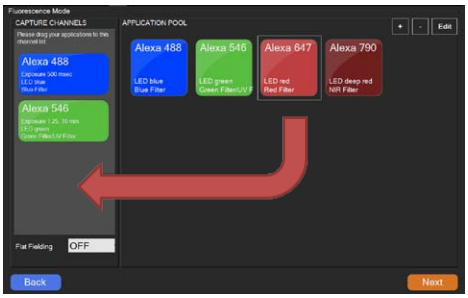
Copy Marker
With this function you can copy the prestained marker of your membrane from the ‘Marker‘ image to your signal image.
You can choose two ways of adding a marker: Creating an overlay with the complete marker image and copying only a region of it.
To create an overlay simply press the button ‘Overlay Scan Images with Marker‘. Please note that the image created this way can no longer be quantified, since the sample data will be compromised this way.
Should you desire to copy a regional part of the marker image to another image you will need to create a frame on the marker image by clicking in the image and pulling the frame to the desired size. You can adjust the size of the frame by clicking and holding the small squares in the corners. If desired you can create more than one region this way.
Afterwards you can copy the regions set up this way by pressing the button ‘Copy Regions to Scan Images‘.
If you want to delete a selected region you can do this by pressing the corresponding button, using the button ‘Remove all Regions‘ will delete all frames created for regional transfer.
Press ‘X‘ to leave this mode.

Fluorescence Overview



Fluorescence Mode

After placing your sample correctly in live mode you will be transferred to fluorescence mode. Under the label ‘Application Pool‘ you will find the already existing fluorescence applications of your imaging device.



Choose the desired fluorescence channels and drag them to the capture channels list on the left side of the window.

If you click on next these channels will be imaged with the predefined settings one after the other.

You can also choose to activate the flat fielding setting. If you have the need of information about this feature please contact Intas‘ customer service.

You can delete an existing fluorescence application by selecting it and afterwards pressing ‘-‘. If you want to add a new application please press ‘+‘.

If you want to change the configuration of one of the applications, you have to select it and then press ‘edit‘. The editing window will then open.

You can change the name of the application by editing it in the name field.

Choose the desired exposure time for the application or set it to automatic exposure.

You can choose the emission filter for this channel from the list of available filters and the excitation light source from the list of available light sources. Save the changes by pressing ‘Modify‘, cancel by pressing ‘X‘.

Back

By pushing this button you will go back to the live mode.

Image View Fluorescence

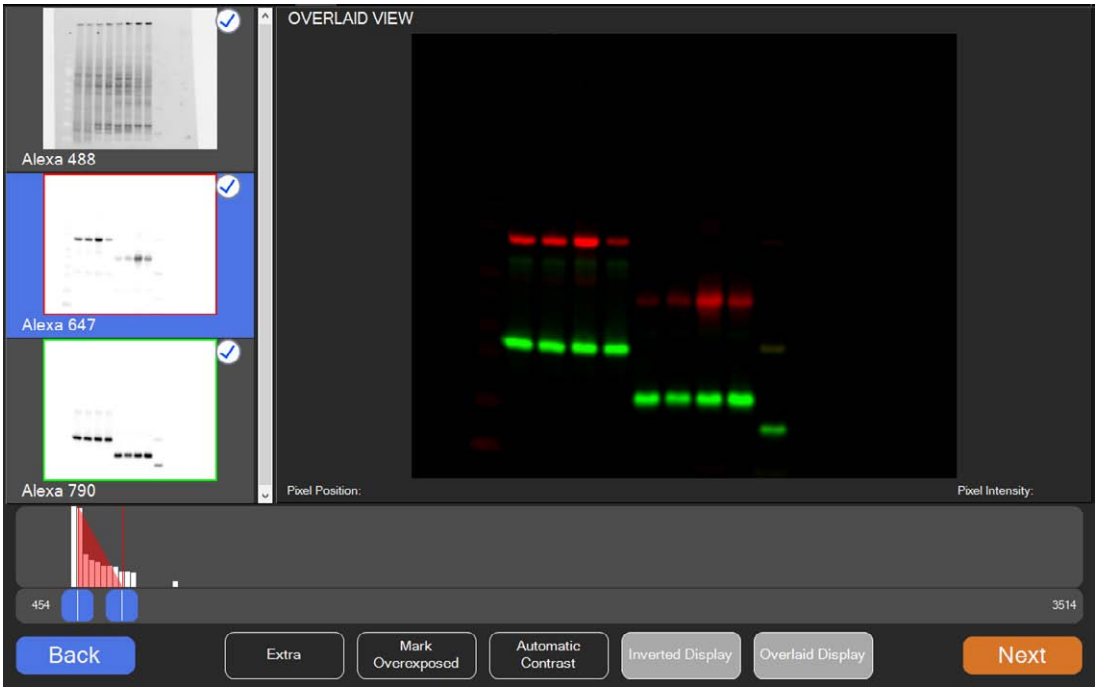
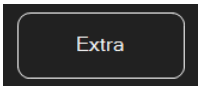


Image Gallery
On the left side of the window you will find the image gallery, presenting all of the acquired images. You can select different images, the selected image will be shown in the larger 'Image View' window on the right. Note that all images will have a small frame representing the false color this channel will have in the image overlay.

Image View
On the right side there is the image view window, presenting the selected image. If you place your mouse cursor over the image or press the touchscreen, you will get the pixel position and pixel intensity values of that exact position.

Histogram
The histogram shows you the amount of pixels with a certain saturation level. You can use the sliders to alter the contrast settings of the image:
Left slider: Lower contrast level, reduces the background.
Right slider: Upper contrast level, increases the signal intensity.
You can also click on the numbers on the left and the right side to define the borders directly.

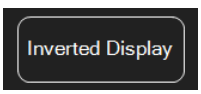


Extra
This Button will enable you to perform a set of different features.
Crop: For more information on cropping please refer to page 14
Annotation: For more information on how to annotate your image please refer to page 14
Channel Color: Please refer to the following paragraph.
Inverted Overlaid: You can switch the background color of your overlay image from black to white with this setting.

Channel Color
You can choose the color you would like every fluorescence image to have in the overlay from the list shown on the left. Also you can choose to exclude images.

Mark Overexposed
If this button is activated (grey background), saturated pixels in your image will be marked red.

Automatic Contrast
This feature will set the contrast levels to automatically calculated values and will move the sliders of the histogram automatically.



Inverted Display
With this function you can invert the black and white values of the image.

Overlaid Display
Press this Button to receive the overlay of all active false color assigned channels in the image view window.

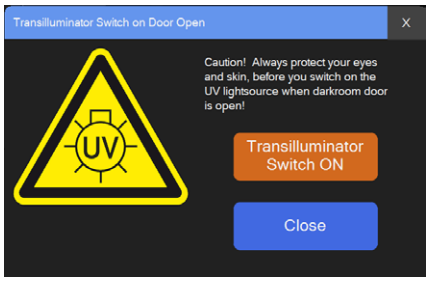
UV-Application

UV-Application
The UV-application is designed to enable you with the documentation of a variety of samples, e.g. agarose gels, coomassie gels or colony plates.
Please note that you do not necessarily need an actual UV light source to use this mode and that you might need additional equipment for different applications. Please contact Intas‘ customer support if you have any questions about possible uses of this mode for your experiments.

Live View
If you choose this mode, you will automatically start live image acquisition. This will enable you to place your sample into the darkroom and align it correctly.
Use the focus button as seen on page 5 to focus on your sample.

Focus Time
You can change the focus time to adjust the light levels of the live image. Increasing the exposure time will reduce the transferred frames per second while increasing the image brightness. The minimal focus time is 10 ms.

Transilluminator Switch ON
Press this button to turn on the light source designated for this mode. This does not necessarily need to be a transilluminator. If the system door is shut, this will turn on the light source.



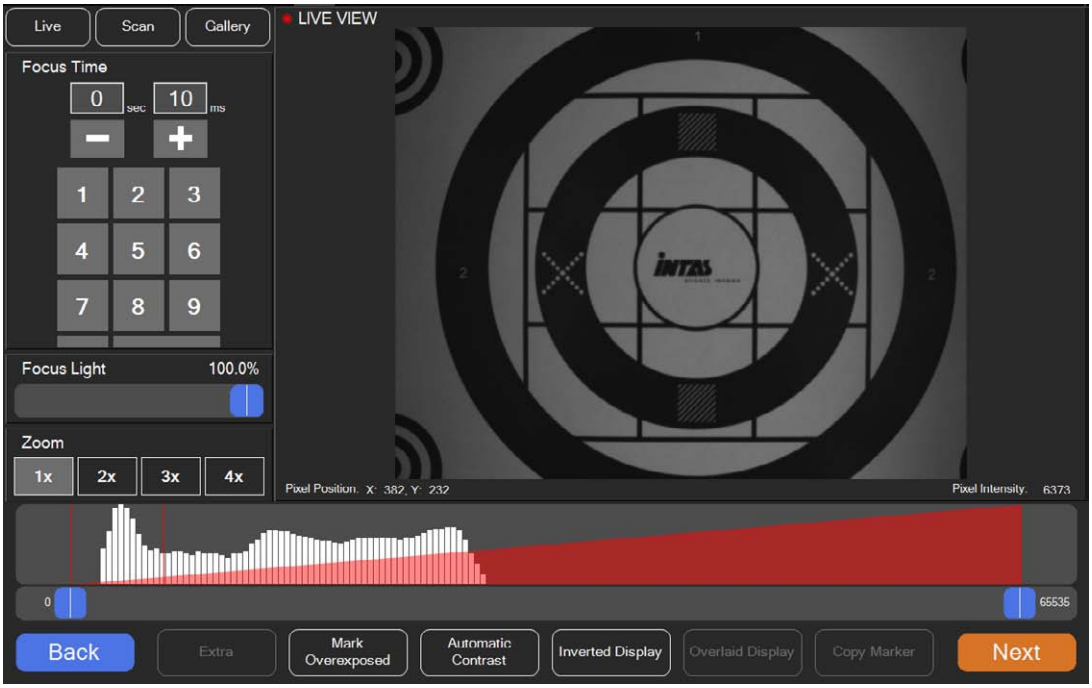
If you have the system door opened, there will be a warning screen appearing where you can then turn on the lightsource. If you have a UV light source in your imaging device, make sure your are sufficiently protected before turning on the UV light with the door opened.
Pressing close will return you to the home screen.

Zoom
If your sample size is smaller than the actual field of view of the live mode image, you can use the digital zoom to enlarge it while also reducing the file size.

Histogram
The histogram shows you the amount of pixels with a certain saturation level. You can use the sliders to alter the contrast settings of the image:
Left slider: lower contrast level, reduces the background
Right slider: upper contrast level, increases the signal intensity

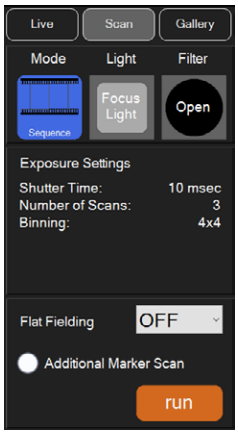
Next
By clicking on ‘next‘ you will start the image acquisition process. You will then be transferred to the image view window as seen on page 13.

Expert Mode



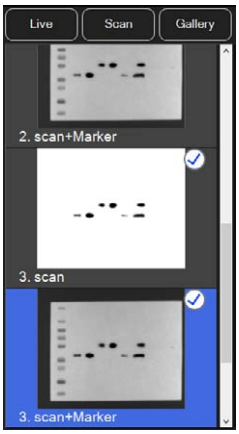
Live View

If you choose expert mode, you will automatically get to the live view window. This mode will enable you to place your sample into the darkroom and align it correctly.
Use the focus button as seen on page 5 to focus on your sample.



Scan

In expert mode, you can choose between 5 different scan modes. Please refer to the explanation on page 10 for more information. Click on the ‘Mode‘ image to select the settings needed for your experiment. Click on ‘Light‘ to select a lightsource and on ‘Filter‘ to select one of the emission filters present in your imaging device.
To change the exposure settings, click on the corresponding part of the scan setup. You will be able to change the exposure time, number of scans and binning in the newly opened window.
If you wish to apply a flat field correction, you can select it in the pull-down menu ‘Flat Fielding‘. For more information on this process please contact Intas‘ customer service.
Should you wish to acquire an additional photography of your sample, you can select ‘Additional Marker Scan‘. To start the image acquisition process choose ‘run‘.



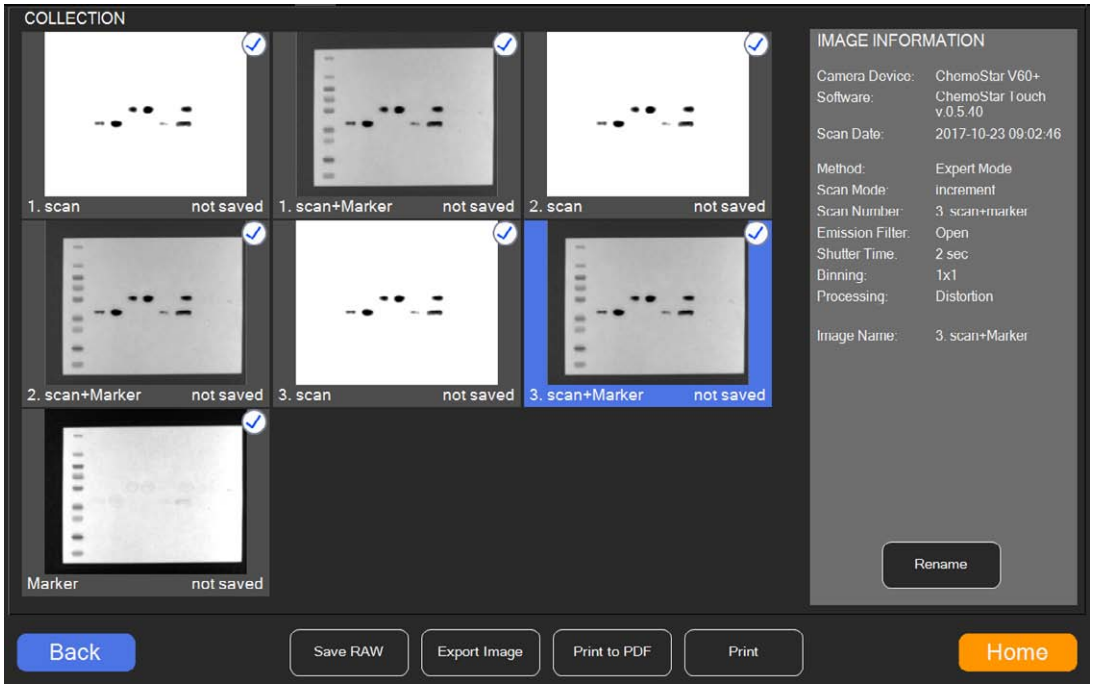
Gallery

After a successful image acquisition, you can press the button ‘Gallery‘ to select and edit the set of images. The different editing tools are described on pages 13, 14 and 16.

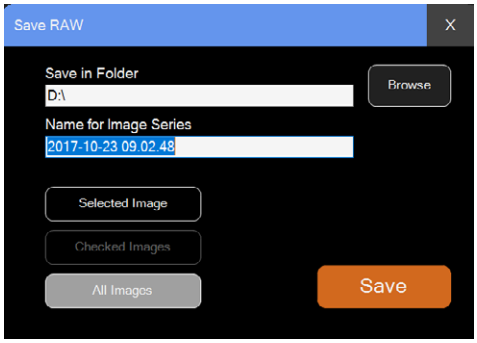
Histogram

The histogram shows you the amount of pixels with a certain saturation level. You can use the sliders to alter the contrast settings of the image:
Left slider: lower contrast level, reduces the background
Right slider: upper contrast level, increases the signal intensity
You can also click on the numbers on the left and the right side to define the borders directly.

Image Collection and Saving



Collection Overview
In this window you will see an overview over all images created during the scanning process. You can select different images to view the corresponding image information in the right part of this window. This meta data will also be saved in the raw data files and can be shown when loading previously created images into the ChemoStar software.
You can choose different ways of saving your results.
By choosing ‘Save RAW‘ you will be able to save the non-contrast enhanced raw data files of your experiment. These images will be saved as 16 bit monochromatic .tif files.
By choosing ‘Export Image‘ you can select to save the contrast enhanced, annotated and edited images to different file formats, meaning .jpeg, .png and 24 bit .tif files.
If you select ‘Print to PDF‘ you can save your images with the image information as seen on the right and the specific contrast settings to a single .pdf file.
If you have a printer connected to your imaging device, you can also directly print the generated images by selecting ‘Print‘. Please note that the printer must be selected as the standard printer in the Windows settings.
If you want to rename singular images of your experiment, you can select them and then press the ‘Rename‘ button.

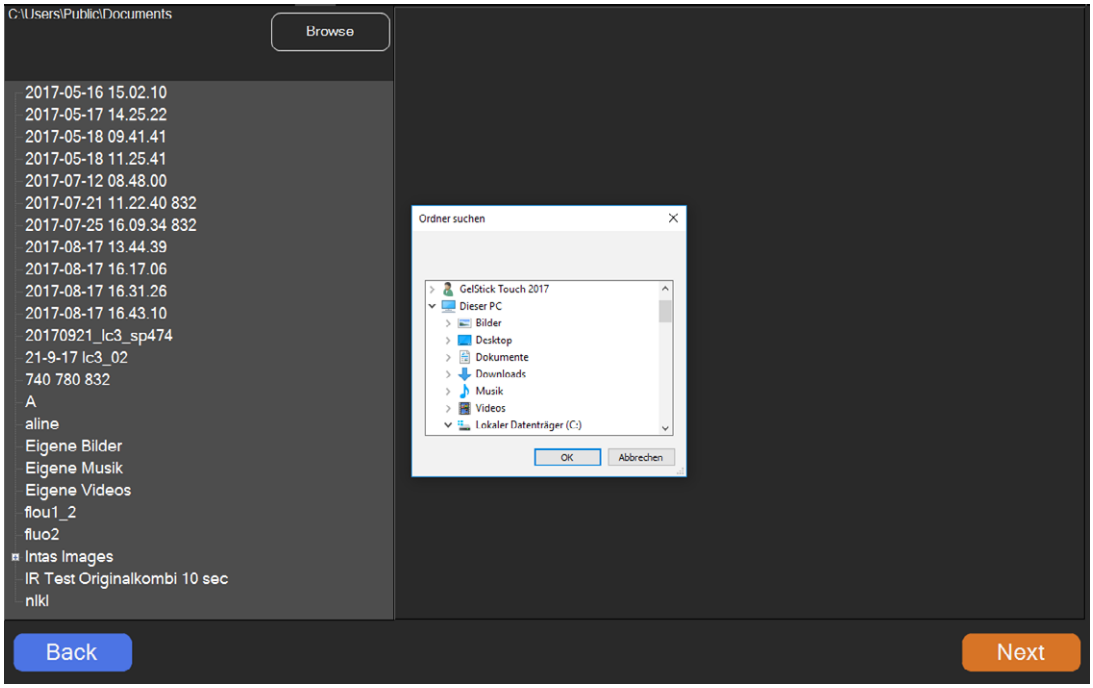


Saving
You can select the folder to save your results in by clicking on ‘Browse‘. If you do not type in a name for your image series, it will be saved with the current date and time as the file name.
You can select to only save the selected or all images. If you want to save more than one image, but not all of them, you can leave the images to save checked in the top right corner and afterwards select ‘Checked Images‘ in the saving window.

Home
By clicking on ‘Home‘ you will get back to the home screen as seen on page 7.

Back
By clicking on ‘back‘ you will get back to the expert mode screen as seen on page 18.

Load Images



Load Images
With this mode you can reload existing raw-data projects into the ChemoStarTS software. You can browse for projects using the Windows file browsing system by clicking on ‘Browse‘.
You can also browse through your file system using the file list on the left side of the window.

Next
By choosing ‘Next‘ you will get to the image view screen as seen on page 13. There you can view the images included in the selected project and edit them.

Back
By clicking on ‘Back‘ you will get back to the home screen as seen on page 7.

Instrument specifications

Specification	ChemoStar Touch
Dimensions (L × W × H)	475 mm x 500 mm x 830 mm
Instrument clearance (Back)	120 mm
Weight	55 Kg
Voltage	100 - 240 V
Fuse	2.5 A delay-action / 5 x 20 mm
Rated frequency	50/60 Hz
Rated power	250 Watts