Roundshot D2x / D2xs
Software release: *3.2 (February 2010)*

Instruction Manual

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Impressum

1. System Overview

1.1 Roundshot D2x

①	Lens tube / lens mount	⑨	Ethernet cable/connectors (a/b)
②	Water bubble indicator	⑩	Motor
③	Lens tube / lens mount	⑪	LED (control light)
④	Lens brackets	⑫	On/off, start/stop button
⑤	Lens	⑬	Socket for external starter cable
⑥	Tilt break	⑭	Socket for external power cable
⑦	Tilt plate	⑮	Ethernet plug (to computer)
⑧	Power cable/connectors (a/b)	⑯	Battery

1.2 Computer / tablet PC

The camera is controlled by a connected computer (tablet PC) which also serves to visualise and store the images. For best convenience we recommend using a tablet PC with touch screen, for example a Motion Tablet PC or an Apple Mod Book by Axiotron.

It is also possible to use the camera with other computers. Important factors when selecting a suitable computer are:

- speed of operating system (32-bit or 64-bit) – ideally 64-bit machines
- speed of the processing unit (dual core, quad core)
- available RAM,
- Gigabit Ethernet (for fast image transfer)
- size and speed of the hard disks (preferrably fast SSD drives for fast image saving)

Currently the following operating systems can be used (both 32-bit and 64-bit):

- Windows XP
- Windows VISTA
- Windows 7

With Intel processors only:
- Mac OS 10.5
- Mac OS 10.6

1.3 Accessories

Tablet PCs and accessories:

Motion J3400

Mobile Keyboard for Motion J3400

Battery charger

Power supply

Laptop holder to attach on a tripod

NiMh battery 12V 4.5A

USB GPS device: GlobalSat BU-353 USB

1.3 Accessories (continued)

Power plugs for different countries:

Continental Europe

United Kingdom

North America (USA,
Canada, Mexico) & Japan

Australia & New Zealand

Various additional accessories:

Starter cable

2. How To Get Started

2.1 Step 1: Get the computer ready

2.1.1 With tablet PC (supplied with camera)

For cameras supplied with a tablet PC the Seitz Roundshot capture software is already installed on the tablet PC and the network configuration is complete.

Start the tablet PC by pulling the on/off lever on the top left side of the computer. The start-up takes approximately one minute:

„ALT+CTRL+DELETE" socket

„on/off" lever

The tablet PC is operated with the supplied digital pen via touch screen. To activate the „right mouse click" press the button and hold:

„right mouse click"

When the computer has been idle and goes to standby, it can be reactivated by pulling the on/off lever.

If a password for the tablet PC has been set and the tablet PC is already part of a domain, stick the digital pen into the „alt+control+delete" socket on the upper left of the tablet PC. Then the logon screen will appear. For tablet PCs with password and without domain the password prompt screen will appear directly.

electronic keyboard

Activate the electronic keyboard by selecting the icon on the lower left corner of the screen and enter the password. The standard password is „roundshot". For security reasons please change the password to your own once logged on.

We discourage the use of the fingerprint reader as it can result in a complete blockage of the tablet PC.

2.1 Step 1: Get the computer ready

2.1.2 With all other computers

For all other computers download the latest software version from the „Club D3" website (www.roundshot.ch) and load the Seitz Roundshot installer program (exe) on **your computer. For more information on how to access the „Club D3" website please** refer to section 6.4.

Important: Make sure to install the software using an account which has administrator rights.

SeitzRoundshot-3.2-windows-installer.exe

Double click the icon. The program set-up will start automatically and the software will be installed in the following directory:
C:\Program Files\Seitz\Digital3

The program directory contains two folders:
• HMI (Human Machine Interface)
• PDS (D3 Imaging Server)

The „Human Machine Interface" represents the graphical user interface by which the **camera is controlled and the images are displayed. The „D3 Imaging Server" handles** all image data.

Create the following shortcuts on your desktop:

Seitz Roundshot — Starts the Seitz Roundshot capture software

images — Shortcut to the Digital3 images folder
(to C:\Program Files\Seitz\Digital3\PDS\images)

2.1 Step 1: Get the computer ready

### 2.1.2 With all other computers (continued)

Deactivate User Account Control for Windows VISTA

Windows VISTA has an additional security layer built in which prompts the user before execution of an application. To run the Seitz Roundshot capture software this additional security layer needs to be turned off. Open control panel, select user **account, select "Turn user account control on or off", deselect the "Use user account control":**

deselect

Set up gigabit ethernet controller for maximum speed (Windows XP or VISTA)

By default the gigabit ethernet controller card in Windows XP or VISTA is set to maximum battery saving. To connect to the camera quickly and to allow a maximum transfer speed it is necessary to change the battery speed and link detection speed. Open the device manager, right mouse-click on properties of the gigabit ethernet **controller, select tab "Advanced":**
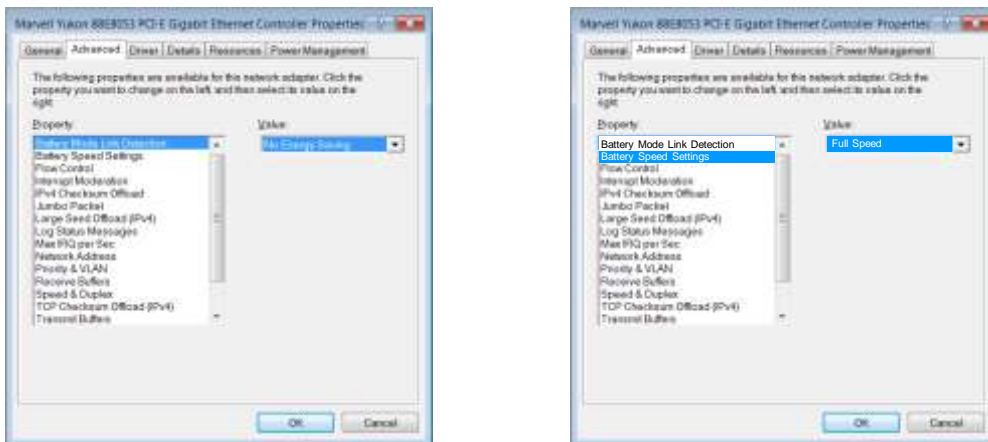
Turn off all non-essential computer functions and adjust screen brightness

Functions such as WLAN and bluetooth are not essential for image-taking and should therefore be turned off. This can be done most easily in the computer BIOS when **starting up the computer (for tablet PCs right mouse click, select "BIOS"). The screen** settings for a Motion tablet PC can be set using the Motion dashboard (click button on the right of the screen).
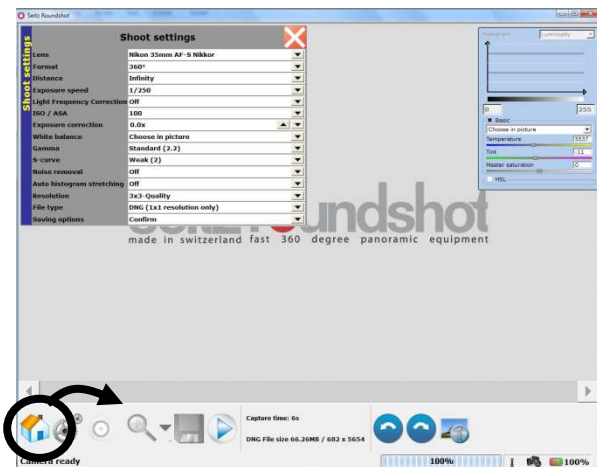
2.1 Step 1: Get the computer ready (continued)

2.1.2 With all other computers (continued)
Start the Seitz capture software by double-clicking the shortcut on the desktop:

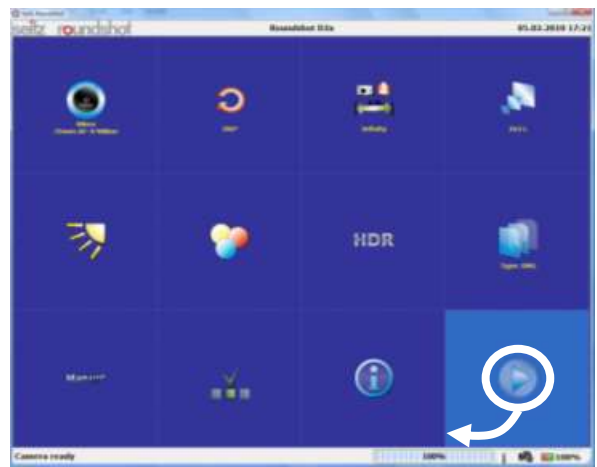Seitz Roundshot

The software opens directly in the **"Shoot"** menu:

Shoot menu   Parameter menu

The **"Shoot"** menu is used for image taking, viewing (preview), editing (raw conversion, post production) and finally saving. All previously defined values for image taking and post-processing can be accessed in the "Shoot settings" drop down list for quick control.

The **"Parameter"** menu is used for programming personalised values (for example, special rotation angles, distances etc.) or for accessing additional special functions. These values are grouped by features (lens, format, distance, resolution, exposure, colour, focus, file, manage, optimisation and file info).

To navigate from the **"Shoot"** menu to the **"Parameter"** menu press

To navigate from the **"Parameter"** menu to the **"Shoot"** menu press

2.1 Step 1: Get the computer ready (continued)

Press the „power on" button on the camera to start the camera connection process. The network connection icon shows the ongoing process. A network pop-up confirms that the connection is established.

The green LED (previously continuous green) now starts to blink. The connection is confirmed in the capture software by the **„Camera ready"** message which appears in the lower left hand corner of the software. At the same time a small yellow pop-up window showing the camera MAC address and IP will appear in the lower right hand corner of the software:

Camera Ready

Connected Camera:
MAC 00:50:c2:5e:30:1a
IP   10.0.0.80
Version V1.07- V1.2

If the camera connection cannot be established automatically the **"Camera not connected"** message appears in the lower left hand corner of the software:

Camera not connected

In the **"shoot"** menu place the mouse over the camera connection icon:

The software searches in the network for available cameras and displays them in a list (with their IP numbers):

Roundshot D3 (IP 10.0.0.80)
Roundshot D2x (IP 10.0.0.88)
Roundshot D2xs (IP 10.0.0.89)

Click on the camera name to start the connection.

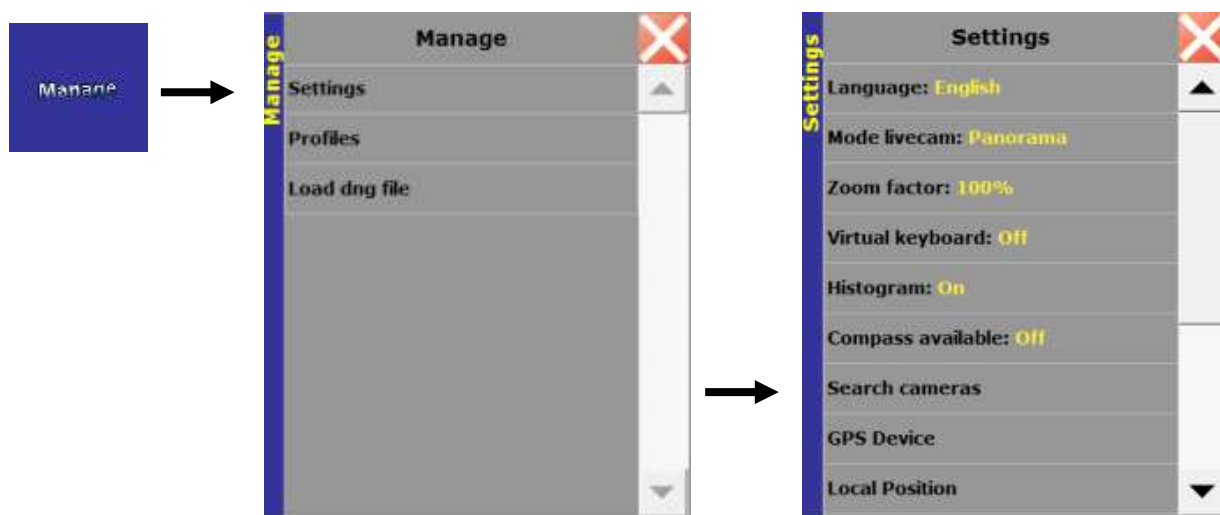It is possible to change the IP of the camera in the pop-up window.

Establish the camera connection by confirming with **"OK"**.

Connect to Camera

IP Address:
10.0.0.80

OK   Cancel
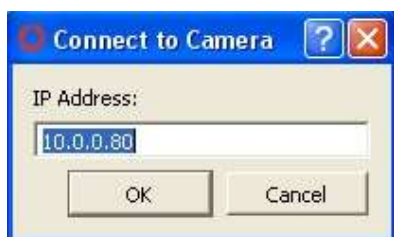
2.1 Step 1: Get the computer ready (continued)

The connection can also be managed in the **"Parameter"** menu:

Go to **"Parameter"** menu, **"Manage/Settings/Search cameras"** to detect the camera within the network:

When the camera connection is detected, the camera is displayed in the list. In a network with more than one camera a list of cameras will be displayed. Choose the **camera by clicking on "Roundshot D2x". Click on "connect to camera"** to establish the connection:

Confirm by pressing the ![X] button.

Important: this step may also be necessary when the Seitz Roundshot capture software has been reinstalled or updated.

2.1 Step 1: Get the computer ready (continued)

If the camera cannot be detected, open the network properties and check the settings. It is important that the network uses an IP in the same range (but not identical) as the IP of the camera and that both are located in the same subnet:

Open network connections of your computer.
Open LAN connection.
Choose „internet protocol TCP/IP" and „properties".
Choose „fixed IP" and enter the following IP address: 10.0.0.68
Subnet mask: 255.0.0.0

If you would still like to connect to internet while working with the camera, then set the same standard gateway network IP as your network (for example 192.168.178.xx), the same subnet (for example 255.255.255.0) and the same DNS server (for example 192.168.178.11). Ask your system operator for assistance.

It is also possible to change the camera IP to bring it into a desired range (for example: 192.168.178.xx). It is important that the computer TCP/IP properties has the same IP range than the camera (for example: 192.168.178.10). By clicking on **„change IP"** the IP address on the camera is changed:
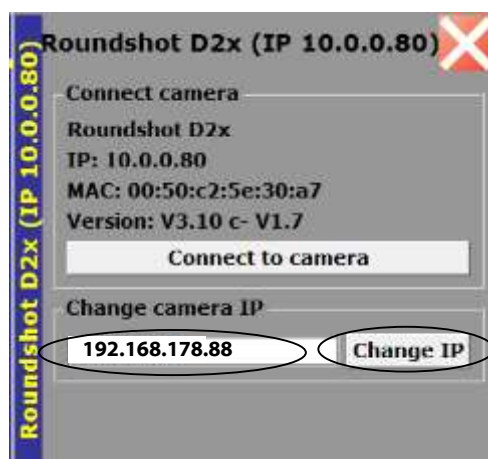
2.2 Step 2: Select shoot settings

Press   ▷   to navigate to the **"Shoot"** menu.

The next step consists in defining the parameters for image taking. Here is an example of possible settings for a first image:
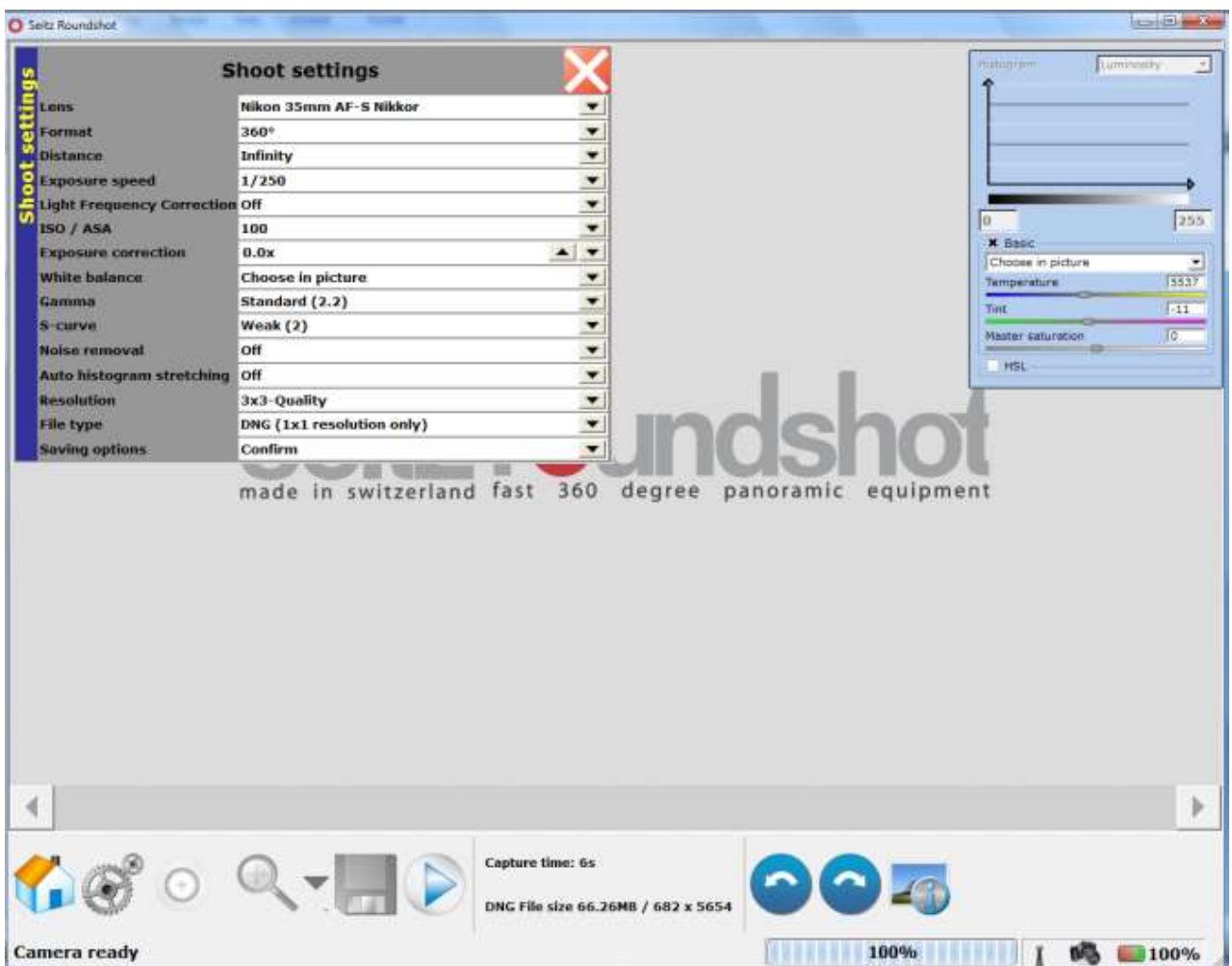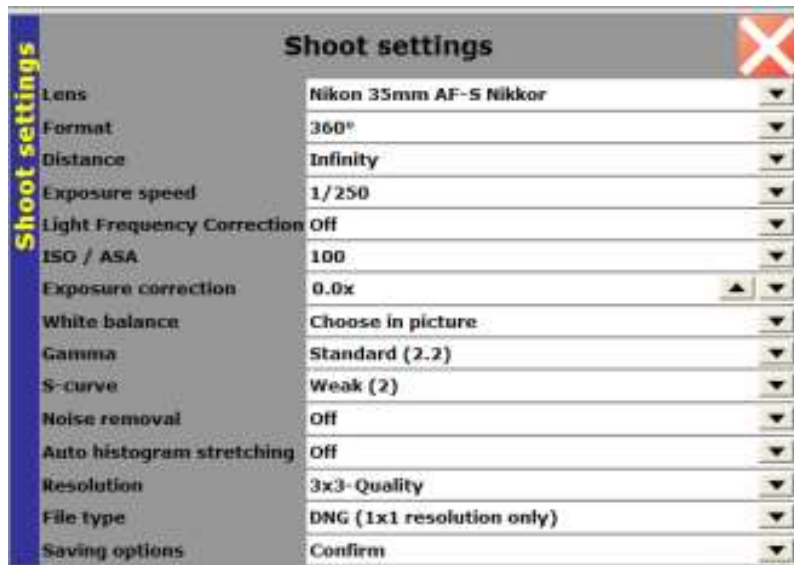

If the desired values are not in the list (a lens, a specific format, etc.) press
and program/select the values in the **"Parameter"** menu. For more detailed
information on image parameters and software functions please consult section 3.2
"Parameter menu".

Press   ▷   to start a scan.

2.3 Step 3: Adjust your settings

 Press the „shoot settings" button to adjust the image parameters:

For example, change the image angle, the exposure speed or the sensitivity of image capture (ISO/ASA).

Create another scan.

 Focus **with the focusing assistant, don't forget to adjust the distance** setting in the software.

 Zoom to check the sharpness.

Repeat these steps until the image is perfect.

2.4 Step 4: Save the image

 Save the image and transfer the image on your computer for post-processing.

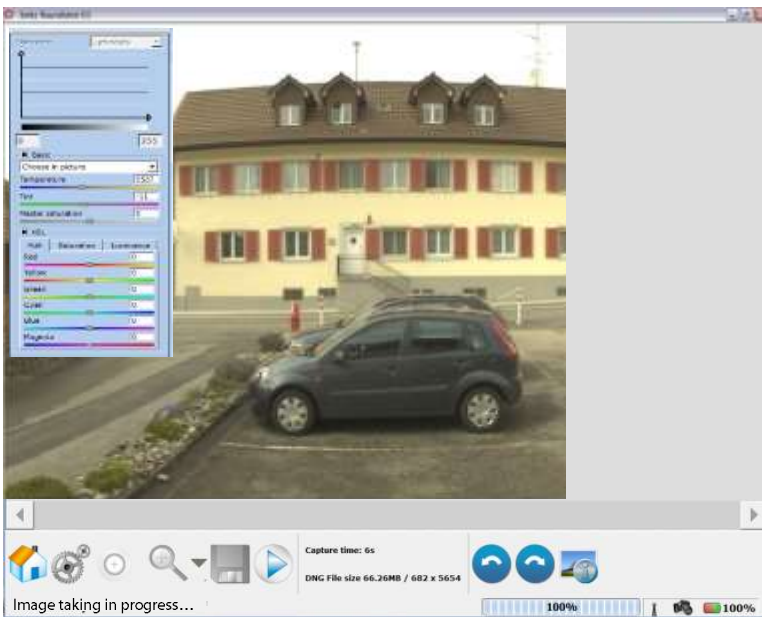 Once the image has been saved the icon turns green.

3. Seitz Roundshot capture Software

3.1 Shoot menu

The **„Shoot "** menu allows to operate the camera (position of camera head, start and stop, focus, rescan), zoom into the preview, apply post-production to the image and save the panorama.

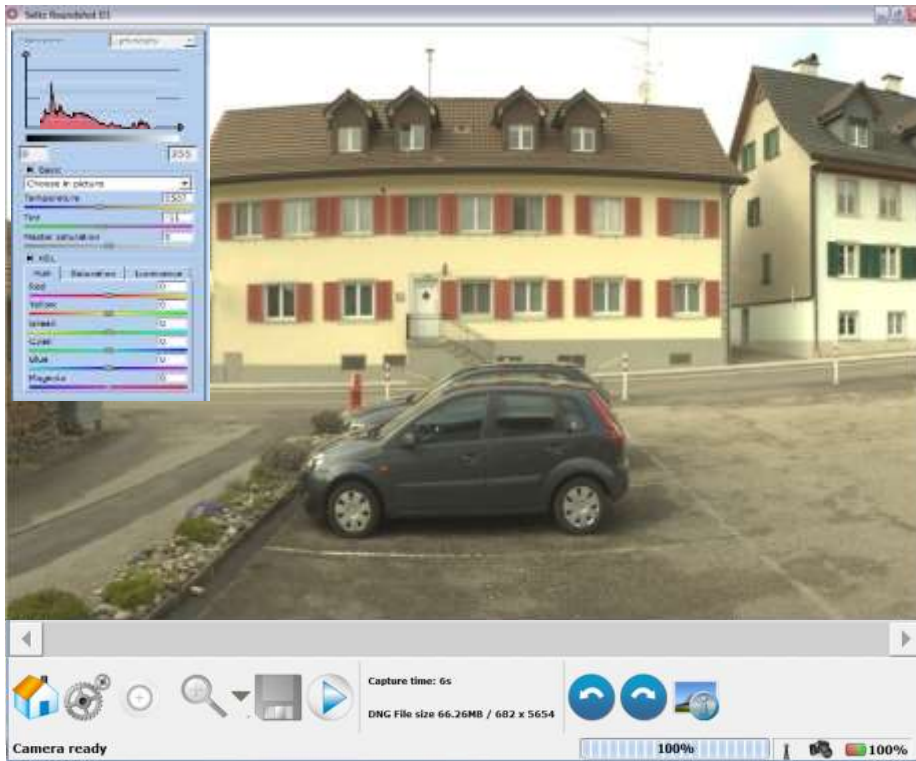Press the **„Start"** button to start the image taking process:

The preview shows the image as it is built up by the scan. The ongoing scan is indicated by the message **„Image taking in progress"** on the lower left hand side of the computer screen.
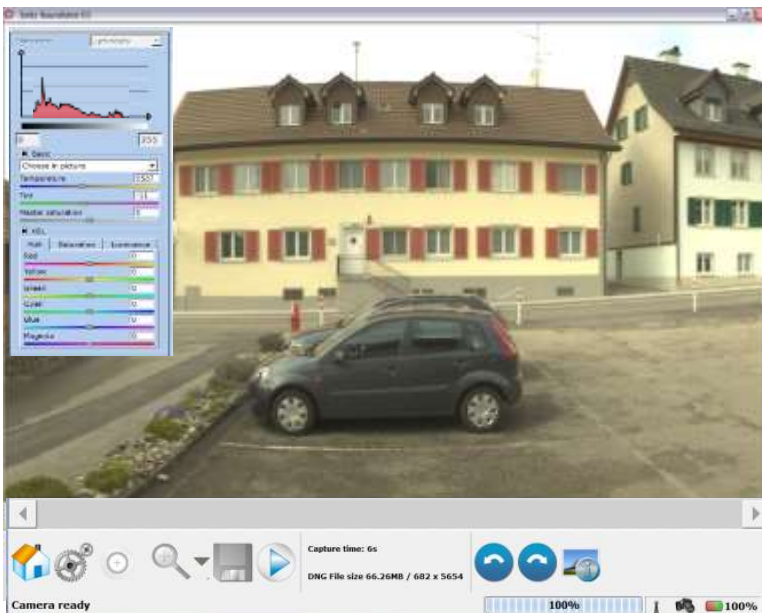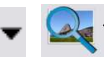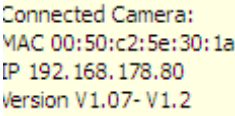
Once the scan is fully transferred to the computer RAM, the **„Camera ready"** message and the image histogram appear.

Please note that the HSL (colour) menu is minimised by default for image taking. **It can be expanded (as pictured above) by clicking on "HSL". It is minimised because** these colour options are required for post-production only.

The **„Shoot"** menu is controlled using the following buttons and graphical elements:

	Home / Parameter menu		Camera head position
	„Shoot settings" list		File info
	Focusing Assistant		Progress bar
	Zoom		GPS status symbol
	Fit on screen		Camera connection
	Save button (not yet saved)	Connected Camera: MAC 00:50:c2:5e:30:1a IP 192.168.178.80 Version V1.07- V1.2	Camera connection **displayed on „mouse over"**
	Save button (already saved)		
	Start	100%	Battery status
	Stop		
Capture time: 6s DNG File size 66.26MB / 682 x 5654	Scan info (capture time, file size/format info)		Histogram

The above display is optimised for a 1,280 x 1,024 px screen resolution. When using a smaller resolution missing graphical elements can be accessed using >> arrow buttons.

Once the scan and preview are complete, additional post-processing steps can be performed on the image such as:

- White balance (automatic, choose in image or other options)
- Histogram stretching (automatic or custom using the histogram tool)
- Gamma or S-curve (when confirming to apply changes to existing image)
- Black adjust (for longer exposures when a black value interpolation is required)
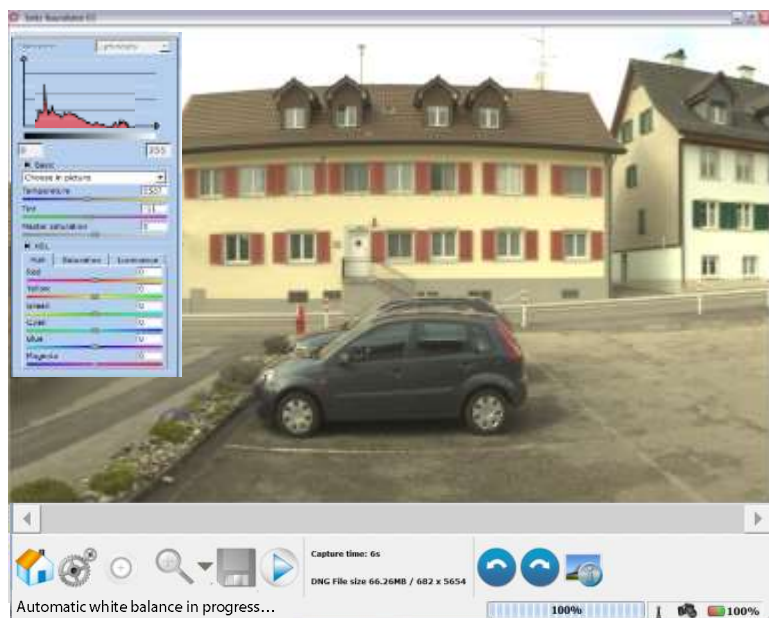
The ongoing rendering process (for example: Automatic White Balancing) is shown on the lower left corner of the window.

These post-processing steps can be launched automatically right after the scan (for example: Automatic White Balance or Black adjust) or some post-processing parameters can be changed and then be applied to an existing scan (for example: „Choose in picture" White Balance, new Gamma values, new S-curve values).

These post-processing options are explained in more detail below.

For image-taking we recommend to focus on framing the image (format, degree), exposure and on sharpness and saving the image as a raw file (dng). All other adjustments such as white balance, histogram stretching, HSL etc. can be done conveniently on a calibrated screen at home / in the studio. Please refer to chapter 5 for detailed explanations on the ideal workflow (post production).

3.1.1 Shoot settings

The white-balanced image is now ready for further processing:

Press the shortcut **„Shoot Settings"** and the following list opens:

Shoot settings	
Lens	Nikon 35mm AF-S Nikkor
Format	360°
Distance	Infinity
Exposure speed	1/250
Light Frequency Correction	Off
ISO / ASA	100
Exposure correction	0.0x
White balance	Choose in picture
Gamma	Standard (2.2)
S-curve	Weak (2)
Noise removal	Off
Auto histogram stretching	Off
Resolution	3x3-Quality
File type	DNG (1x1 resolution only)
Saving options	Confirm
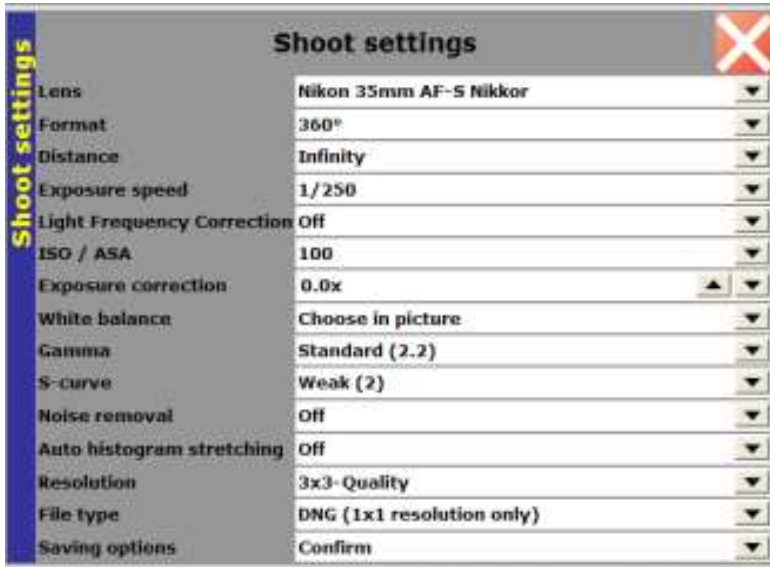
The **„Shoot Settings" list** allows the selection of parameters quickly without having to go back to the „Parameter" menu. There are three types of settings:

Settings for …

… image taking	… optimisation	… saving
Lens	White balance	File type
Format	Gamma	Saving options
Distance	S-curve	
Exposure speed	Noise removal	
ISO/ASA	Auto histogram stretching	
Exposure correction		
Resolution		

Apply on a new scan only	*Optimisations apply on raw data of existing image*	*Saving of existing image**

The image displayed on the computer is always a raw image for which only the preview has been created in RGB. The choice of file type (and for example the raw conversion for .tiff or .jpeg) is only applied when the „Save" button is pressed.

Press the [X] button to close the **„Shoot Settings"** window.

* When saving in raw (dng) all optimisation settings are set to „linear" or „off" except for the White balance setting which is saved together with the raw (dng) file

3.1.2 Focusing Assistant

Press the button **„Focusing Assistant"** and the focusing cross appears:
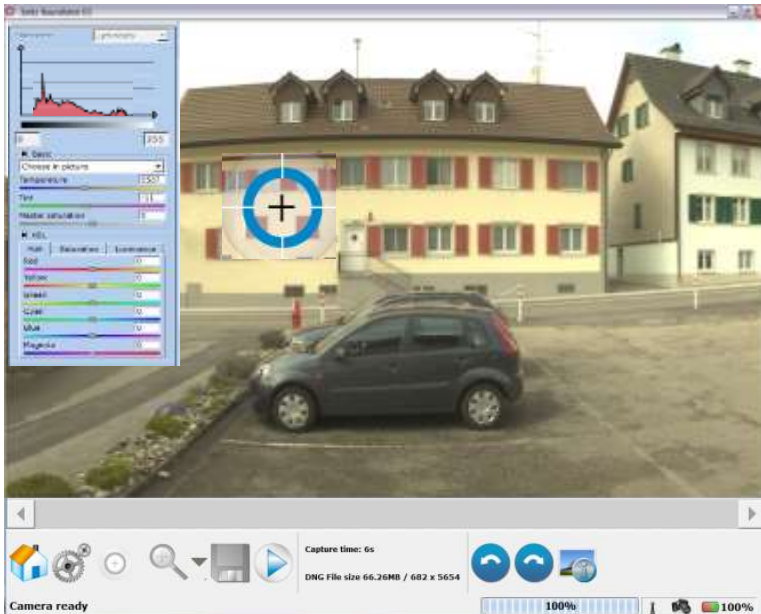
Place the focusing cross on the spot where the camera should focus.
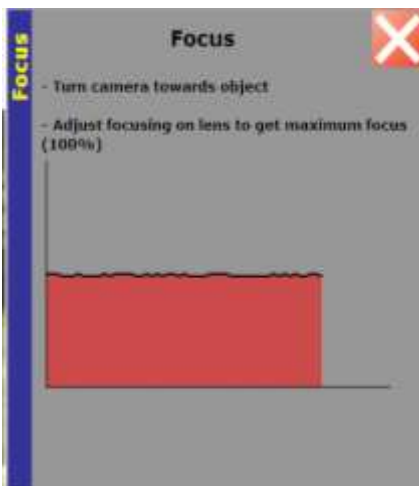
The „Focus" window shows the contrast metering (red surface) for the selected focusing spot.

Adjust the focusing on the lens until the contrast metering shows the highest possible value.

Press the button to close the „Focusing Assistant" window.

> 💡 The Focusing Assistant is an additional help for the photographer to obtain the best sharpness. Set the approximate distance on the lens first and then use the Focusing Assistant to fine-tune sharpness. Choose a point in the preview image with good contrast and avoid uniform surfaces (such as a white wall, etc.).

3.1.3 Zoom

 Press the button **„Zoom"** and the zoom rectangle appears:
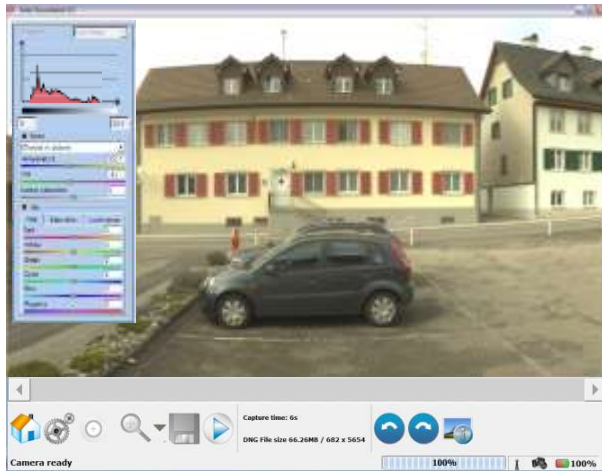
Place the rectangle on the area to magnify.

The zoom window opens showing a 100% magnification* of the selected area.

Apply **„Noise Removal"** directly on the zoomed area. These settings are applied during raw conversion (when saving to TIFF or JPEG).

Press the button to close the „Zoom" window.

> Use only a moderate amount of noise removal. A moderate use of noise removal can increase the overall image quality. Please note that once the image is saved as a tiff or jpg, these modifications are permanent and cannot be reversed for the saved image. We recommend to save the image as a dng (raw) file whenever possible and to apply the optimisation only in post-production.

* Other zoom levels can be selected in „Manage/Settings/Zoom factor"; 100% is the default zoom factor

3.1.4 Fit on screen

Press the button **„arrow down"** button next to the „zoom" icon to display the panorama in its full width:

The icon has changed from the "zoom" to the "fit on screen" option:

Press the ▼ button again to change back to the standard panorama display with scroll bars.

> 💡 The "Full panorama display" can be useful when a full image needs to be viewed (for example for composition purposes).
>
> The standard display showing the panorama in its full height and with scrolling bars for horizontal panning is useful to see 100% of the vertical resolution.

3.1.5 Camera head position

Press the **„camera head position"** buttons to turn the camera head to the desired starting position. To activate the camera rotation, the mouse/pan needs to be moved gently over the surface of the button.

Please note that the camera head can also be turned by hand without creating any damage to the camera motor. Turning the camera head by hand may be quicker in most situations.

The „camera head buttons" are a useful feature when the camera is actually inaccessible (for example when it is mounted on a pole or at a distance).

3.1.6 File info

Press the **„File info"** button to add an „Image description", information on the Artist and the Copyright to the metadata of the image.

File info

Image Description

Sunset scene on Miami South Beach Boulevard

Artist

Jessica Parker Smith

Copyright

Jessica Parker Smith

Metadata are stored with the image and make it possible to document all parameters of the image. This is useful for follow-on work or for post-production. Access metadata in PhotoMe, Photoshop Bridge/camera raw, Lightroom or in Photoshop by clicking ALT+CTRL+SHIFT+I.

3.1.7 Histogram
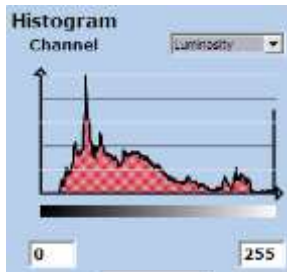
The **„Histogram"** is displayed with the image and shows the distribution of light from the very dark to the very light parts (in DNs) of the image.

For convenience the „Histogram" window is semi-transparent and can be moved across the preview image.

The „Histogram" is an important tool to determine the quality of the exposure. When the image is perfectly exposed, the histogram shows an evenly distributed light frequency with no cropping of light at the borders like pictured above.
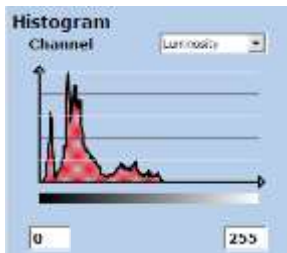
When the image is underexposed, the histogram values are situated on the left of the graph, i.e. most of the light frequency is distributed in low DN levels. Create a longer exposure or open the aperture.
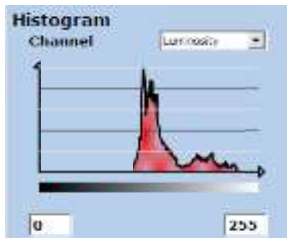
When the image is overexposed, the histogram values are situated on the right of the graph, i.e. most of the light frequency is distributed in high DN levels. Create a faster exposure or close the aperture.
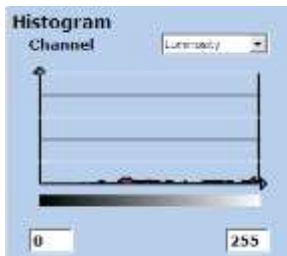
When the exposure of the image is cropped, the histogram becomes very flat. This happens when some extreme values are located below the minimum (0) or above the maximum (255). Adjust the exposure speed or the aperture until the cropping disappears.

The x-axis of the graph shows the light levels (in DNs) and the y-axis the frequency of these light levels in the image. It groups the DNs in classes (for example, 0-100 DN, 101-200 DN, 201-**300 DN…, 15'901 – 16'000 DN) and then plots the frequency of** these classes (how many times these light levels are observed in the image) on the y-axis to show the statistical distribution.

> Underexposing the image is less problematic than overexposing it. An underexposed image (for example by 1 f-stop) can quite easily be brightened or tone-mapped in post-production (with often better dynamic range), whereas darkening an overexposed image does not lead to the same results (information in bright areas is cropped).

3.1.7 Histogram (continued)
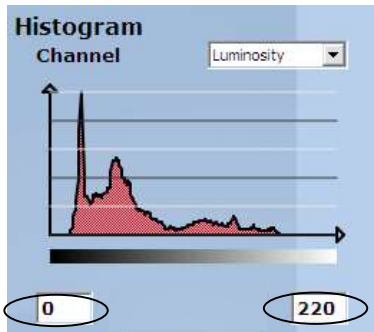
The **„Histogram"** tool also allows to create „histogram stretching".

With „Histogram stretching" the software adjusts the lightness (in DN) from zero to the minimum value and from 255 to the maximum value entered in the histogram tool. After the histogram stretching a new preview image is displayed.

It is also possible to use the **"Automatic histogram stretching"** function of the Seitz Roundshot capture software (see chapter 3.2.10 "Optimisation"). The automatic function sets the minimum and maximum values automatically to the extreme (min/max) values observed in the image.
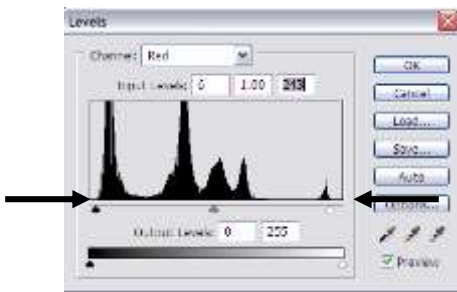
A third option is to correct the histogram levels in Photoshop as illustrated in the graph on the left.

When working in the field use the histogram tool to check the exposure only and apply histogram stretching later in post-production.

Histogram stretching can improve the colours of the image. We recommend its use only in well-lit scenes (daylight) and to stretch the min/max by 20% only (upper limit 200). Stretching the histogram by more than 20% can create additional noise in the image. Using it for example at night is not recommendable as intentionally dark areas of the image become too bright.

3.1.8 Colour adjustment

Use the **"colour adjustment toolbar"** for fine tuning the colours on your image.
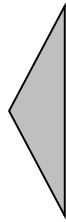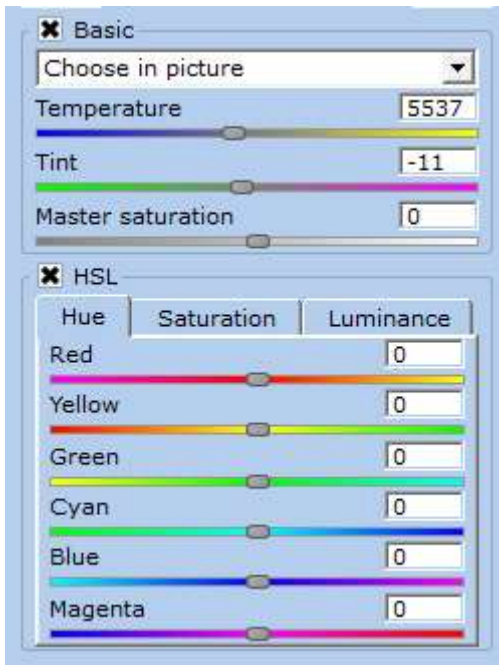
Use the **"basic"** field to control general parameters i.e. temperature, tint and saturation. These parameters have an influence on the entire image.
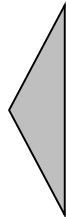
Use the **"HSL"** field to fine-tune colours selectively. The hue, saturation and lightness of independent colours can be changed for an optimal colour precision.

All colour adjustments should be done when displaying the image on a calibrated screen. This will ensure best colour results and a high degree of printing accuracy.

HSL tool slows down the image process. For this reason it is highly recommended to use it only during post processing and not during image-taking.

3.1.9 Start / Stop

When no image taking, image optimisation or saving process is ongoing, the **„Start"** button is active. Press it to start a new scan.

When an image taking, image optimisation or saving process is ongoing, the **„Stop"** button is active. Press it to stop the ongoing process.

3.1.10 Save

When the camera has an existing RAW image in memory and no image taking, image optimisation or saving process is ongoing, the red **„Save"** button is active. Press it to save the image. The selected optimisation and saving settings are applied.

Once the image is saved, the icon turns green.

The time for image saving depends first of all on the speed of the hard disk and secondly on the chosen image parameters.

To reduce the saving time:
• Select the required image format and resolution before taking the image (for example 3x3 instead of 1x1)
• Save the image as a .dng file; do the post-processing on the image later*
• Use „noise removal" only to a moderate extent; especially „noise removal" increases the required saving time significantly

* Post-processing of dng files in camera raw (latest version) and Lightroom 2.0 is possible with images of up to 65'000 horizontal pixels. The Seitz Roundshot capture software can open and process any dng file.

3.2 Parameter menu

Press to navigate to the **"Parameter"** menu.

The **„Parameter"** menu allows to set all parameters for image taking, processing and storage.
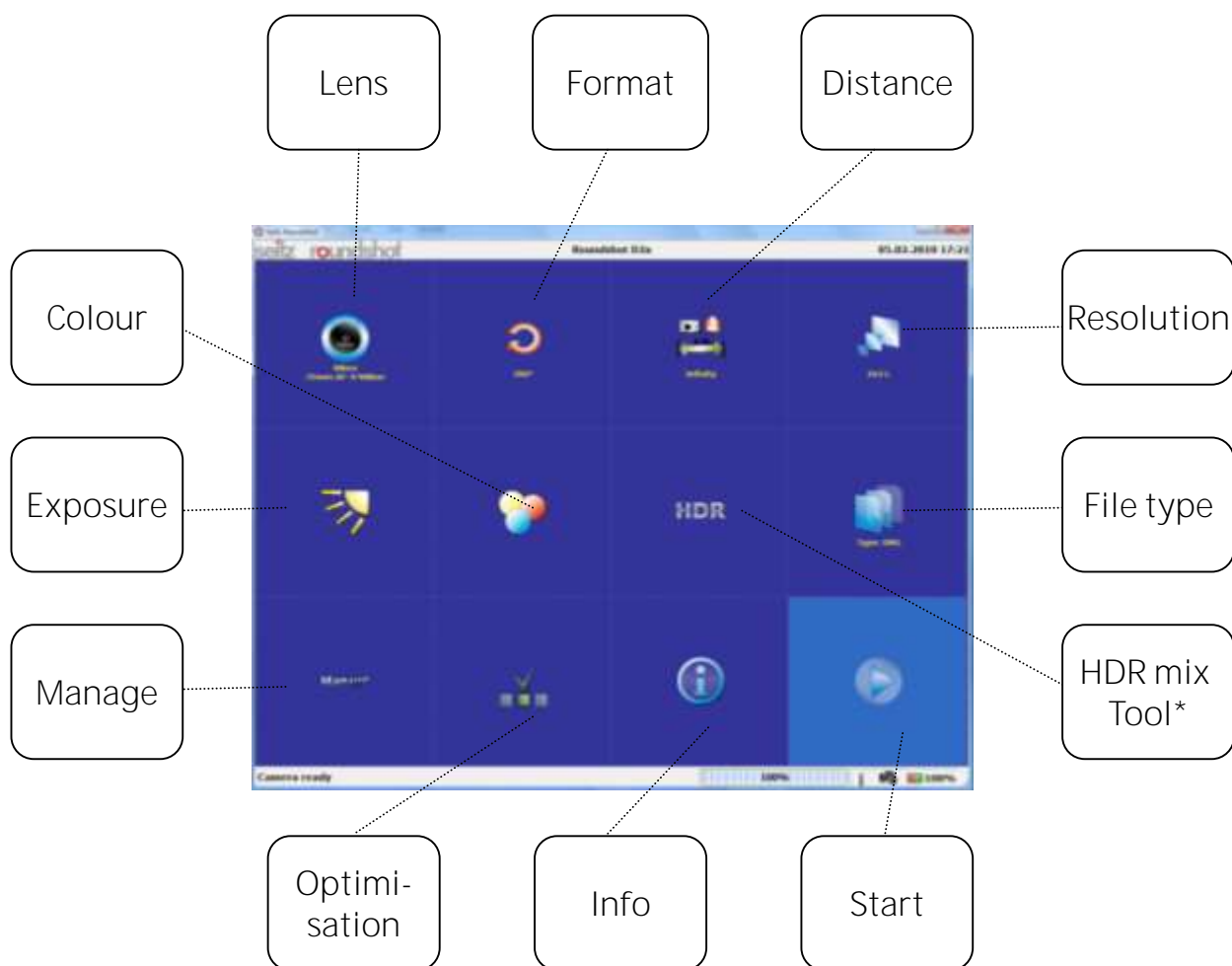
* HDR mixing tool is not available for the 3.2 software version. It will be activated in a future software release.

3.2.1 Lens
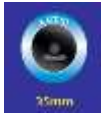
Press the „Lens" button in the „Parameter Menu" menu to activate the **„Lens"** menu:

The first level of the lens menu shows **„favourite lenses".** This is a personal selection of lenses that are often used.

To activate a lens in the software click on its name. A green tick icon indicates the active lens.

The **„new"** button is deactivated on this level of the lens menu. New lenses can only be selected or created in the „all lenses" section.
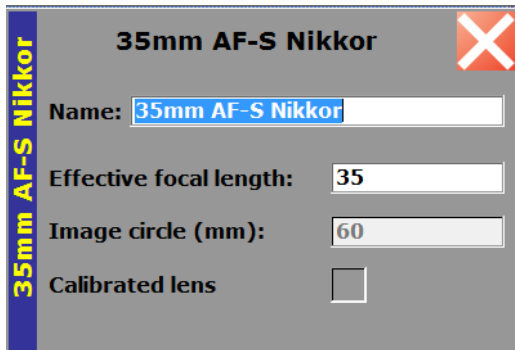
To edit an existing lens, press the button **„edit"**. It is possible to change the lens name and the effective focal length , but not the image circle.

Press the [X] button to close the window and save the settings.

To delete an existing lens, press the button **„delete".** Select „yes" when asked whether to remove the lens from the favourite list.
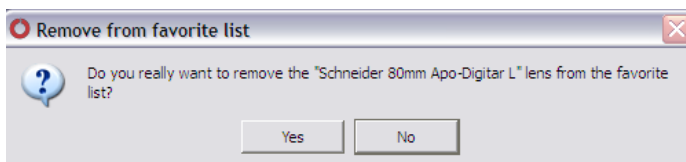
Please note that this command does only remove the lens from favourites, but not **from the entire lens list („all lenses").**

3.2.1 Lens (continued)

Press the button **„all lenses"** to display the entire lens list:
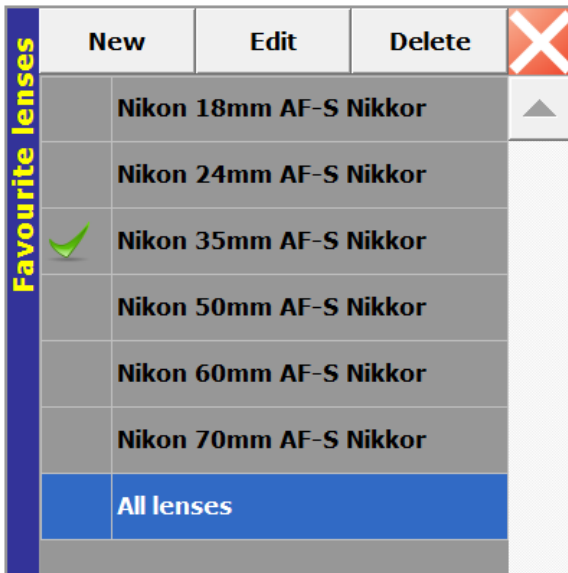
The lenses are shown in alphabetic order (brand name) and grouped by type.

Press **„new"** to create a new lens brand. Once the lens brand is created it is possible to add new lenses to it. The process of creating a new lens is explained on the following pages.

Press the [X] button to close the window and save the new lens brand.

Click on the brand name/type to display the available lenses. The lenses are shown in order of focal lengths.

3.2.1 Lens (continued)

Pre-programmed lenses can be selected from the lens list. By clicking on a specific lens it is marked as a favourite and is added to the favourites list on the first level of the lens menu.

To create a new lens, press the button **„new"**.

To edit an existing lens, press the button **„edit"**.

To delete a lens from the list, press the button **„delete".**

Press the button **„new"** to create a new lens within the selected lens brand/type.

Enter the effective focal length and the image circle at infinity as given in the technical data sheet of the lens manufacturer. Defining the correct effective focal length at infinity is very important for optimum sharpness

Verify the estimated focal length by photographing a circular object. If the circle appears compressed, increase the focal length in the lens list. If it appears stretched, decrease the focal length in the lens list.

Lock the focal length position (with tape), place the lens on a Nikon digital SLR camera, take a jpg picture, open it in a metadata viewer software such as PhotoMe (www.photome.de) or in Photoshop. The exact focal length will be indicated in the metadata.

3.2.2 Format

Press the „Format" button in the „Parameter Menu" menu to activate the **„Format"** menu:
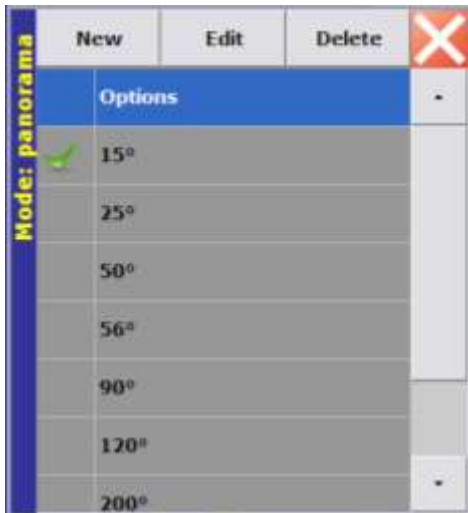
Pre-programmed panorama formats can be selected from the list.

To create a new format, press the button **„new"**.

To edit an existing format, press the button **„edit"**.

To delete a format from the list, press the button **„delete".**

To define format options click on **„Options".**

New format / Edit format

Click on **„New"** or **„Edit"**. Enter the rotation angle (in degrees). When working with a tablet PC, activate the electronic keyboard by selecting the icon on the lower left corner of the screen.

3.2.2 Format (continued)
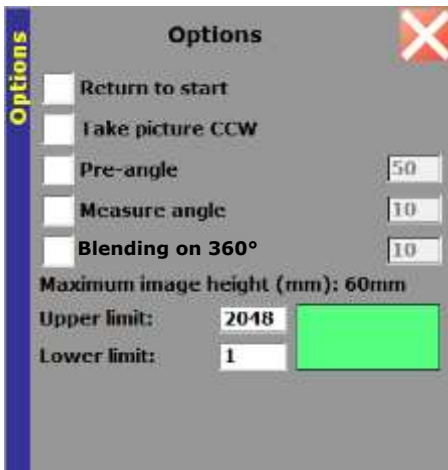
Click on **„Options"** to define additional format settings.

After the image is complete, the camera always returns to its initial position using the shortest path. When selecting **„Return to start"** the camera will returns to the start position from the same path as the image was taken. This is useful for pixel matching multiple image merging.

"Take picture CCW" allows the motor to rotate in the opposite direction. Rotate the digital scan back by 180°.

„Pre-angle" sets a pre-rotation (without image taking) before the actual image capture.

„Measure angle" defines the horizontal angle for automatic light metering (for livecam and security applications only). Please note that for automatic exposure (pre-scan) the camera creates a pre-scan for exact light metering.

"Blending on 360°" activates automatic blending of beginning and end of a 360° panorama. Enter the desired overlap in degrees. For example, when entering "40" the camera will capture a 400° panorama (40° overlap used for the blending). The output will be a 360° panorama (the image will be automatically cropped to 360°).

The image can be cropped vertically by indicating an upper or lower limit (in pixels). For full resolution: 1 to 2'048. Example with lower limit set at 500 pixels and upper limit set at 1'500 pixels. The green area in the rectangle shows the scan area.

Press the button to save the settings and close the „Format" window.

> 💡 When the final output format and media (print vs. web) are not yet final, use the full image format (vertical / horizontal). On the other hand, if the final output format and media are already final, reduce the format to minimise the amount of data and to lower the processing and saving time of the image.

> 💡 To combine several images either for multiple HDR or for shifting / stitching it is necessary to force the motor back by a counter-clockwise rotation. This allows a very precise pixel registration and easy merging.

> 💡 "Blending on 360°" works only with an angle of exactly 360°.
> When selecting any other angle the blending option will be set to "off".

3.2.3 Distance

Press the „Distance" button in the „Parameter Menu" menu to activate the **„Distance"** menu:

Pre-programmed distances can be selected from the list.

To create a new distance, press the button **„new"**.

To edit an existing distance, press the button **„edit"**.

To delete a distance from the list, press the button **„delete".**
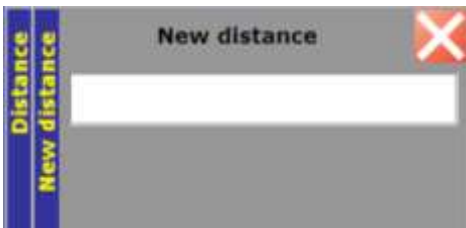
New distance / Edit distance

Enter the distance (in metres). When working with a tablet PC, activate the electronic keyboard by selecting the icon on the lower left corner of the screen.

Press the [X] button to save the settings and close the „Distance" windows.

The distance setting needs to correspond to the focusing distance set on the lens. The exact distance setting is required by the software to adjust the effective focal length. Setting the distance correctly enhances sharpness.

Technical note:
When focusing at closer distances than infinity, the effective focal length increases, which is (after entering the correct distance) automatically adjusted by the software. Also, the software adjusts the horizontal image format, as with a larger effective focal length the image becomes longer (more pixels).

3.2.4 Resolution

Press the „Resolution" button in the „Parameter Menu" menu to activate the **„Resolution"** menu:

The Roundshot D2x allows seven resolution options:
• XXL **(1x1 / 2'048 pixels vertical resolution)**
• XL **(2x2 / 1'024 pixels vertical resolution)**
• L (3x3 / 682 pixels vertical resolution)
• M (4x4 / 512 pixels vertical resolution)
• S (6x6 / 341 pixels vertical resolution)
• XS (9x9 / 227 pixels vertical resolution)
• XXS (12 x 12 / 170 pixels vertical resolution)

By selecting a smaller vertical resolution the software combines several pixels into one, thus reducing the overall image format.

For example, when choosing „L", the software combines the information of 3 pixels vertically and 3 pixels horizontally into one pixel.

Press the [X] **buttons to save the settings and close the „Resolution" window.**

When the final output format and media (print vs. web) are not yet final, use the full resolution. This allows to select the desired portion of the panorama later and gives full freedom for high quality reproductions.

On the other hand, if the final output format and media are already final, reduce the resolution to minimise the amount of data and to lower the processing and saving time of the image.

3.2.5 Exposure

Press the „Exposure" button in the „Parameter Menu" menu to activate the **„Exposure"** menu:

The menu contains the following options:
- Exposure: Selection of automatic (spot, prescan , variation) or manual exposure speeds
- Light frequency correction: To compensate for the indoor light frequencies (50Hz for Europe/ 60Hz for US)
- Sensitivity: Selection of ISO/ASA
- Exposure correction
- Options: To define the light measure area on the sensor
- Timer
- Scheduler: For automatic photo jobs (image taking) and post-jobs
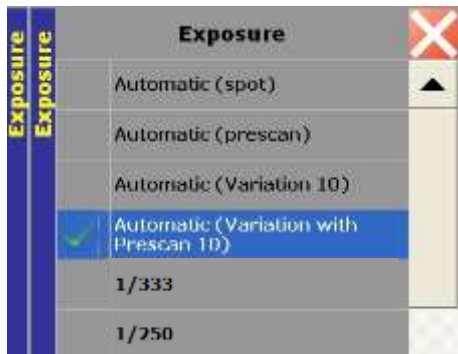
Click on **„Exposure"** and select **„automatic (spot)", „automatic (prescan)", „automatic (variation)", "automatic (variation with** prescan) or one of the manual exposure speeds.

When selecting **„automatic (spot)"** the sensor reads the light automatically and continuously adjusts the rotation speed.

When selecting **„automatic (prescan)"** the camera first completes a prescan to measure the actual light conditions for the chosen image angle and applies the resulting average exposure for the final (second) scan.

When selecting **„automatic (variation)"** the camera adjust the rotation speed for every scan line. With the parameter 1 to 100 the degree of speed adjustment can be set (1 for weak, 100 for maximum adjustment).

With "automatic **(variation with prescan)"** the camera will create a prescan for light measuring and then a second scan for exposure. During the second scan the camera adjusts the rotation speed for every scan line. With the parameter 1 to 100 the degree of speed adjustment can be set (1 for weak, 100 for maximum adjustment).

When selecting a manual exposure speed choose it from the values in the list.

3.2.5 Exposure (continued)
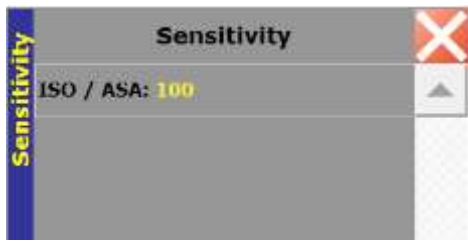
Click on **„Sensitivity".** .

The sensitivity of the sensor is defined with ISO/ASA. Changing ISO/ASA (gain) leads to signal amplification

Using higher ISO/ASA amplifies the signal and leads to additional noise.

Click on **„ISO/ASA".** Select the desired value from the list.

Confirm by pressing the [X] button.
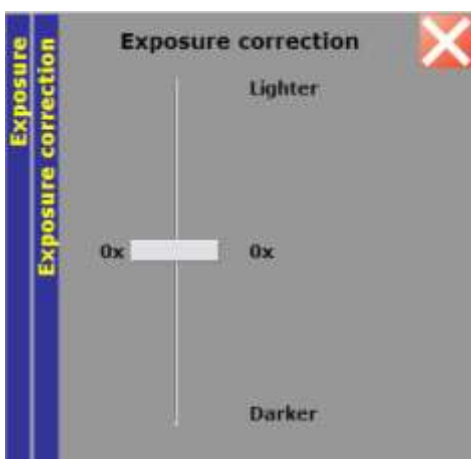
Click on **„Exposure correction".**

The graph shows the exposure correction in apertures (f-stops).

Push the lever up to make the image lighter or down to make the image darker.

Confirm by pressing the [X] button.

3.2.5 Exposure (continued)
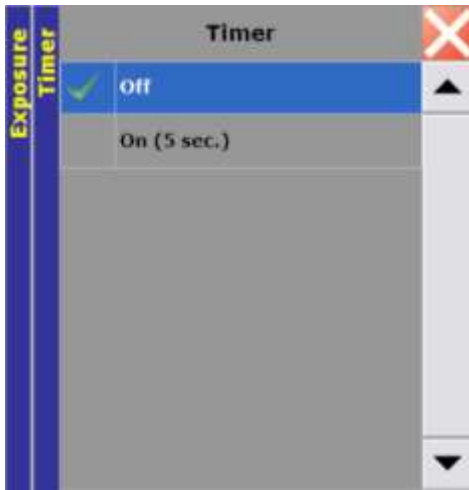
Click on **„Timer".**

Activate the timer by selecting „On" and by entering the desired delay time of the timer in seconds (0-99). When working with a tablet PC, activate the electronic keyboard by selecting the icon on the lower left corner of the screen:

Confirm by pressing the ![X] button.
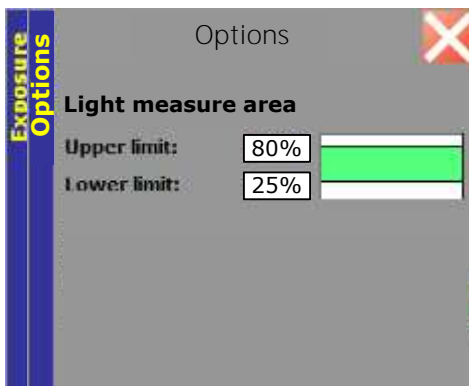
Click on **„Options".**

Define the sensor area for light measuring (for automatic exposure options) in %.

For example, when setting the upper limit to 80% and the lower limit to 25%, the light reading will be done between pixels 536 (25%) and 1,535 (80%).

Confirm by pressing the ![X] button.

Changing the light measure area can be beneficial when the upper and lower parts of the scene have significantly different lighting and the exposure needs to be optimised for one part of the image.

3.2.5 Exposure (continued)

Click on **„Scheduler".**

This opens the menu to define jobs for automatic image taking, for example to create differently exposed images.
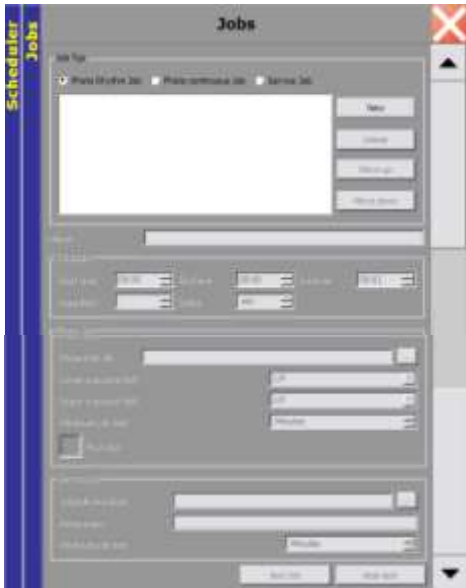
Click on **„Jobs".**

Define the type of sequence for image **taking ("rhythm job" or "continuous job"...)** and its frequency/start-stop time.

Assign a profile for the job to be applied for every image.

It is also possible to automatically start post-processing scripts after image taking (post job).

Confirm by pressing the [X] button.
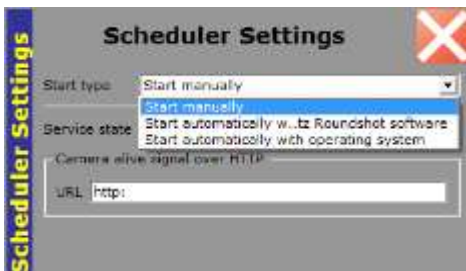
Click on **„Scheduler settings".**

Select the type for scheduler to use (manual/automatic).

Then press "start" to launch the scheduler.
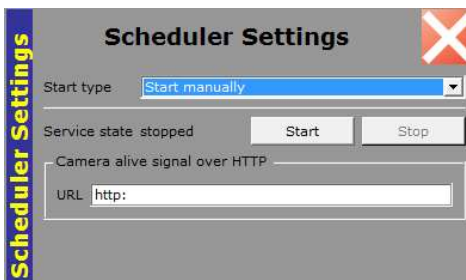
Confirm by pressing the [X] button.

Please refer to section 4.10 for a more detailed explanation on the scheduler.

3.2.5 Exposure (continued)

💡 When working with automatic exposure we recommend using the prescan option as this allows the most accurate exposure control.

💡 To freeze motion, use a fast exposure speed. This is achieved by selecting a fast rotation speed.

Depending on the available light, setting a higher ISO/ASA value or opening of the aperture may be required (for example, from f=16 to f=8).

💡 To capture static or almost static scenes where a fast exposure speed is not important, close the aperture (for example, from f=8 to f=16). This will increase sharpness and depth of field.

3.2.6 Colour

Press the „Colour" button in the „Parameter Menu" menu to activate the **„Colour"** menu:

All settings in this menu are applied on the raw image when it is converted into RGB only (for image preview and when saving the image as .tiff or .jpg). When saving a panorama as a raw image, only the white balancing values are saved with the .dng file, **all other "Colour" and "Optimisation" options are not saved.**
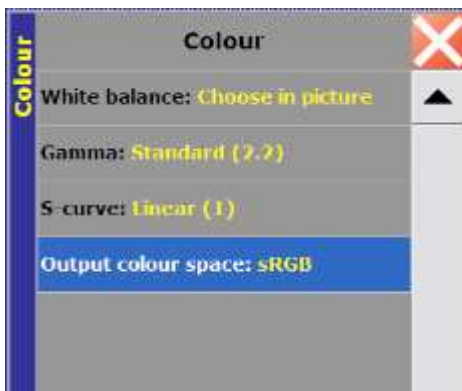
The menu contains the following options:

- White Balance: Selection of automatic, manual or light-specific white balance
- Gamma: tone-mapping, stronger saturation of middle tones and reduction of high tones
- S-curve: tone-mapping, stretching of middle tones and compression of high tones
- Output colour space: sRGB or AdobeRGB

Select **„White Balance".**

The selected white balance option is automatically applied on the preview. In the **case of „choose in picture" the white point** can be set with a pen directly on the preview. The choices are:
Custom, Automatic, Choose in Picture, Tungsten, Fluorescent, Direct sun, Cloudy, Shade

Confirm and save your settings by pressing the   button.

„Automatic white **balance"** sets the white point according to predefined assumptions. This settings works well for most situations. In situations with special light conditions select **„choose** in **picture"** or one of the light presets (tungsten, fluorescent, direct sun, cloudy).

3.2.6 Colour (continued)
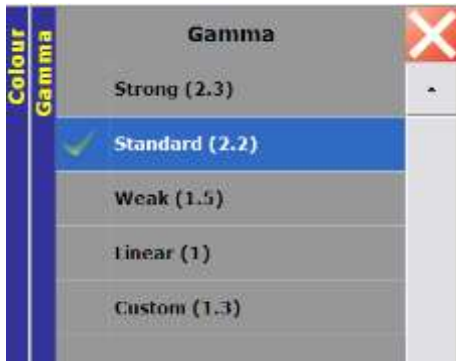
Select **„Gamma".**

Select between the pre-defined options **„Strong", „Standard", „Weak", „Linear"** or create your own gamma by selecting **„Custom"**.

The standard setting for gamma is 2.2. When **selecting „Custom" enter the desired gamma** value. When working with a tablet PC, activate the electronic keyboard by selecting the icon on the lower left corner of the screen.

Confirm and save your settings by pressing the button.

The standard setting for gamma is 2.2. If an individual tone-mapping (in post-processing) is required, set gamma to linear (1.0).

The gamma transformation is required because the data as captured by the digital sensor has a linear output. However, this is not how the human eye perceives colour and light information. The gamma tone mapping accentuates the mid-tones and gives the image a natural look and feel. This transformation comes closest to the perception by the human eye.

3.2.6 Colour (continued)
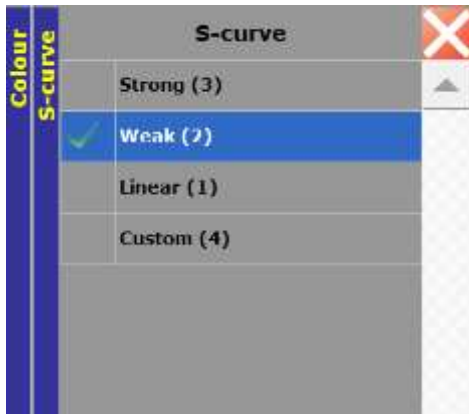
Select **„S-Curve".**

Select between the pre-defined options **„Strong", „Medium"** or **„Linear"** or create your own S-Curve by selecting **„Custom"**.

The standard setting for S-Curve is Weak (2).

When selecting „Custom" enter the desired S-Curve value. When working with a tablet PC, activate the electronic keyboard by selecting the icon on the lower left corner of the screen.

Select **„Output colour space".**

Select between sRGB and adobeRGB.

Confirm and save your settings by pressing the [X] button.

💡 The standard setting for S-Curve is 2 (Weak).

Contrary to gamma which is a necessary transformation to display a natural image, S-Curve tone mapping is optional. The S-Curve tone mapping stretches the mid-tones, compresses the extremes and increases contrast.

💡 AdobeRGB is the larger colour space, so the colours will saturate more quickly in sRGB. For output requiring fine detail (such as fine-art printing) it is therefore recommendable to work in AdobeRGB.

3.2.6 Colour (continued)

To leave the „Colour" menu and save your settings press the ✖ button.

If changes have been made to the colour or optimisation settings and an image already exists, the following message appears:
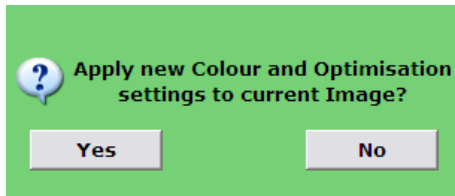
By selecting **„yes"** the new colour & optimisation settings are applied directly on the image which is loaded in the RAM of the **computer. When changing to the „shoot"** menu, the updated image is displayed.

By selecting **„no"** the new colour & optimisation settings are applied on a new scan only.

When working with DNG (raw) images, only the white balance information is stored together with the DNG file. All other optimisations (gamma, S-Curve, sharpening, noise removal) are set to linear or „off". This is necessary to keep the original raw file unchanged.

3.2.7 HDR*
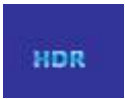
HDR   Press the **"HDR"** to access to the HDR mixer menu

Select "Generate HDR" to access to the HDR mixing tool .

(screen: 32-bit HDR — Generate HDR)
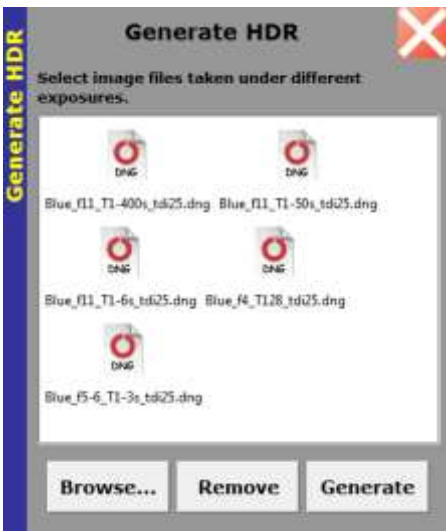
Press **"Browse"** and select a set of differently exposed images of the same scene. Only DNG files are usable.

All the parameters necessary for the HDR generation are stored in the image metadata (except for aperture. see hint below).

Click **"Generate".** The mixing of the 32-bit HDR image takes a few minutes, depending on image size and number of images. The progress of the mixing process is indicated by a percentage progress bar.

A 32bit EXR file is saved according to the selected image saving path.

(screen: Generate HDR — Select image files taken under different exposures. Blue_f11_T1-400s_tdi25.dng, Blue_f11_T1-50s_tdi25.dng, Blue_f11_T1-6s_tdi25.dng, Blue_f4_T128_tdi25.dng, Blue_f5-6_T1-3s_tdi25.dng. Buttons: Browse... Remove Generate)

💡 Avoid changing the lens aperture from one image to image because:
- The camera can move slightly creating a misalignment between images
- The depth of field changes between images
- The aperture information is not written in the metadata and has to be corrected manually. This can be done by readjusting the exposure time in a metadata editor like Photome.

💡 To obtain a perfect pixel registration between the different images it is **important to activate the function "return to start" in the menu "Format / Options".**

---

* HDR mixing tool is not available for the 3.2 software version. It will be activated in a future software release.

3.2.8 File type

Press the „File" button in the „Parameter Menu" menu to activate the „File" menu:

The menu contains the following options:

- Type
- Filename
- Location
- Output (not yet available with this software version)
- Saving options
- File info

Press **„Type"** to choose among the following 3 file types:
- DNG (raw, 16-bit per channel)
- TIFF (48-bit)
- JPEG (24-bit)
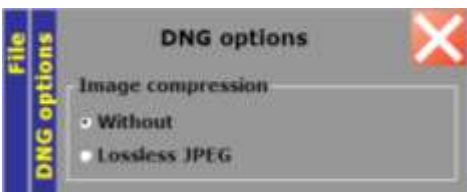
DNG files can be saved with (lossless jpg) or without compression.
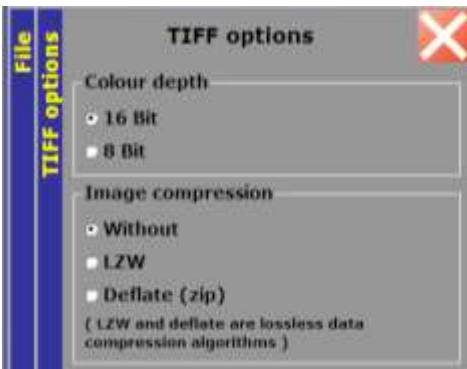
For TIFF files it is possible to define a 16 bit (standard) or 8 bit colour depth.

TIFF files can be compressed using the LZW or deflate (zip) compression algorithms which are lossless.
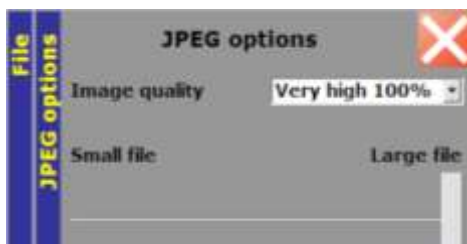
JPEG files can be compressed gradually by selecting the desired quality:
Very high (100%), High (75%), Medium (50%), Low (25%) and Very Low (10%).

Confirm and save your settings by pressing the   button.

3.2.8 File type (continued)

Saving the image as a DNG file has the advantage of significantly reducing the saving time compared to prcessed images (Tiff or JPEG). Also, making colour conversion and optimisations as a second step is beneficial as the original image data is left unchanged and can always be accessed.

Camera raw (latest version) and Lightroom 2.0 can convert the Roundshot **D2x panorama if the image has less than 65'000 horizontal pixels.**

The Seitz Roundshot software can reopen dng files and convert them into tiff or jpg images without pixel limitations. For more information on the ideal workflow please visit chapter 5.

For a JPEG **file the maximum amount of horizontal pixels is 65'500. For** wider images we recommend saving them in tiff and then convert them back to JPEG in Photoshop.

The maximum file size for a TIFF image is currently 4 GB.
For more information please consult section 4.1.3.

3.2.8 File type (continued)

Press **"File name"** to choose among the following 4 options:

- Number (1, 2, 3, …)
- Time stamp (yyyy-MM-ddThh-mm-ss)
- Name + number (Prefix)
- Name + time stamp

"Number" gives a unique incrementing number to every image.

"Time stamp" labels the image by giving it the time stamp at the beginning of the image taking process, for example:
2007-07-25T18-26-13
which corresponds to 25 July 2007 at 18:26 and 13 seconds.

By pressing **"?"** further time stamp options are displayed, for example the day can be written as a day in the week instead of a number, the hour can be expressed in am/pm instead of 24h etc.
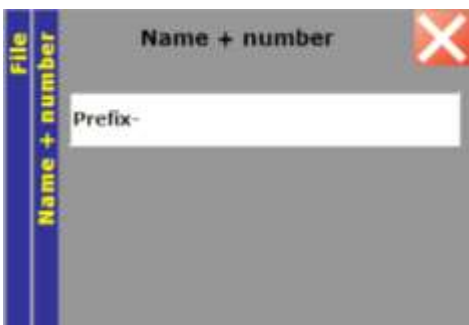
"Name + number" combines a prefix (text or number) with a unique incrementing number for every image.

"Name + time stamp" combines a prefix (text or number) with the time stamp at the beginning of the image taking process.

By pressing **"?"** further time stamp options are displayed.

Confirm by pressing the [X] button.

3.2.8 File type (continued)
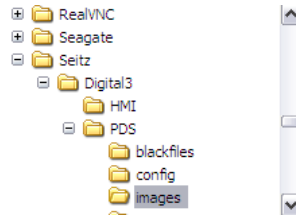
Press **„Location"** to choose the default destination folder for image saving.

A second window will open that allows to browse and set the desired default destination folder.

The standard location is:
C:\Program Files\Seitz\Digital3\PDS\images

Press **„Saving options"** to choose how to save the images:

Confirm: **requires to press the „save" button** after image taking
Auto Save: saves the image directly after **image taking without pressing the „save"** button
Save as: **requires to press the „save" button** after image taking and prompts for file name

Confirm and save your settings by pressing the   button.

The standard saving option is „confirm". This allows to work with the image to perfection before saving. „Auto Save" is useful to save time when previously defined settings can be applied to a uniform scene. „Save as" is a convenient choice if the photographer wants to give specific names to the images for better image retrieval.

3.2.8 File type (continued)

Press **„File info"** to add information to the metadata of the image.

It is possible to add an image description, the artist and copyright information. These details are saved in the metadata of the image and can be accessed in Photoshop Bridge or in Photoshop (CTRL+ALT+I).

A second (more direct) way of adding file information to a new image is to use the **„File info"** button in the shoot menu.

The file information details are saved in the metadata of the image and can be accessed in Photoshop Bridge or in Photoshop (CTRL+ALT+I). They add essential additional information (scene, artist) to the automatically saved metadata (such as lens selection, format, distance, resolution, exposure, colour settings, file type, optimisations).

3.2.9 Manage
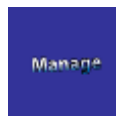
Press the „Manage" button in the „Parameter Menu" menu to activate the **„Manage"** menu:

The **„Manage"** menu makes it possible to preview and handle images as well as defining basic settings of the software.

Click on **„Load dng file"** to open a saved raw image.

The **„Load dng file"** window appears and shows the default destination folder for image saving. Browse and select the file to be open and confirm with „OK".
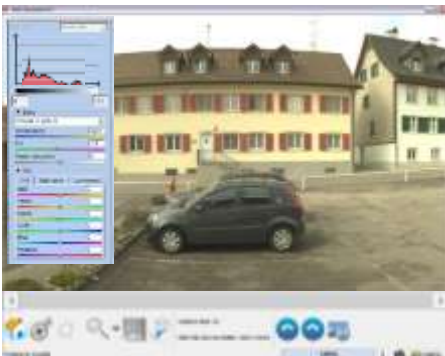
The dng file is loaded and automatically displayed in the preview window. The image can now be post-processed (white balance, gamma, S-curve, sharpening, noise removal, histogram stretching) as well as converted and saved as a TIFF or JPEG image.
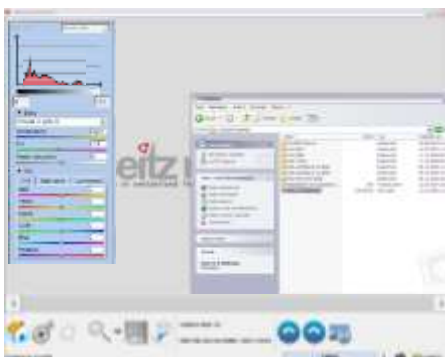
A second (more direct) possibility to open a saved raw image is to open a small explorer window on top of the Seitz Roundshot D3 software and drag + drop the file into the "shoot" window.

3.2.9 Manage (continued)
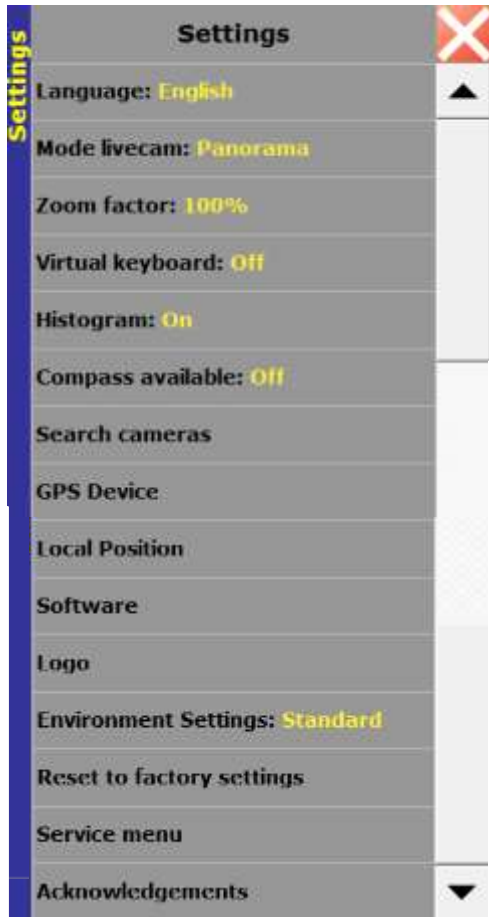
Press **„Settings"** to choose among the following options:

- Language: Displays all software text in a language of your choice
- Mode: Allows Panorama (360°), linear or turntable applications; the actual mode (360, 6x17, other attached camera) and available modes are automatically detected by the software
- Zoom factor: Enables to set a desired % enlargement of the zoom window image
- Virtual keyboard: Activates/deactivates the virtual keyboard for alphabetic and numeric entries
- Histogram: Activates/deactivates the automatic histogram stretching option
- Compass: Activates/deactivates the compass if it is attached to the camera
- Search Cameras: Helps to find and connect to cameras (IPs) in the network
- GPS Device: Allows to locate and activate data transfer from attached USB GPS devices

- Local position: Allows to set the GPS position to automatically determine the times for sunset and sunrise used in the scheduler
- Software: Shows the installed release of the camera (flash file), D3 imaging server and Seitz Roundshot D3 software
- Logo: Allows to change the Roundshot logo in the background of the shoot menu to display a custom logo
- Environment settings: Choose between standard and cold condition. The cold condition gives more power to the motor avoiding it to block in a low-temperature environment, but it consumes more battery
- Reset to factory settings: Reloads all predefined software settings in case the D3 software parameters are no longer valid
- Service menu: enables access to a menu for hardware and software maintenance. You can update the camera firmware from this menu
- Acknowledgements

3.2.9 Manage: Settings

Select **„Language"** and choose from the available languages.

Available languages for this software version are:

- English
- Deutsch
- Français
- Italiano
- Español
- Simplified Chinese
- Standard Japanese

Confirm by pressing the [X] button.
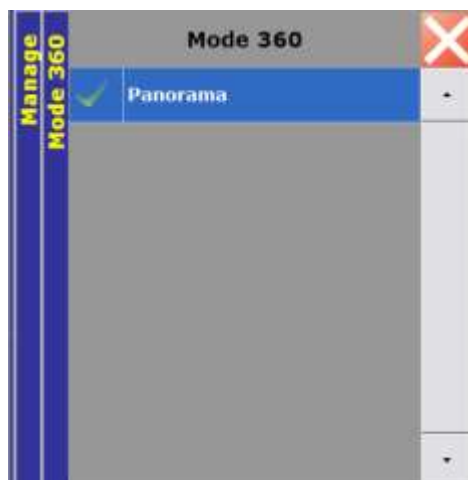
Select **„Mode"** and choose from the available camera modes.

The software automatically detects the connected camera hardware (Roundshot D2x) **and therefore the mode is „360". When** connecting other cameras the mode changes automatically.

For this software version the available mode is **„Panorama". For future versions „Linear" and „Turntable" will also be available.**

Confirm by pressing the [X] button.
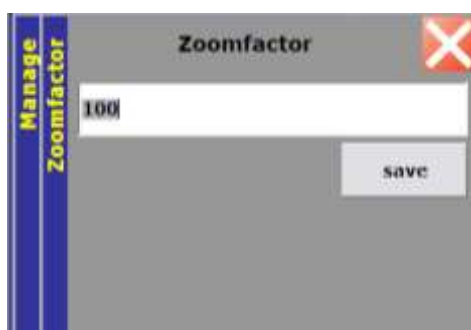
Select **„Zoom factor"** to define the percentage zoom of a selected area on the **preview (menu „Shoot").**

Confirm by pressing the [X] button.

3.2.9 Manage: Settings (continued)

Select **„Virtual keyboard"** to turn the alphanumeric/numeric entry pad on or off.

The virtual keyboard is helpful when working with tablet PCs when the user wants to enter data without having to activate the electronic keyboard of the computer.

Confirm by pressing the button.

Select **„Histogram: off"** to suppress the display of the histogram in the "Shoot" menu.

Select **„Histogram: on"** to activate the display of the histogram in the "Shoot" menu.

The histogram graph is a very useful tool to define the perfect exposure of the image.
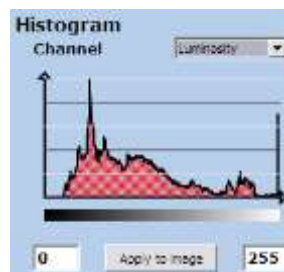
Confirm by pressing the button.

3.2.9 Manage: Settings (continued)

Select **„Compass"**.

This function activates the compass if it is connected.

The option **"On with calibration"** allows the compass to be calibrated the on the first use.

Confirm by pressing the button.
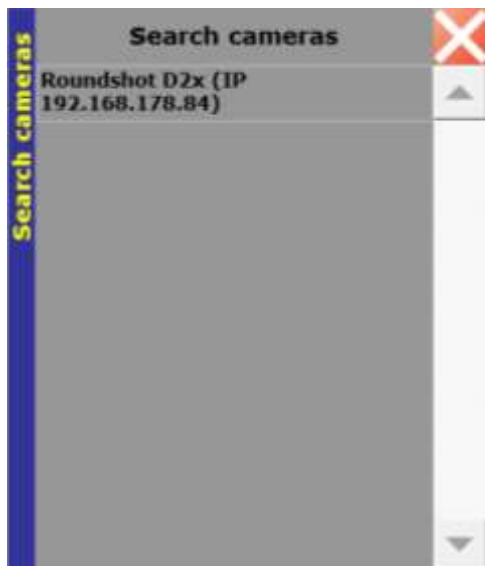
Select **„Search Cameras"**.

This function helps to detect cameras in the network and connect the computer to the camera.

When a camera has been detected, it appears **in the window, for example with „Roundshot D2x" with its IP number in brackets (IP 192.168.178.84)**

If there are several cameras available in the network, they are all outlined in the list.

Click on „connect to camera" to establish the connection.

It is also possible to change the camera's IP by entering the new IP in the window. Changing the IP can be necessary when there are IP conflicts between several cameras in the network.
When working with a tablet PC, activate the electronic keyboard by selecting the icon on the lower left corner of the screen.

For more information on how to establish a connection between computer and camera please visit section 2.

Confirm by pressing the button.

3.2.9 Manage: Settings (continued)
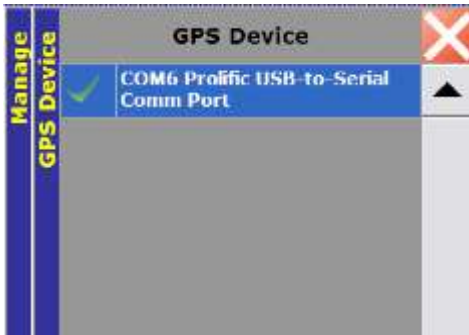
Press **„GPS Device"**.

Select the COM port where the GPS device is connected.

This function allows to automatically save the GPS location in the image metadata.

Please refer to section 4.8 for more details.
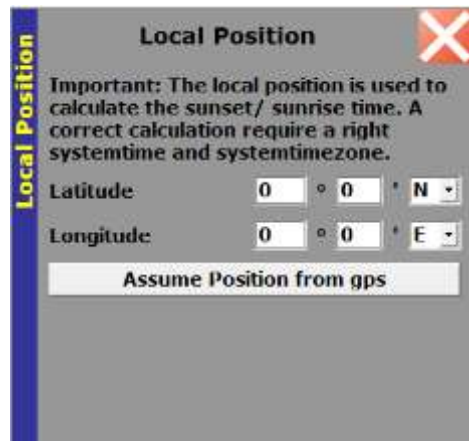
Select **„Local position"**.

This function allows to set the GPS position manually. This determines the times for sunset and sunrise as used in the scheduler.

"Assume Position from gps" can also get the information from any connected GPS device.

Confirm by pressing the ✖ button.

The USB GPS device allows to save the GPS position automatically in the **metadata of the image. The "Local position" feature is only relevant when** using automatic image taking with the Scheduler. It does not write any GPS position into the image metadata. For photography in the field we **therefore recommend using the USB GPS device and to leave the "Local position" unchanged.**

Select **„Software"**.

The currently installed versions of software are indicated in the list:
- Camera (flash file software within the roundshot D2x)
- D3 Imaging Server
- Seitz Roundshot D3 (this software)

Please consult section 4.5.2: „Software & firmware update" and section 3.2.9 „Manage: Settings: Flash Camera".

Confirm by pressing the ✖ button.

3.2.9 Manage: Settings (continued)

Select **„Logo"**.

This functions allow to customize the background of the shoot menu with a custom logo.

Click on **"use custom logo"** and select the corresponding jpeg or png file.

Confirm by pressing the ⊠ button.

Select **„Environment settings"**.

Select "Cold condition" if the temperature is lower than 0°. This will give the motor more power to avoid blocking.

Please note that this function consumes more battery.
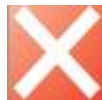
Confirm by pressing the ⊠ button.

Select **„Reset to Factory Settings"** to reload predefined software settings. This is useful when the actual software settings are invalid.

Important: This function deletes all custom settings!

To protect custom settings tick **„Keep lenses"** (to maintain new lenses programmed by the user), **„Keep formats"** (to maintain special angles of rotation) and **„Keep distances"** (to maintain special distance settings).

Confirm by pressing the ⊠ button.

3.2.9 Manage: Settings (continued)

Select **„Service Menu"** and enter the follow 5-digit code:

31415 (the first 5 digits of Π)

Please check first the connection to the camera („camera ready"). **If the message „camera not connected" is displayed the** service menu functions cannot be used.
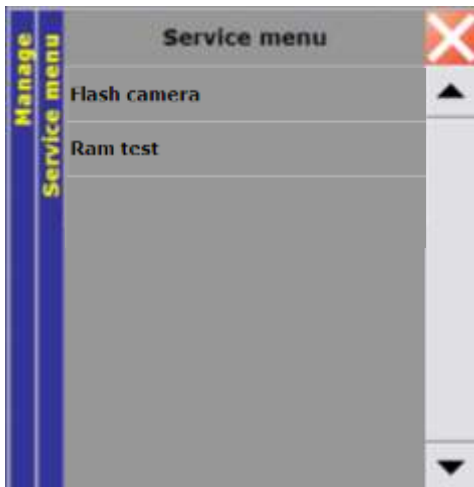
The following two service menu choices are available:

- Flash Camera
- Ram test

The flash camera process may take some time. If the camera shuts down during the update due to lack of battery the software may become corrupt. This is why we recommend connecting the camera to a steady power source instead of using the battery.

Select **„Flash Camera".**

This function updates the software within the camera.

To do this you will need to download first the new flash file from the Seitz Roundshot website.

At the same time make sure to download the latest version of the capture software. This is important to ensure compatibility between the software within the camera and on the computer.

3.2.9 Manage: Settings (continued)

Place the flash file on your computer. Make sure that the camera is connected and the battery is fully charged before flashing the camera..

Then select the file by clicking on „File" and browsing:

When the file has been detected the grey button „Flash Camera" is active.
Press it to flash the camera.

This process takes approximately 1 to 2 minutes. Stand by and do not touch the camera or computer.

When the flash camera process has been completed successfully a confirmation pop-up window appears.

Confirm by pressing the ✖ button.
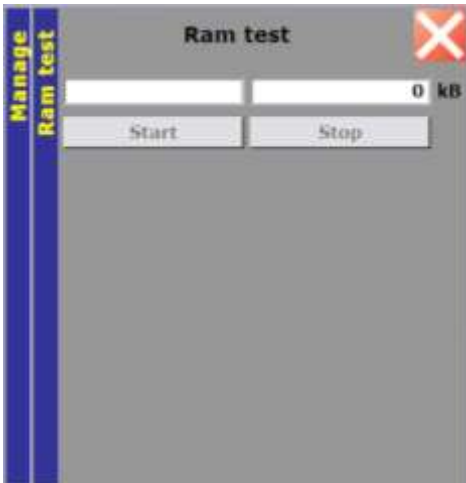
Select **„Ram test".**

Press „Start" to test the available RAM in the digital scan back.

As a first step the software will fill data in the camera RAM. This write process will be displayed in the window on the left.

Then the software will download data from the camera RAM. This read process will be displayed in the window on the right.

When the two processes are finished and the data (in kB) in the two windows match, the camera RAM is fully operational. The left window will display the message **"done"** and in the right window the RAM capacity of the camera are displayed.

In case the two data sets (in kB) do not match, the camera RAM is damaged and an error message (**„Ram test error"**) will appear. Please send the digital scan back to the factory for repair.

Confirm by pressing the ✖ button.

> The „Ram test" should only be performed when a camera malfunction occurs continuously (for example, no data transfer is possible between digital scan back and computer).

3.2.9 Manage: Settings (continued)
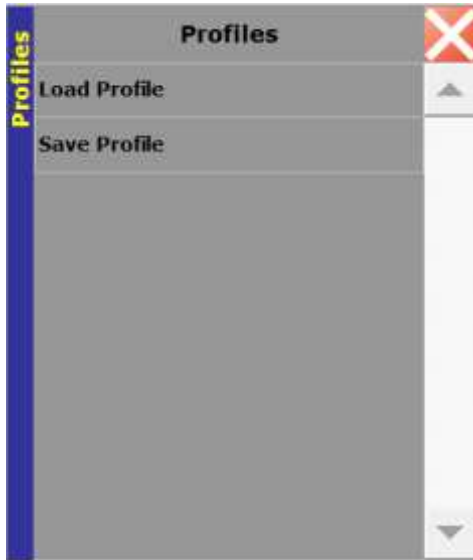
Select **„Profiles"**

Use "Save profile" to create a file containing all parameters and settings (including lens colour settings , angle etc.)

Using "Load profile" activates the parameters of a previously saved profile. These parameters will be loaded in the software and used for the next image.

These profiles can also be selected from the scheduler menu to automatically create differently exposed images.

Profiling is a useful technique to repeat image taking under certain light conditions. For example, it is possible to save a profile for daylight photography outdoor (example: automatic prescan, ISO 100 etc.), indoor photography, HDR photography etc.

Use the profiles with the scheduler for automatic image taking. This is very useful in HDR photography or to let the camera work on its own for a longer time period without any intervention by the photographer (for example, for high resolution time-lapse).

3.2.10 Optimisation

Press the „Optimisation" button in the „Parameter Menu" menu to activate the **„Optimisation"** menu:

The menu contains the following options:

• Noise removal
• Auto Histogram stretching

Select **„Noise removal".** There are four options:
• Weak
• Medium
• Strong
• Off

„Noise removal" applies a noise reduction filter to the image.

Confirm by pressing the ✕ button.

> 💡 Use only a moderate amount of noise removal. A moderate use of noise removal can increase the overall image quality. Please note that once the image is saved as a tiff or jpg, these modifications are permanent and cannot be reversed for the saved image. We recommend to save the image as a dng (raw) file whenever possible and to apply the optimisation only in post-production.

3.2.10 Optimisation (continued)

Select **„Auto histogram stretching "** to turn the automatic histrogram stretching on or off.

With „Auto histogram stretching" set to „on" the software adjusts the lightness (in DN) from zero to the minimum and from 2^{16} to the maximum values observed in the image.

The same can be achieved by adjusting the minimum/maximum values in the histogram tool ("Shoot" menu) or in Photoshop:
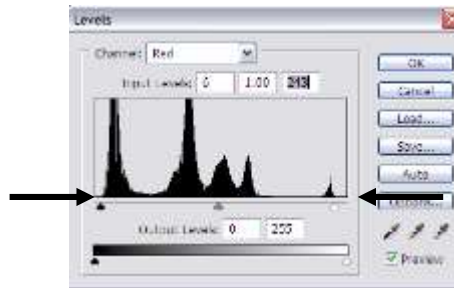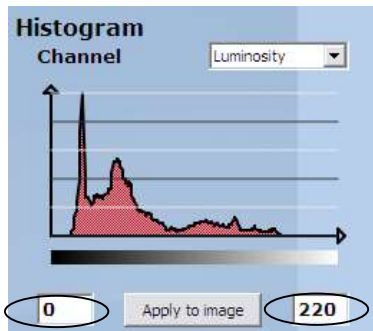
Histogram stretching can improve the colours of the image. The "Automatic histogram stretching" function in the capture software is limited to 1 f-stop. We recommend its use only in well-lit scenes (daylight). Using it for example at night is not recommendable as intentionally dark areas of the image become too bright.

To leave the „Optimisation" menu and save your settings press the   button.

If changes have been made to the colour or optimisation settings and an image already exists, the following message appears:
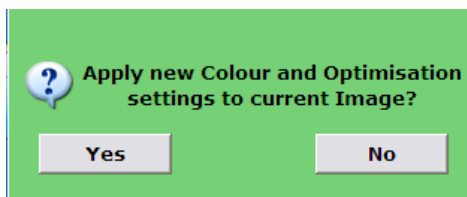
By selecting **„yes"** the new colour & optimisation settings are applied directly on the image which is loaded in the RAM of the computer. When changing to the „shoot" menu, the updated image is displayed.

By selecting **„no"** the new colour & optimisation settings are applied on a new scan only.

When changing to the „shoot" menu, the rendering process is in progress and the new colour & optimisation results can be viewed.

3.2.11 Info

Press the „Info" button in the „Parameter Menu" menu to activate the **„Info"** menu:

All settings (metadata) are stored with the image and are embedded in the file compliant with the EXIF 2 standard.

Confirm by pressing the button.

It is also possible to add additional information to the new image by clicking **"File info"** in the "Shoot" menu:

Metadata are stored with the image and make it possible to document all parameters of the image. This is useful for follow-on work or for post-production. Access metadata in PhotoMe, Photoshop Bridge/camera raw, Lightroom or in Photoshop by clicking ALT+CTRL+SHIFT+I.

3.2.12. Start

Press the **„Start"** button to go to the **„Shoot"** menu to take an image.

4. Tips & resources (how to . . .)

Contrary to traditional digital cameras, the Roundshot D3 does not acquire the **image by a „oneshot" exposure. The image is created by a fast scan. The techniques** involved for this technology are different from traditional digital photography. Setting the image parameters correctly will have a visible impact on image quality.

This is why we have summarised the most important tips & resources in this section. When applied closely these tips will allow enhanced image quality. Further techniques (for example tilt) allow to exploit the full potential of this high resolution camera.

4.1 … obtain the best sharpness

There are several factors at work that influence the sharpness of the image:

Parameters enhancing sharpness

Lens settings (focus, aperture)

Lens data

Distance setting

4.1 … obtain the best sharpness (continued)

Lens settings (focus, aperture)
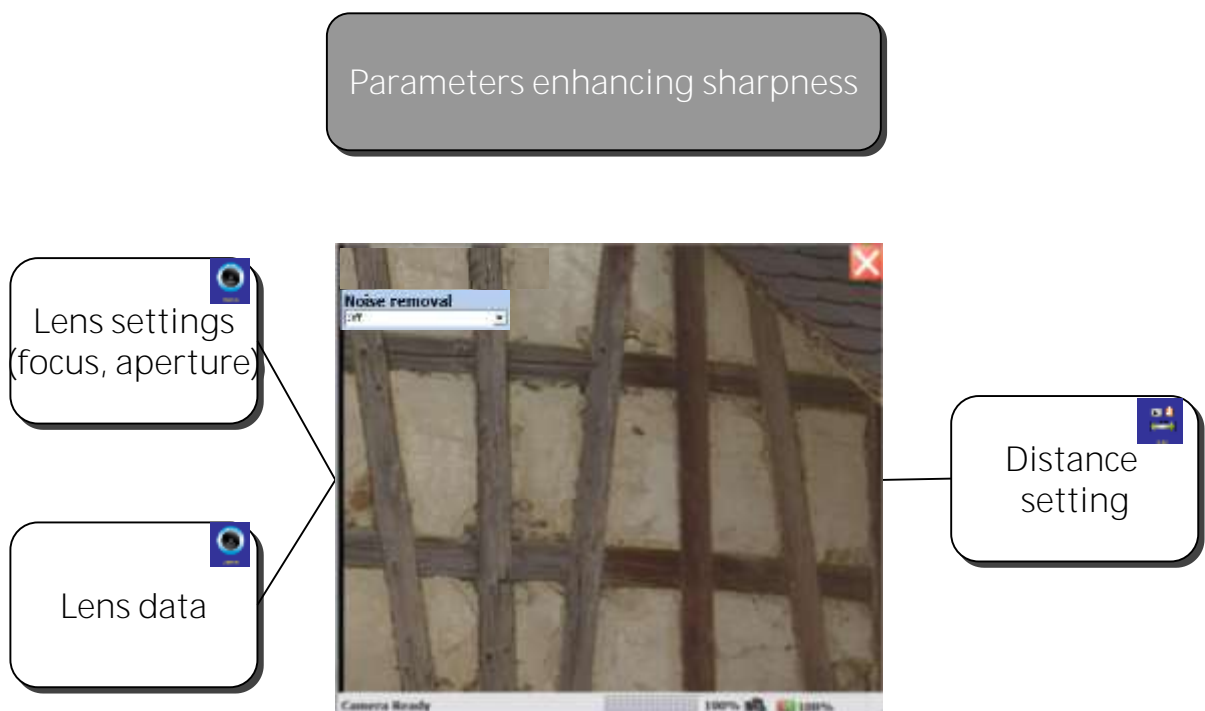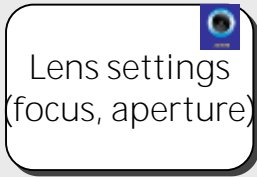
Focus on the lens manually and with the Focusing Assistant
Set the approximate distance on the lens first and then use the Focusing Assistant to fine-tune sharpness. Repeat this process once all other sharpness enhancements (lens data, distance setting) are complete.

Close the aperture as far as possible
Contrary to other digital cameras and digital backs the optimum sharpness is not achieved at an intermediary f-stop (such as f=11) but rather when closing the aperture as far as possible (for example, f=22 or more).
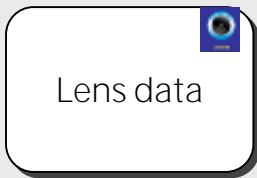
Lens data

Enter accurate lens data
Make sure that the effective focal length in the software is accurate. For example, the effective focal length for the 80mm Schneider Apo-Digitar L is not 80.0mm but 80.34mm. Setting the effective focal length precisely is important to calculate the exact horizontal dimensions of the panorama

Distance setting
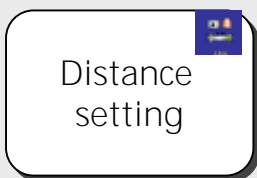
Set the same distance in the software as set on the lens
Changing the focusing distance on the lens makes the focal length vary. Enter the exact focusing distance in the software („Distance"). **The software computes the new effective focal** length which in turn is needed to obtain the best sharpness.

4.1 … obtain the best sharpness (continued)

How to determine the effective focal length empirically

Step 1: Set up a square table at a distance of a few metres on a wall (exactly 90° angle to camera). On the table draw a cross (for example, exactly 1m vertical, 1m horizontal):
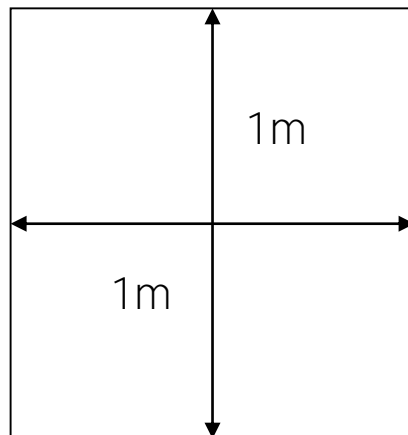
Step 2: Centre the optical axis of the Roundshot D2x camera exactly at the centre of the cross. Focus on the cross and change the distance in the software. Enter the effective focal length in the Seitz Roundshot capture software, starting for example with f=28.0

It is possible to precisely and easily determine the effective focal length of Nikon lenses using a Nikon digital SLR camera.

Lock the focal length position (with tape), place the lens on a Nikon digital SLR camera, take a jpg picture, open it in a metadata viewer software such as PhotoMe (www.photome.de) or in Photoshop. The exact focal length will be indicated in the metadata.

4.1 … obtain the best sharpness (continued)

Step 3: Complete a series of test images, each time increasing the effective focal length in the software. The Seitz Roundshot capture software will automatically adjust the image length (amount of pixels horizontally).

| f=28.0 | f=28.1 | f=28.2 | … | F=29.0 |
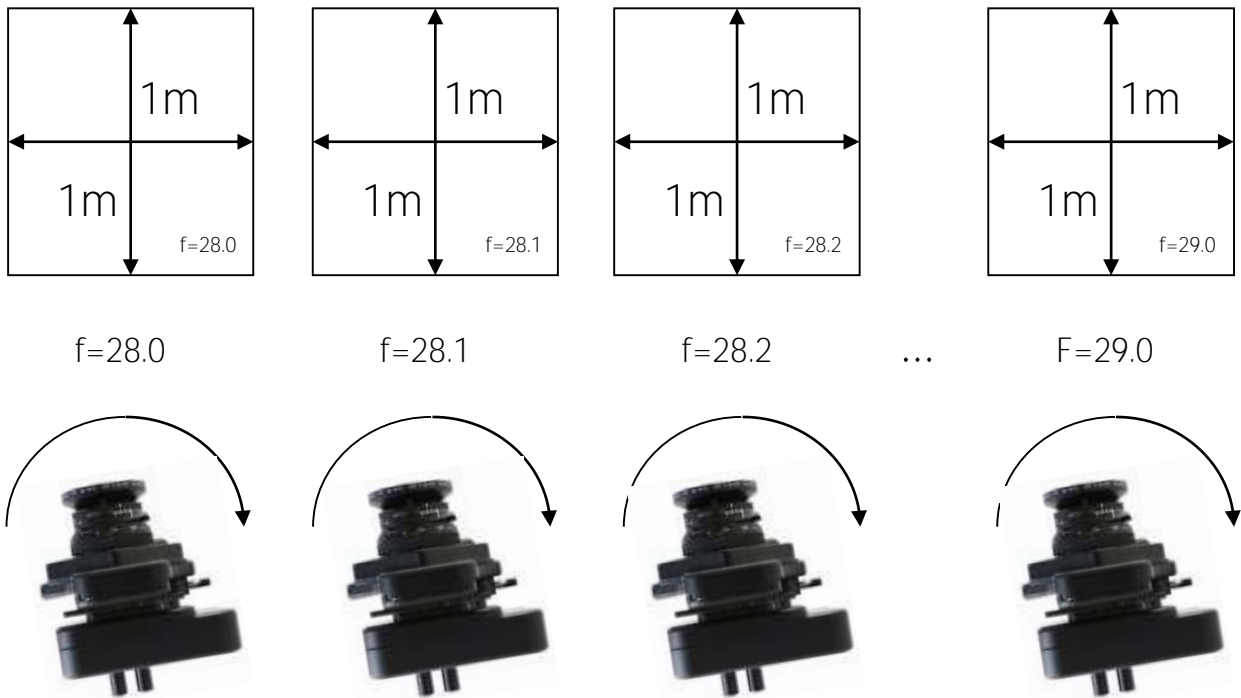
Step 4: Open the test images in an image processing software. Magnify the square lines and place magnetic guides that match the square exactly. Mark the 1m x 1m table and copy it into a new file. Check the image dimensions. When you have found a perfectly square table you have found the correct effective focal length.

Step 5: Enter the correct effective focal length in the software.

4.2 ... select the image format

In rotational 360° panoramic photography the image format is defined by three factors:
• the image height (sensor resolution in pixels vertically)
• the image length (degrees of rotation horizontally)
• the effective focal length of the lens used

The image height **for the Roundshot D2x camera is 2'048 pixels. This vertical** resolution does not change regardless the lens used.

The image length can be defined in the software in degrees, from 1° to 999°. With a given image length and a given effective focal length, the software calculates the number of steps required to complete the image:

$$\text{Image length} = \frac{f * 2 * \pi * deg}{360 * pitch}$$

where: f =   effective focal length
       π =   3.14159265
       deg =   degrees of rotation (image length)
       pitch =   size of one pixel;
                        for D2x = 14 µ or 0.014mm

For example:

The image length for a 360° panorama taken with the Roundshot D2x:

35mm lens   =>   35 x 2 x 3.14159265 x 360 / 360 / 0.014 = **15'707 pixels**

80mm lens   =>   80 x 2 x 3.14159265 x 360 / 360 / 0.014 = **35'903 pixels**
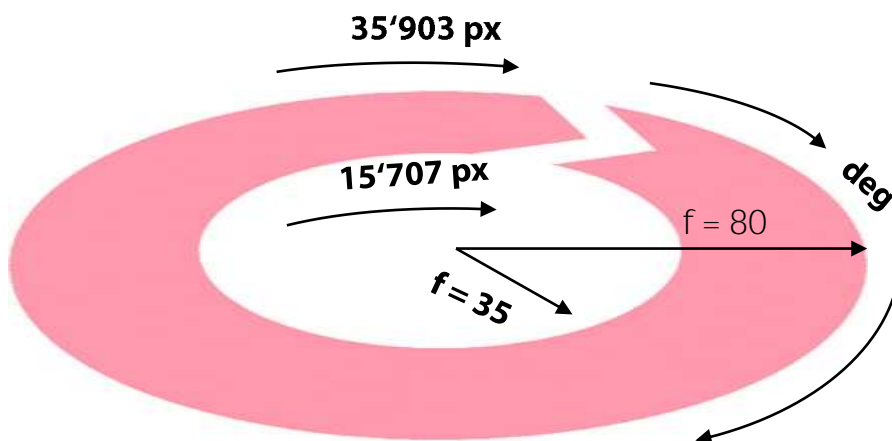
4.3 … compute the capture time

Capture time is the amount of time required to complete the scan for a given image format and capture speed (set by the exposure speed). It is calculated by multiplying the read-out speed per pixel by the number of horizontal pixels in the image:
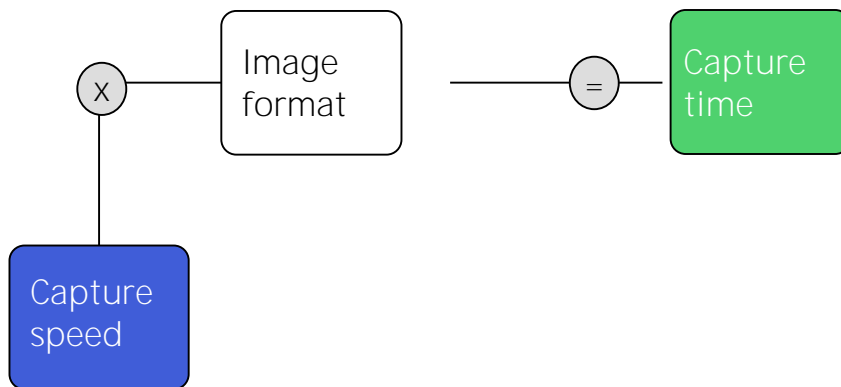
To take the example of the 35mm and 80mm focal lengths again:

35mm: 4 seconds

80mm: 10 seconds

These are minimum capture times (under daylight lighting conditions).

4.4 ... equalize beginning/end of a 360° panorama

Please note that for software versions 3.2 and higher the blending of a 360° panorama **can be done automatically in menu "Optimisation/blending". This section explains how** to do the blending manually.

In certain situations 360° images will not match at the beginning and the end of the panorama, or in other words, there will be a seam. This is due to changing light conditions at the beginning and the end of the scan (for example a cloud passing in front of the sun). To overcome this issue we recommend retouching the image in Photoshop according to the following procedure:

1. Capture the panorama at 400°

For a smooth blending the original image should be more than 360°. Typically 400° will give good results.

2. Open the panorama in Photoshop and extend its canvas

Increase the canvas size to obtain a white background to the left of the image.
The extension size should exceed area above 360° (in this example > 40°).
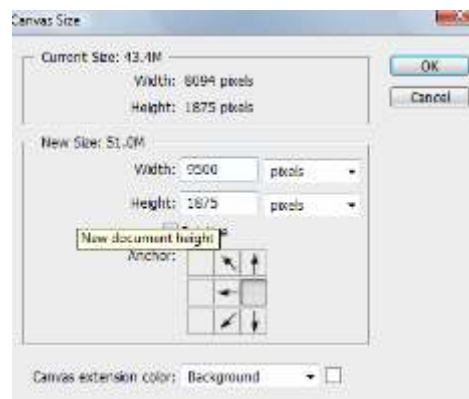
As a result, the panorama has an additional white background to the left:

3. Prepare the blending area

On the right part of the image select an area including more than the part above 360°
(>40° in this example). Cut the selection and paste it on the left of the image.

selection

cut

paste

4. Blend the layers

Select layer 1, set its opacity to 50% and add a layer mask.
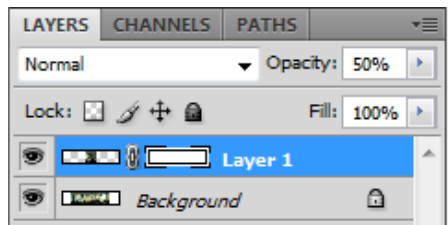
Using the left arrow on the keyboard, move layer 1 until it matches perfectly the background image. Zoom to more than 100% to check.

Select the layer mask and activate the gradient tool with the "Foreground to background" preset.
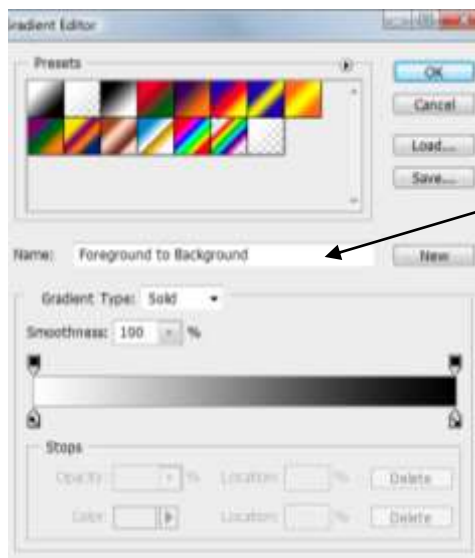
"Foreground to Background"

4.4 ... equalize beginning/end of a 360° panorama (continued)

Press the shift key and draw the gradient line from left to right with the gradient tool on the area where the 2 layers are overlapping.

Finally set the opacity of the layer 1 to 100%:
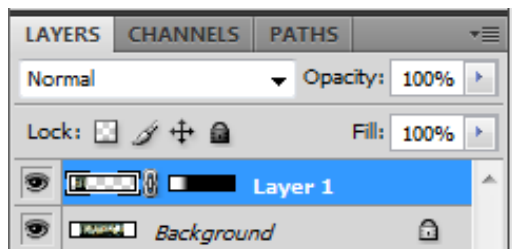
The exposure at the beginning and end of the panorama is now perfectly equal:

5. Crop the panorama to 360° and load it in a viewer

Merge all layers using the tool "flatten image" in the "Layer" menu. Then crop the image to remove the white areas on both sides of the image. Zoom to more than 100% to be sure that not even a line of 1 pixel width from these white areas remains.

Resize the image and load the final 360° panorama in a viewer of your choice.

4.5 … use a USB GPS device

Select **„GPS Device"**.

When no GPS device is connected, the **„GPS Device"** window remains empty.

Install the USB driver for your GPS device (for example: *GlobalSat BU-353*) on your computer first. Then connect it via the USB port. The detection of the GPS device may take 3-4 minutes.

In this situation the GPS status symbol which is indicated on the lower right of the computer screen appears in grey (no connection) and the LED of the GPS device is off.

Once the USB GPS device is recognised by the computer and the USB driver loaded, the window shows the connection on the active COM-port (in this example COM6).

The GPS status symbol and the LED of the GPS device will change to red. As soon as a satellite signal is received, the GPS status symbol will turn to green and the LED of the GPS device will be red and blinking.

GPS status symbol (located on lower right of computer screen)	LED of GPS device (GlobalSat BU-353)	
		No connection to USB device
		GPS device connected to computer, searching for satellite signal
		GPS device connected to computer and satellite signal received
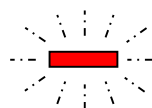
4.5 … use a USB GPS device (continued)

```
GPS-Device (COM6)
 Date/Time: 2008:04:30 10:28:39
 Latitude: N 47deg 33´ 0.3"
 Longitude: E 8deg 59´ 15.426"
 Altitude: 585.4m
 GPS Quality: GPS sps mode
 GPS Mode: 3D/Automatic
 Number of Sat's in Use: 8
```

When the GPS device is connected to the computer and the satellite signal is received, a yellow GPS information tag is displayed next to the green GPS status symbol.

Example: GPS data for Lustdorf / Switzerland

Once the GPS device is connected it automatically feeds the latitude and longitude of the current camera position into the software. This data is then written to the metadata / EXIF when saving a new image.

Confirm by pressing the [X] button.

> Make sure when unplugging and replugging the USB GPS device to always use the same USB port. If not reload the USB driver for the new port.

> GPS devices use a uniform date/time standard which is always Greenwich time (GMT) regardless of the time zone of the actual position. Therefore the date/time of the GPS device may differ from the actual date/time.

> GPS data (latitude, longitude) are saved with the image and can be accessed by viewing the metadata.

> The GPS position is written in the image metadata only if the GPS status symbol is green. It is possible that even if the GPS device is connected the GPS status symbol remains red. In this case the GPS device is not able to fix a location and no GPS data will be saved in the image metadata.

4.6 … use a compass

In "Manage" menu select **„Compass"**.

This function activates the compass if it is connected.

Select **"on"** to activate the compass.

The option **"On with calibration"** allows the compass to be calibrated on the first use. The camera will rotate 360° and the compass output will be synchronized with the motor rotation. This function needs to be used only once.

Confirm by pressing the button.
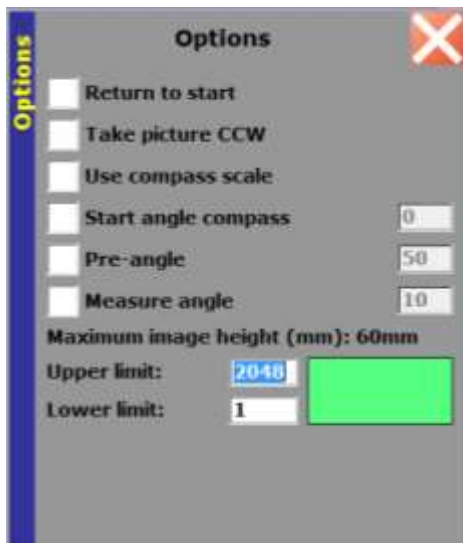
When the compass is active open the menu **"Format / Options".**

Two new options related to the compass are available:

- **"Use compass scale"** allows to embed the compass output angles in the image. These angles will be visible only on tiff or jpeg images. DNG files are not modified.

- **"Start angle compass"** allows to always start taking the picture at the selected compass angle no matter the initial direction of the lens. For example setting this angle to 0° ensures that the images will always start direction north.

Please note that the compass scale will be visible only on tiff and jpeg images. When saving the images in DNG the compass data is lost and cannot be recovered in post processing.

4.7 … program the scheduler

Before programming the scheduler, make sure to create one or more profiles as presented in section 3.2.9. For example to automatically generate a set of differently exposed images to create a 32Bit HDR, three or more profiles should be created (one per image). In the HDR case, all profiles must have the same parameters besides for the exposure time.

In the Exposure menu Click on **"Scheduler"** then select **"Jobs".**

In the **"Jobs"** menu different jobs (or tasks) can be defined:

- Photo Rhythm Job
- Photo Continuous Job
- Service Job (not used for Roundshot D2x cameras)

For example define a **"Photo Rhythm Job"** to take an image at constant time intervals.

In this example, the Job will launch a 1x1 image once every hour during 24 hours per day.

This job uses the 1x1.xml profile and loads these parameters for the image taking.

The image is launched only if the required exposure is between 1/3 sec. to 1/300 sec. and the scan can take a maximum of 10 minutes (if it takes longer the scan will be stopped).

4.7 … program the scheduler (continued)
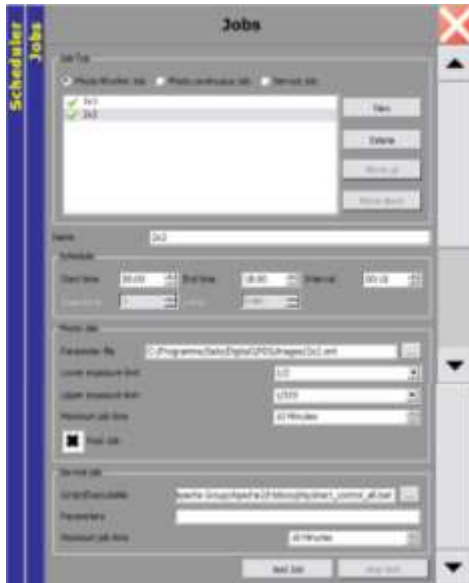
Define a new **"Photo Rhythm Job"** by pressing "New".

Then click on "New Job" so that it is highlighted in grey.

Change its name.

Define the start time and end time as well as the interval of image taking
(in hours : minutes).

Then load the profile (.xml) file for image taking. The default path is:
C:\\Program Files\Seitz\Digital 3\PDS\profiles
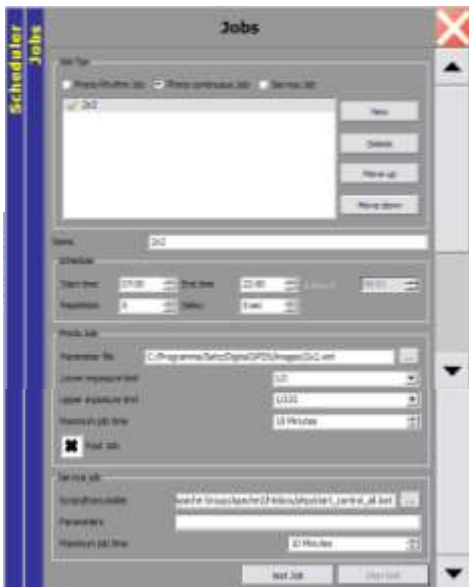
It is also possible to define **"Photo Continuous Job"** as presented in this example.

Define the start time and end time
(in hours : minutes). There is no interval because the image taking is continuous.

Enter repetition (the number of times this job is to be repeated) before other Photo Continuous Jobs are launched.

Then define the profile (.xml) file for image taking.

Confirm by pressing the ❌ button.

💡 In the case of HDR photography, it is recommended to program three or more **"photo continuous jobs".** Each job should contain a profile for one exposure.

It is also possible to repeat the sequence several times and select later the best set of images.

4.7 … program the scheduler (continued)

Once the Jobs are programmed correctly, it is necessary to start the scheduler.

In the Exposure menu Click on **„Scheduler settings".**
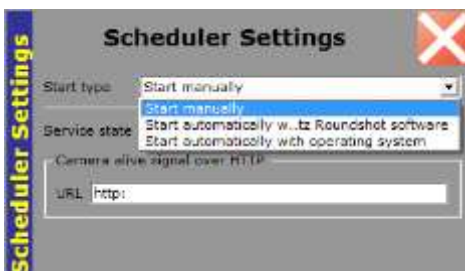
The following start-up options can be selected:

- Start Manually (default): this option is recommended for D2x camera as the sequence can be started and stopped manually using the start or stop buttons

- Start Automatically with software: this option allows the scheduler to start as soon as the Roundshot software is started

- Start Automatically with operating system: this option allows the scheduler to start as soon as the computer is started. This option is used on camera servers.
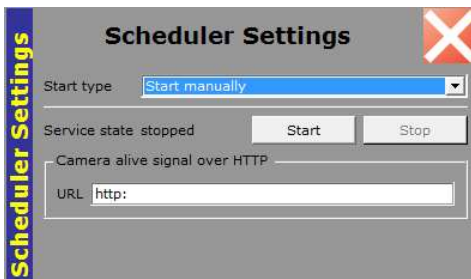
In the case of HDR photography, it is recommended to use the option **"Start manually".**

As soon as the software is closed or the stop button pressed, the scheduler will stop.

Camera alive signal over HTTP should not be used with Roundshot D2x camera.

4.8 … read + edit metadata

Metadata or EXIF are camera and image parameters which are embedded in the image. They help in the post-processing of the files and assist the photographer in retrieving essential image information later in the process (for example, lens, exposure speed, ISO/ASA).

The metadata can be loaded in the following software:

• PhotoMe
• Adobe Bridge + camera raw
• Adobe Lightroom
• Adobe Photoshop

4.8.1 PhotoMe

PhotoMe is a dedicated software to display, analyse and edit metadata. Load a DNG, TIFF or JPG file into the software to display image and camera data:

4.8 … read + edit metadata (continued)

4.8.2 Adobe Bridge + camera raw

Adobe Bridge displays all image files within a folder as thumbnails and is a seemless addition to post-processing software (camera raw). Click on the thumbnail image of the image file to display the metadata (file properties, camera data, settings for camera raw, etc.):
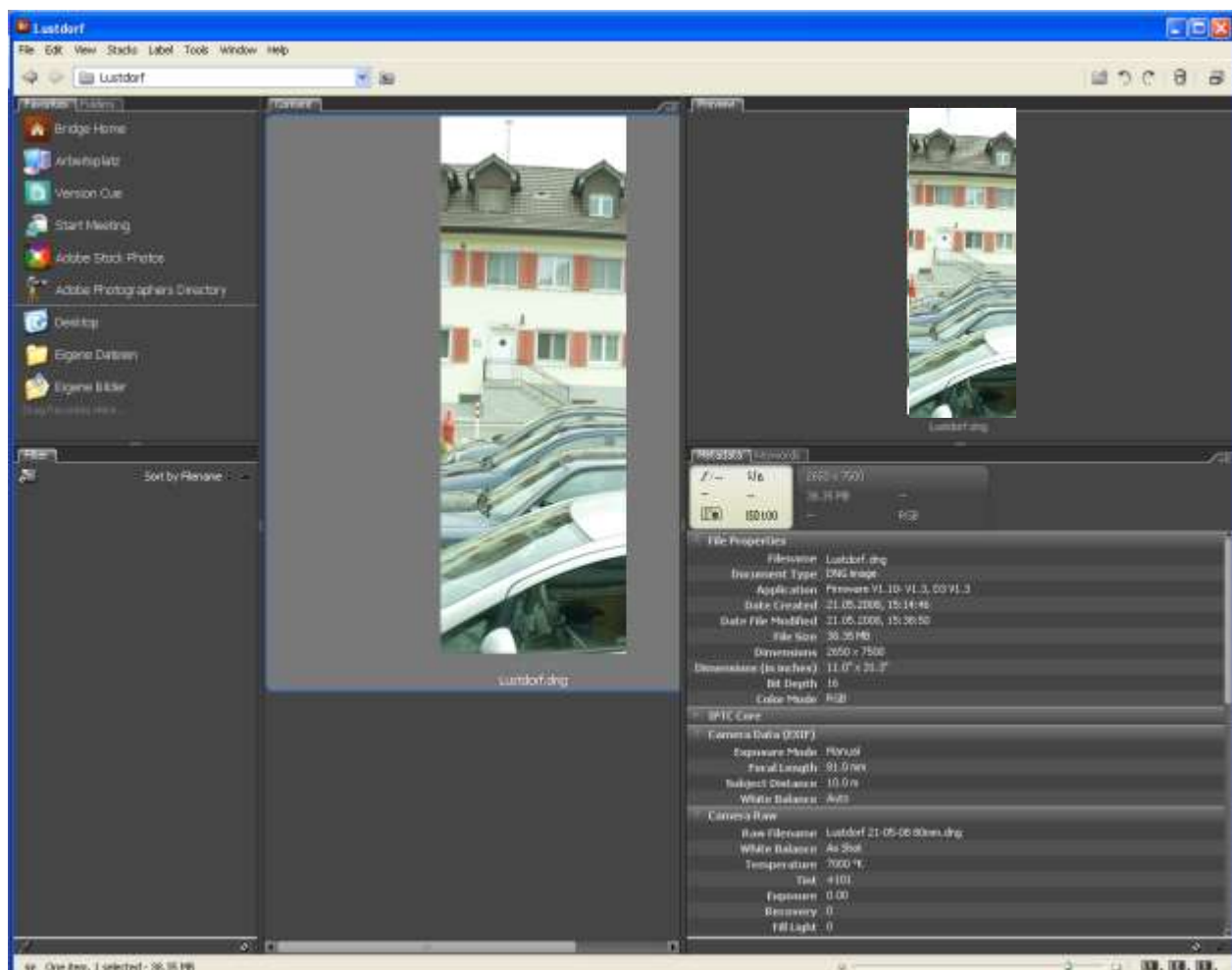
When double-clicking an image it is opened in camera raw.
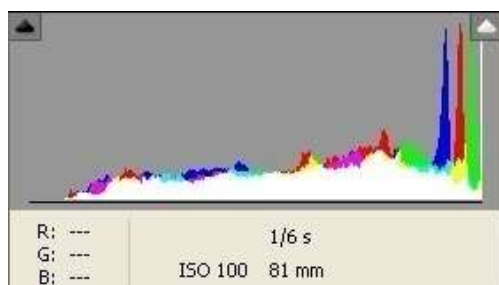
Camera raw shows only metadata for exposure speed, ISO/ASA and focal length.

For a complete list of metadata please refer to PhotoMe or Adobe Bridge.

4.8 … read + edit metadata (continued)

4.8.3 Adobe Lightroom

Contrary to camera raw where a full list of metadata is displayed in Bridge, Lightroom has all metadata integrated. Click on **„Metadata"** to display the full list:
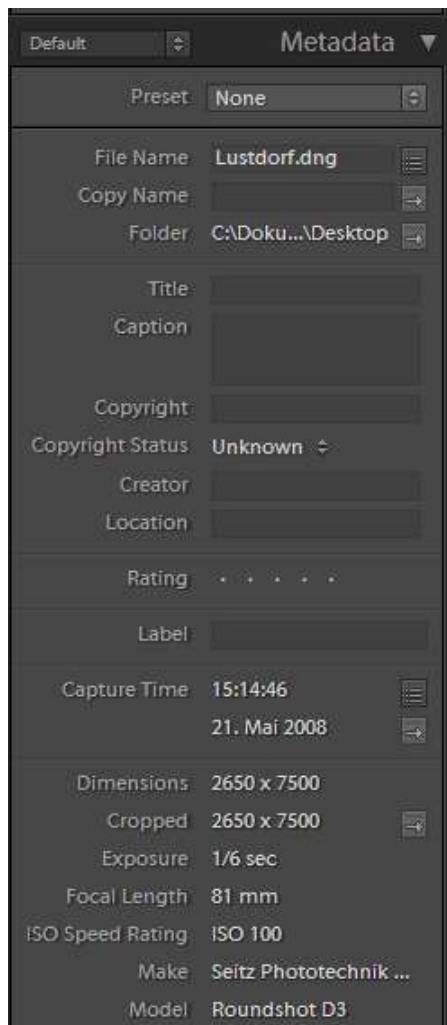
For a full list of metadata please refer to PhotoMe or Adobe Bridge.

4.8 … read + edit metadata (continued)

4.8.4 Photoshop

In Photoshop the metadata can be accessed by selecting **"File/File Info"** or by pressing ALT+CTRL+SHIFT+I:
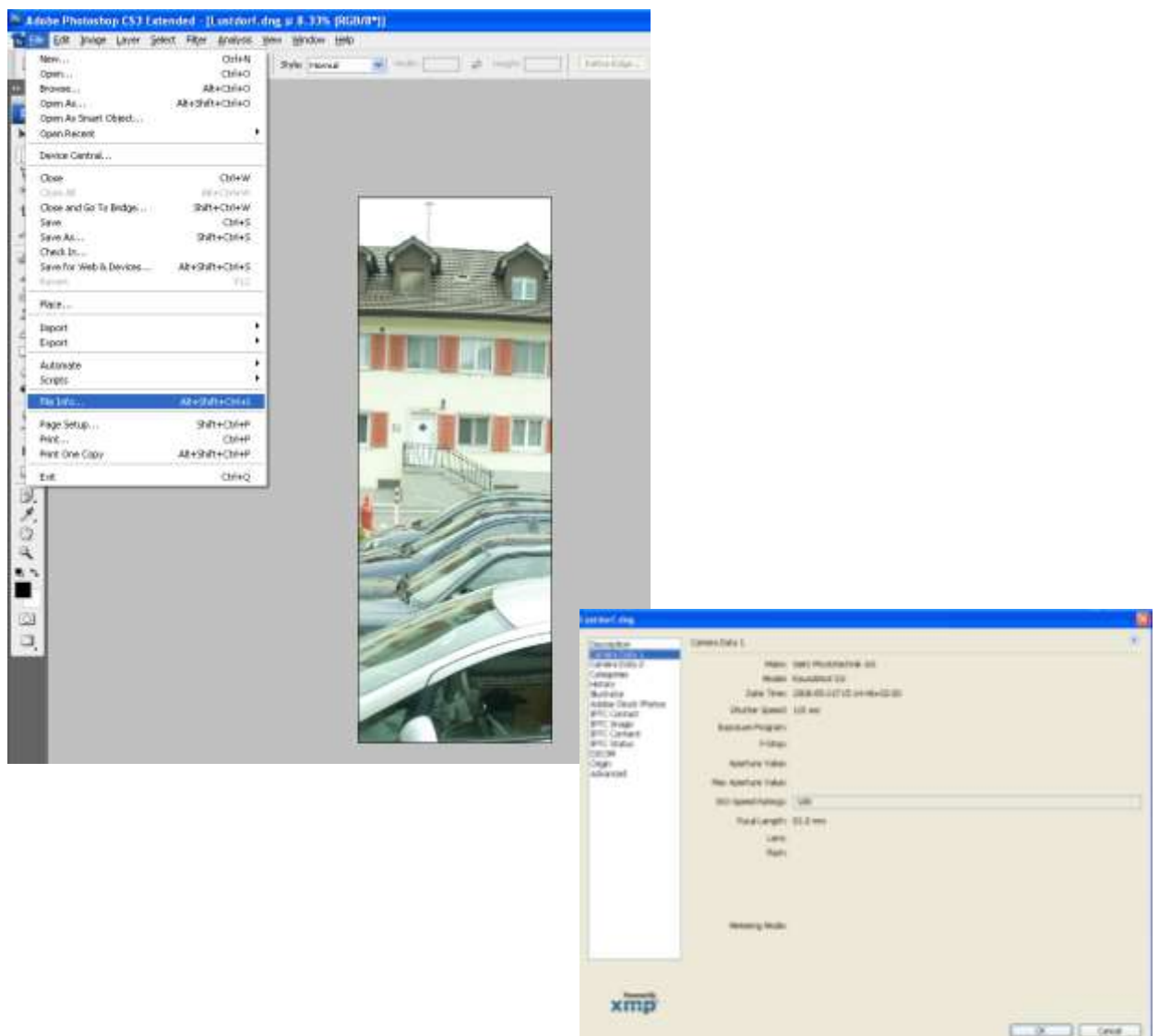
For a full list of metadata please refer to PhotoMe or Adobe Bridge.

5. Workflow

5.1 Introduction

The Roundshot D2x is a very versatile camera system and can be used for a large variety of different applications. For each of these applications different end products are created, which in turn influences the choice of workflow. Therefore we recommend thinking through the ideal workflow before starting to use the camera in the field. There are three main workflows:

RAW workflow	RGB workflow	HDR workflow
Image capture + preview	Image capture + preview	Scheduler (optional)
Optimisation* + rescan	Optimisation* + rescan	Image sequence capture
Optional white balancing**	Raw conversion + optimisation	Saving DNG files
Saving DNG file	Saving TIFF or JPG file	Mix sequence in 32bit EXR file Photomatix or Seitz
Raw conversion + post production	Post production	Post production
Ideal for fine-art photography with the objective to achieve highest quality standards in resolution + image quality	Ideal for applications where speed and minimal post production are important	Ideal for HDR 32bit image generation where mixing pure raw data is important to get accurate light measurement
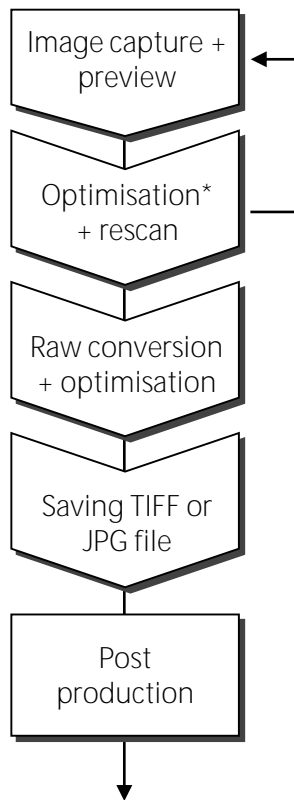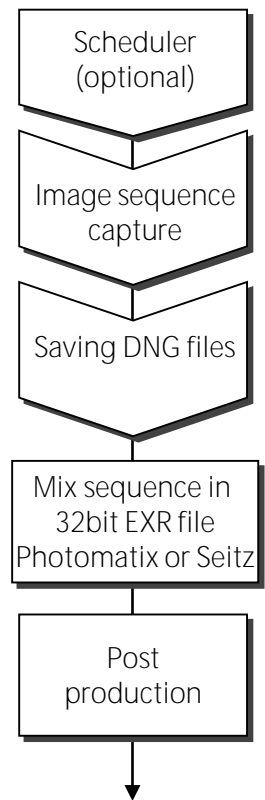
When working with large image files we recommend using 64-bit operating systems with 64-bit imaging software as this significantly increases processing speed.

* By changing setttings such as exposure speed, aperture, focusing, ISO/ASA, etc.
** All other optimisations are not stored with the raw (dng) file (such as histogram stretching, tone-mapping, etc.)

5.2 RAW workflow

Focus on the following points to obtain the highest possible image quality:

• Framing: It is recommended to capture an image containing slightly more angle than necessary to have higher flexibility in framing

• Exposure: Make sure to obtain a perfect histogram. This ensures that the exposure is precise and no additional post-processing (and loss of quality) is required.

• Sharpness: Work with focusing, aperture and distance setting in the software to obtain the best possible definition. Of course sharpness can be enhanced in post-production, but the better the original image, the more natural the final image will be.

Raw saving: Save the image in raw format DNG. Any other format will contain an already converted image with non-reversible operations reducing the adjustment possibilities. All other parameters can be readjusted later during the raw conversion with no risk of data loss, including white balance, tone mapping etc.

Image capture + preview

Optimisation* + rescan

Optional white balancing**

Saving DNG file

Raw conversion + post production

Final tiff / jpeg image
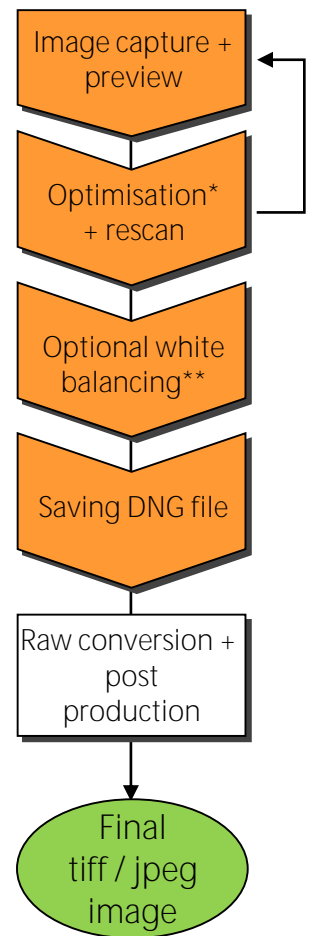
There are currently 3 software solutions for raw conversion + post production on the images:
• Seitz Roundshot software
• Adobe camera raw (+ Photoshop)
• Adobe Lightroom (+ Photoshop)

Open the dng file with the desired application. The raw image will be converted automatically into an RGB image preview. Then apply the post production steps for white balance, histogram optimisation, tone-mapping, colour noise reduction and for other (optional) settings.

5.2 RAW workflow (continued)

5.2.1 Seitz Roundshot software

Open the dng file in Seitz Roundshot software.
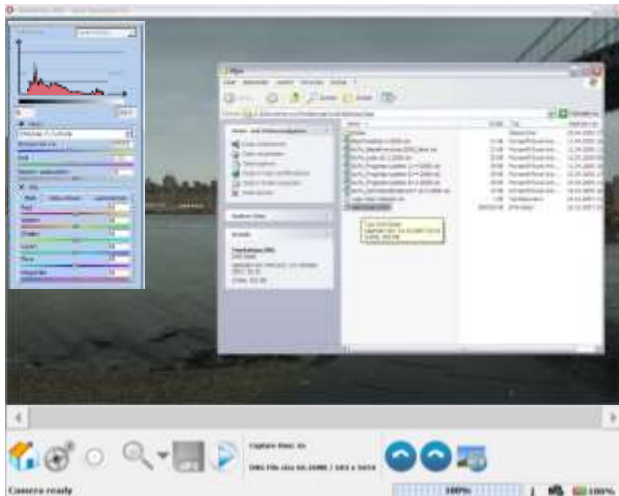
Place an explorer window over the Seitz Roundshot preview window and drag+drop the dng file into the software.

Another possibility is to load the file in the menu **"Manage/Load dng file"**:
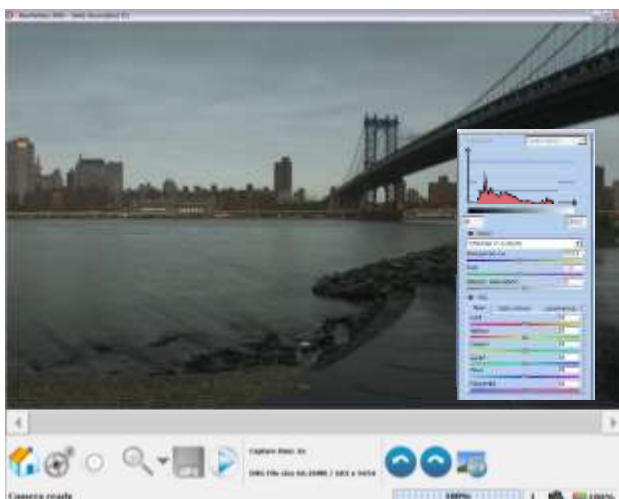
The panorama is displayed in the preview window. Slide the colour adjustment window sideways for better viewing of the panorama.

It is also possible to hide a part of the colour adjustment window if not **necessary or to select "fit on screen" option** to see the entire image.

When working with raw files (DNG) data is never modified. Therefore it is always possible to recover a previous setting of the image. Only when saving in Tiff or Jpeg the modifications are applied on the image data .

5.2 RAW workflow (continued)

5.2.1 Seitz Roundshot software (continued)
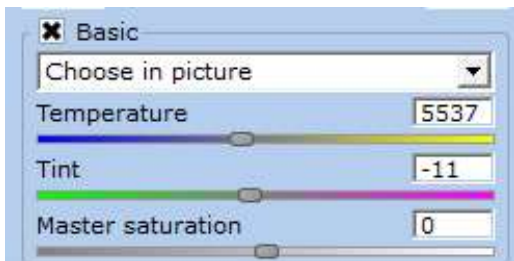
Basic: white balance

As a first step white balance the image. Using the basic menu on the colour adjustment window select one of the white balancing options in the list.

As a starting point it is recommended to use **either "choose in picture" and point on a grey area in the image, or "Automatic". This will give** a starting point for the subsequent fine tuning of colours.

The white balanced version of the image is displayed directly in the preview.

Use the other **"basic"** colour management tools to fine tune the image white balance:

- Temperature: for making the image appear warmer or cooler
- Tint: to compensate a potential greenish or magenta colour cast
- Master saturation: to increase or decrease the overall colour saturation without reducing the dynamic range of the image
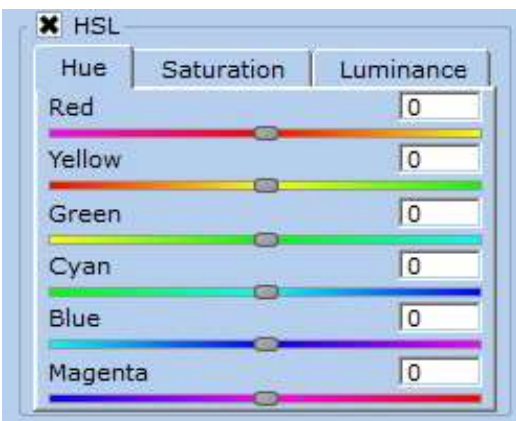
HSL*: Colour selective

Use the **"HSL"** tool to selectively adjust colours. It is possible to select and adjust each of the six proposed colours: Red, Yellow, Green, Cyan, Blue, Magenta. The adjustment can be done in three ways:

- Hue: Change the colour toward neighbouring colours in the HSL colour space
- Saturation: to increase or decrease the saturation of the selected colour only.
- Luminance: to increase/decrease the luminance of the selected colour only

* Hue, saturation, luminance

5.2 RAW workflow (continued)

5.2.1 Seitz Roundshot software (continued)

Tone mapping: contrast & dynamic range

As a next step create a tone-mapping (S-curve) to improve the mid-tones of the image. Select the magnitude of the s-curve from 1 to 5 (or your custom setting):
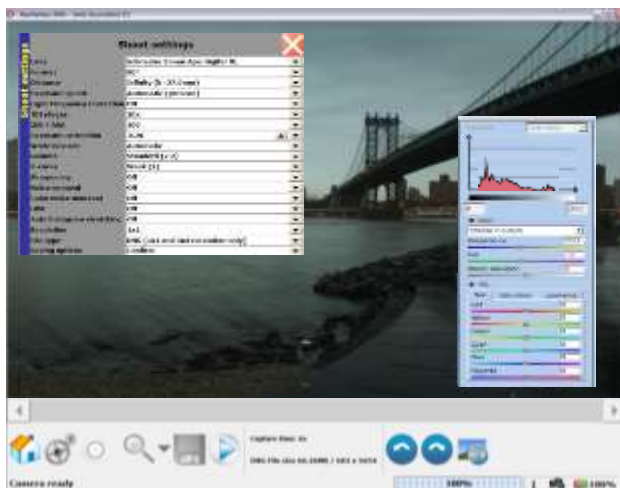
The tone mapped image is shown in the image preview.

Strong (5)
Weak (2)
Linear (1)
Custom (3)

Apply some histogram stretching by entering new minimum and maximum DN values
(for example: 5 / 220). Do not use excessive histogram stretching as this may lead to additional noise (maximum 20%).

The image with the adjusted histogram is shown in the image preview.

> 💡 **The goal of "histogram stretching" is to crop the dark parts of the dynamic** range containing no information. This will shift the left side of the histogram closer to the vertical axis of the graph.
>
> This method helps to remove a significant part of the noise without losing dynamic range (as no information is clipped), and without losing sharpness (as no median filter is used)

5.2 RAW workflow (continued)

5.2.1 Seitz Roundshot software (continued)

Zoom: details enhancement

Noise removal

Off
Off
Weak
Medium
Strong
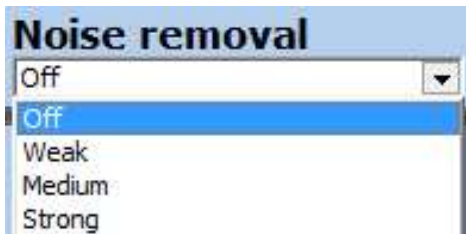
When the colours, contrast and dynamic range of the image are ok, zoom on some high frequency details of the image and apply the details enhancement tools:

• Noise removal: This tool applies a median filtering on the entire image. The different proposed strengths correspond to the filter radius.

For optimal results and minimum sharpness loss it **is recommended to use only the "weak" parameter.**

The effect of the details enhancement tools are visible only in zoom mode. They can also slow down the saving process if active.

5.2 RAW workflow (continued)

5.2.1 Seitz Roundshot software (continued)

Output: Format & bit depth

Open the **"output colour space"** menu. Choose between the two following colour spaces:

- adobeRGB is recommended for fine art applications an printing.
- sRGB is more suited to web applications and regular screen displays.

Open the **"Type"** menu. Choose between the two following output file types:
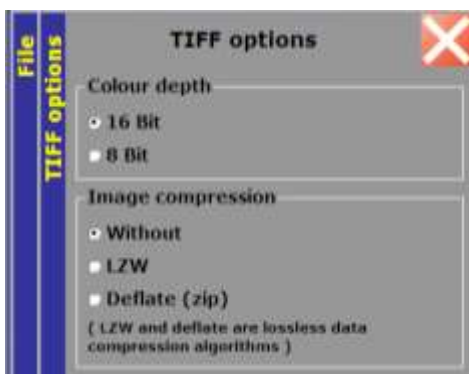
- Tiff: 8 and 16 bit versions are available as well as different lossless compression methods . Depending on the final application, choosing the accurate bit depth can help to either speed up the process or gain quality.
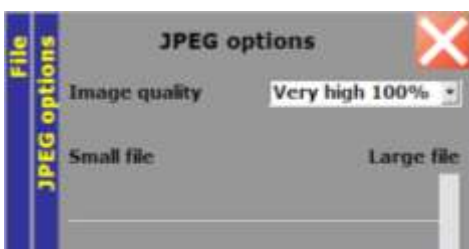
- Jpeg: 100% is a lossless compression. Lower values will generate some loss of quality but gain of disk space.

Finally save the image using the corresponding icon on the shoot menu .

As a next step open the image in Adobe Photoshop for further post production adjustments and retouching.

5.2 RAW workflow (continued)

5.2.2 Camera raw

When opening the dng file in camera raw the following menu is displayed:

Toolbar for direct editing   Preview   Full screen

Histogram

Optimisation tabs

White balance

Histogram optimisation

Zoom settings   Workflow options
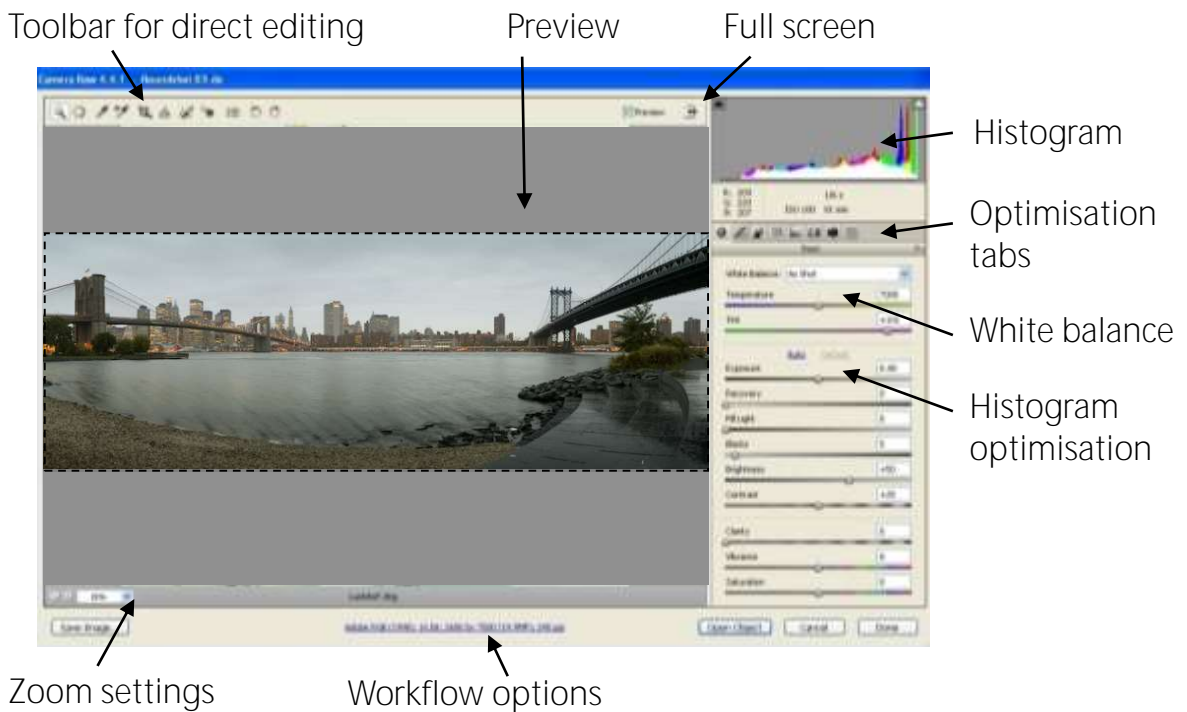
Click on "workflow options". The following options can be defined:
- Working colour space (Adobe RGB 1998, Colour Match RGB, ProPhoto RGB or sRGB)
- Colour depth (16 bit or 8 bit per channel)
- Size/image dimensions (x by 2,048 pixels or reduced)
- Resolution/image density (dots-per-inch, dots-per-cm)

To save processing time it is beneficial to define the desired colour depth and size at this step (rather than later in Photoshop). Choosing an 8 bit colour depth reduces file size by factor 2.

5.2 RAW workflow (continued)

5.2.2 Camera raw (continued)

It is also possible to crop the image by using the cropping cool and by selecting the crop area on the preview image

Use the straighten tool, retouch tool or red eye removal tool to adjust the image.

Once the workflow options and image dimensions are defined and adjustments are done optimise the image step by step:

Basic   Tone-curve   Detail   HSL/Gray-scale   Split toning   Lens correc-tions   Camera cali-bration   Presets

Image Settings
Camera Raw Defaults
Previous Conversion
✓ Custom Settings
Preset Settings

Apply Preset   ▶

Clear Imported Settings

Export Settings to XMP

Update DNG Previews…

Load Settings…
Save Settings…

Save New Camera Raw Defaults
Reset Camera Raw Defaults
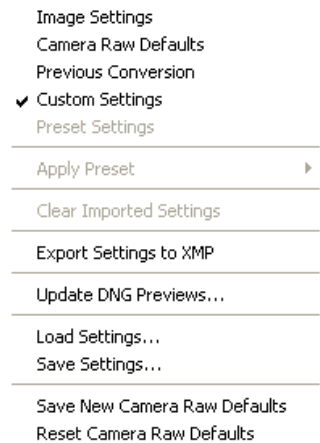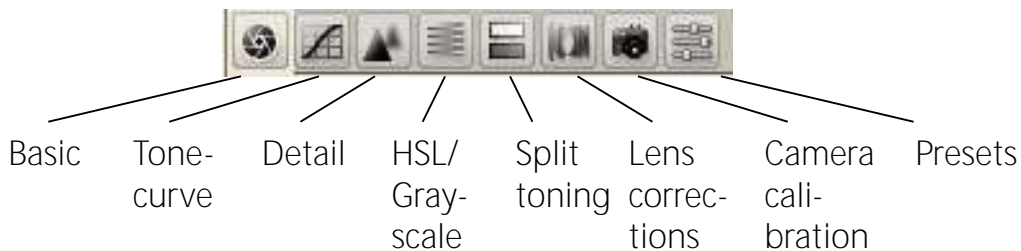
It is also possible to specify which settings are automatically loaded when opening a dng file or to save and reapply (load) specific settings.

To do this click on the settings icon on the right side of the menu bar.

5.2 RAW workflow (continued)

5.2.2 Camera raw (continued)
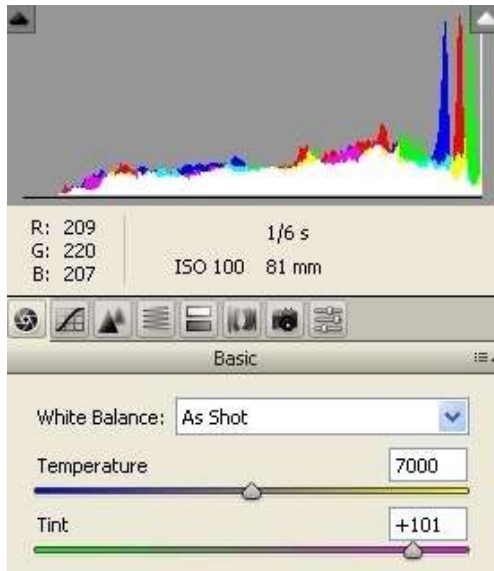
Basic: white balance

The second step consists of setting the most natural white balance of the image. Select one of the options in the white balance drop down list:
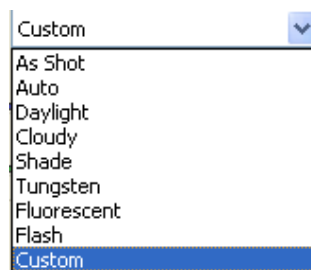
Another possibility is to use the white balance tool (menu bar) to define a specific white point in the preview image:

> 💡 Please note that if any white balancing has been done in the Seitz Roundshot software at image capture, these settings are saved with the dng file and applied when opening the image in the raw converter **software (white balance option: "as shot").**

> 💡 The ideal white point varies with the illumant (light) prevailing in the image. Instead of using a white point a grey point will often give better results.

5.2 RAW workflow (continued)

5.2.2 Camera raw (continued)

Tone Curve

The Tone Curve tool adjusts the histogram of the image by applying a tone curve. The shape of this tone curve can be shaped in two ways:

- Parametric (by entering data for highlights, lights, darks and shadows)
- Point (by moving the points of the curve graphically)
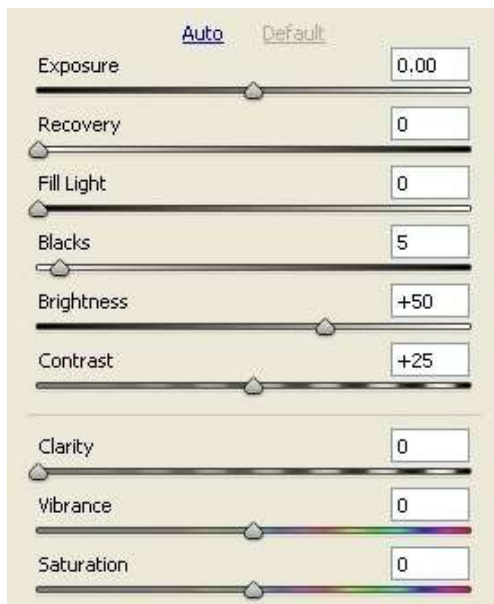
Basic: histogram optimisation

The Histogram optimisation levers allow to change the shape of the histogram (**"default"**). For example, "exposure" shifts the mean value of the histogram up or down, while "black level" adjusts the black point of the image.

Adjust the settings and see the results in the preview.

It is also possible to create an automatic histogram optimisation by selecting **"Auto"**.

The S-Curve tone mapping stretches the mid-tones, compresses the extremes and increases contrast.

5.2 RAW workflow (continued)

5.2.2 Camera raw (continued)
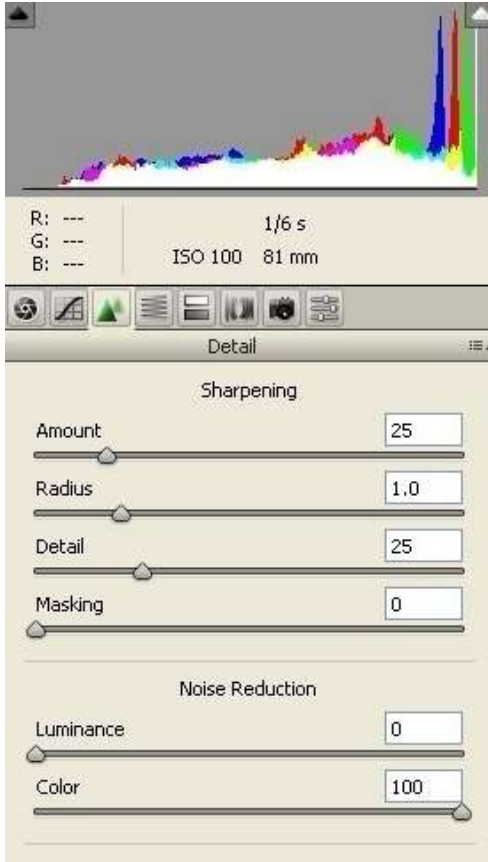
Detail: sharpening + noise reduction

The **"Sharpening"** tool applies an unsharp mask filter on the image. Zoom to 100% in the image (or larger) to control the effects.

"Noise reduction" is a filter which eliminates any colour noise (false colours in areas of high frequency) in the image.

💡 Apply sharpening only at the very end of the post production. It may be preferable to do the sharpening as a second step in Photoshop where additional sharpening options and different sharpening filters are available (for example: smart sharpening).

5.2 RAW workflow (continued)

5.2.2 Camera raw (continued)

The following adjustments allow to fine-tune the image in colour tone or to apply specific lens corrections.

HSL / Grayscale	Split Toning	Lens corrections	Camera calibration
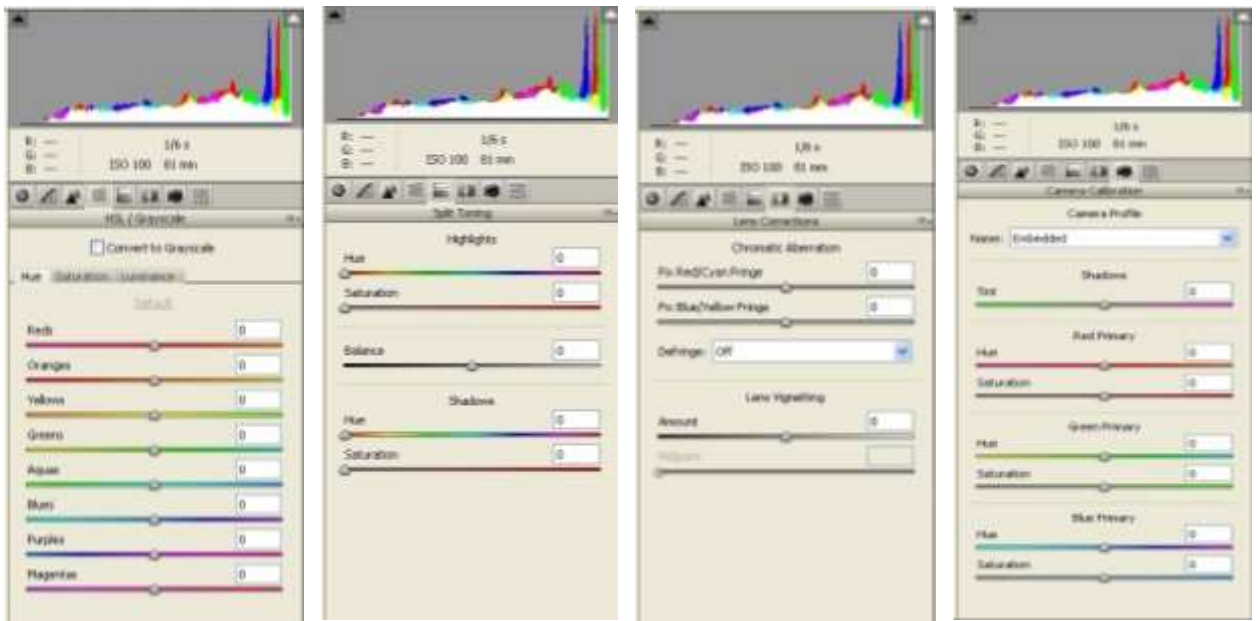
Once all adjustments are complete open the image by clicking the button "Open Image". The dng file is converted into an RGB file (interpolation of RGB layers) and all adjustments and optimisations are applied at once.

The final image opens in Photoshop. Continue the post production in Photoshop if required. Save the image as a 16-bit tiff, 8-bit jpg or in other file formats.

5.2 RAW workflow (continued)

5.2.3 Lightroom

Start the Lightroom software and open your dng file from the "file" menu:

The dng file is now loaded in Lightroom. To see the full image click on the thumbnail image on the left:

Menus

Thumbnail

Histogram

Preview

Menu details

Statistics on loaded images

Display options

5.2 RAW workflow (continued)

5.2.3 Lightroom (continued)

"Library" and **"Develop"** are the two main menus and consist of the following sub-menus:
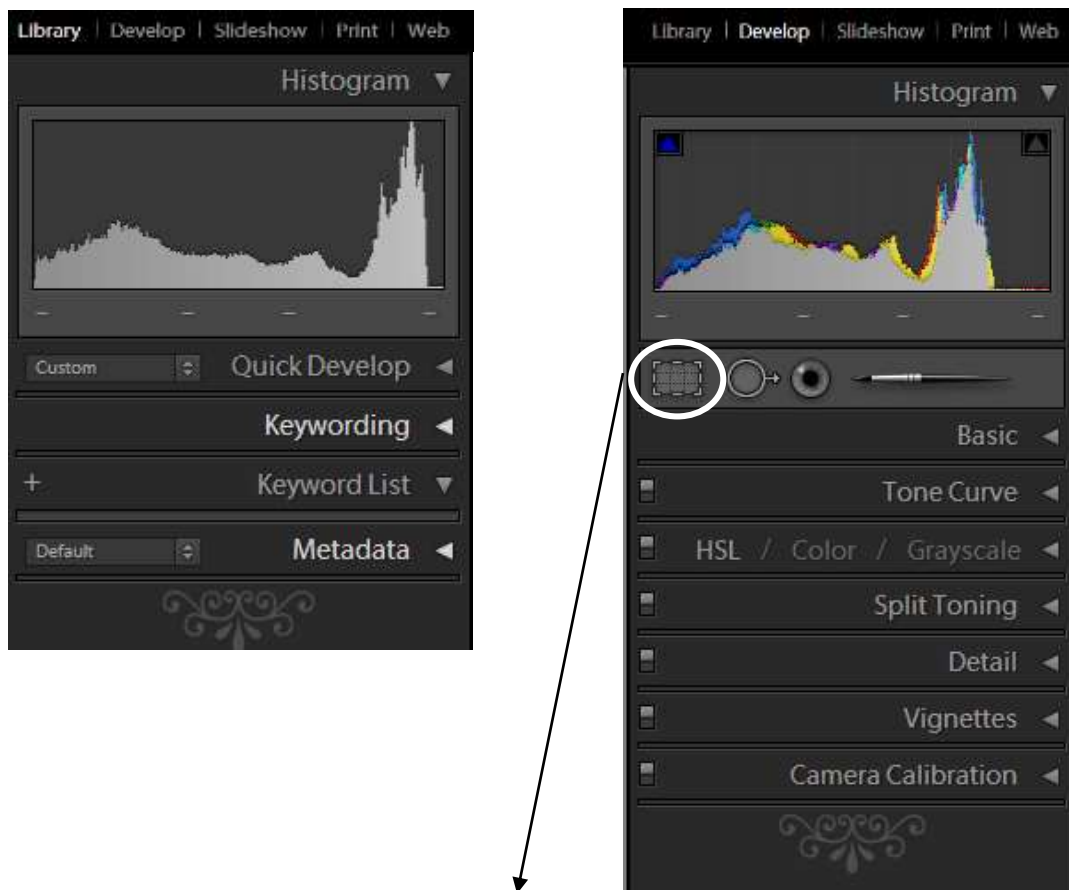
As a first step define the desired image dimensions. This allows to work on the relevant image area only, avoiding additional computation time. Click on the **"crop"** tool and select the crop area in the preview:
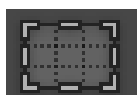
5.2 RAW workflow (continued)

5.2.3 Lightroom (continued)

White balance

The next step consists in setting the most natural white balance of the image. Select one of the options in the white balance drop down list:

Library/Quick Develop

Select one of the options in the white balance drop down list:
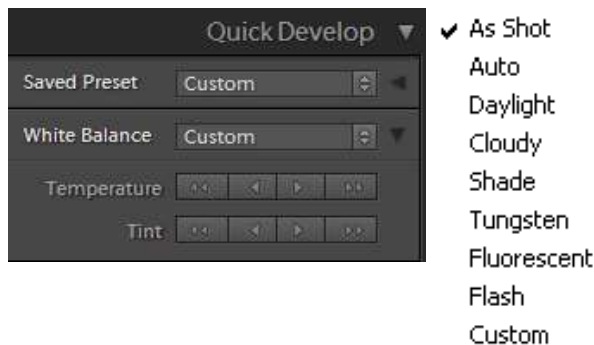
Develop/Basic

Define the white/grey point by using the White Balance Selector tool or change temperature / tint:
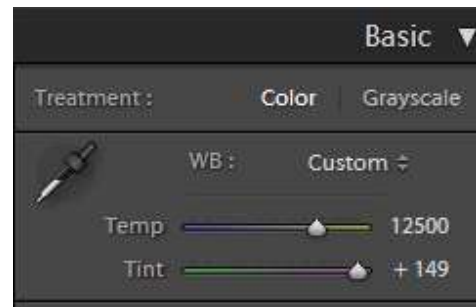
Quick Develop ▼		✔ As Shot
Saved Preset	Custom	Auto
White Balance	Custom	Daylight
Temperature		Cloudy
Tint		Shade
		Tungsten
		Fluorescent
		Flash
		Custom

		Basic ▼
Treatment :	Color	Grayscale
WB :		Custom ⬍
Temp		12500
Tint		+ 149

> Please note that if any white balancing has been done in the Seitz Roundshot software at image capture, these settings are saved with the dng file and applied when opening the image in the raw converter **software (white balance option: "as shot").**

> The ideal white point varies with the illumant (light) prevailing in the image. Instead of using a white point a grey point will often give better results.

5.2 RAW workflow (continued)

5.2.3 Lightroom (continued)

Tone mapping / s-curve: Develop / Tone Curve
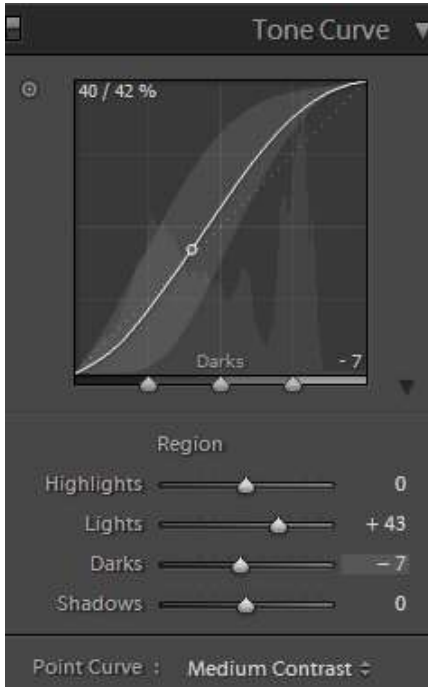
The Tone Curve tool adjusts the histogram of the image by applying a tone curve. The shape of this tone curve can be shaped in two ways:

• Parametric (by changing the levers for highlights, lights, darks and shadows)
• Point (by moving the points of the curve graphically)

Histogram optimisation: Develop / Basic
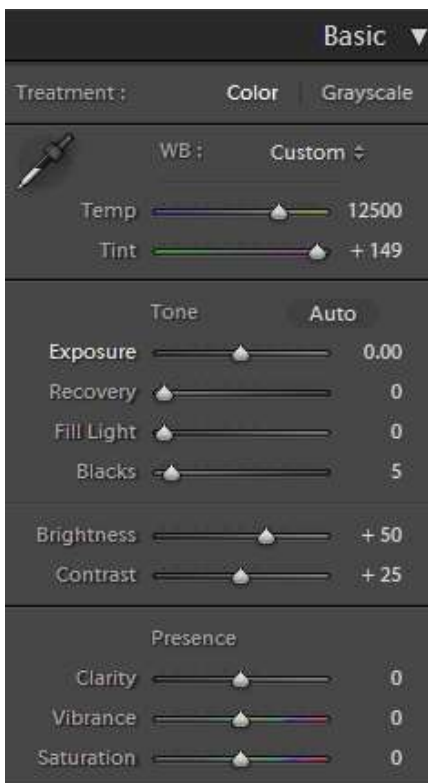
The Histogram optimisation levers allow to change the shape of the histogram. For example, "exposure" shifts the mean value of the histogram up or down, while "blacks" adjusts the black point of the image.

Adjust the settings and see the results in the preview.

The S-Curve tone mapping stretches the mid-tones, compresses the extremes and increases contrast.

5.2 RAW workflow (continued)

5.2.3 Lightroom (continued)

Noise reduction + sharpening: Develop / Detail
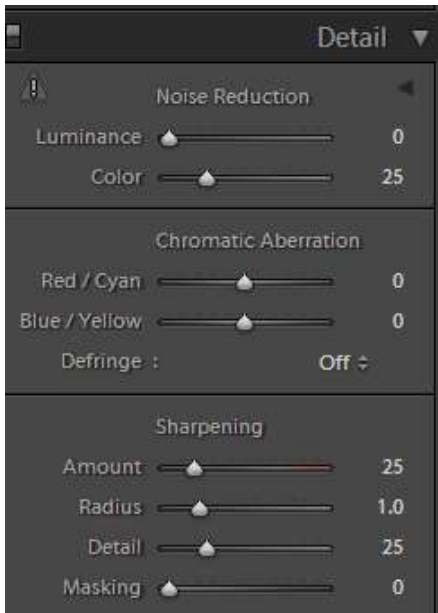
"Noise reduction" is a filter which eliminates any colour noise (false colours in areas of high frequency) in the image.

The **"Sharpening"** tool applies an unsharp mask filter on the image. Zoom to 100% in the image (or larger) to control the effects.

Apply sharpening only at the very end of the post production. It may be preferable to do the sharpening as a second step in Photoshop where additional sharpening options and different sharpening filters are available (for example: smart sharpening).

5.2 RAW workflow (continued)

5.2.3 Lightroom (continued)

The following adjustments allow to fine-tune the image in colour tone or to apply specific lens corrections.
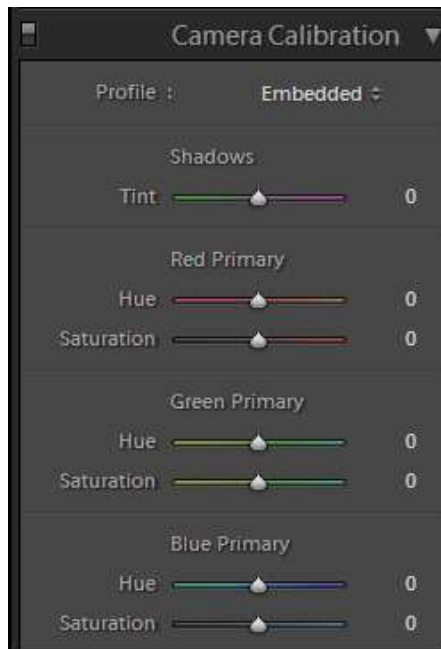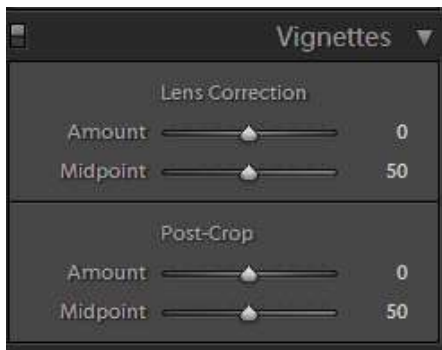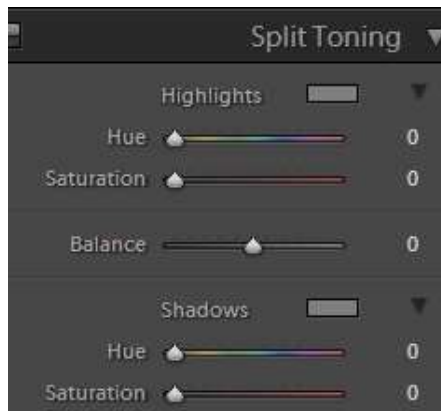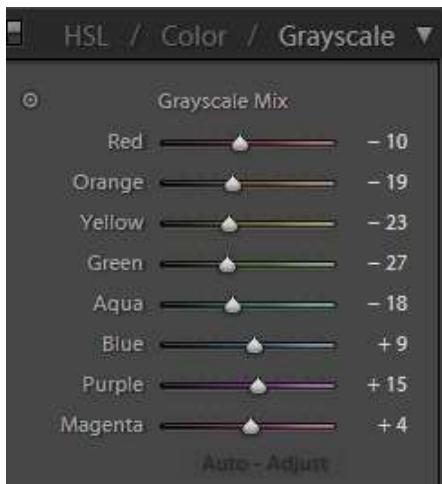
5.2 RAW workflow (continued)

5.2.3 Lightroom (continued)

To convert the dng file into an RGB image select **"File/Export".** Define the export location, the file name, file and image settings as well as post-processing options in the following menu:

TIFF, JPG, PSD, DNG

8-bit, 16-bit

sRGB, Adobe RGB, ProPhoto RGB
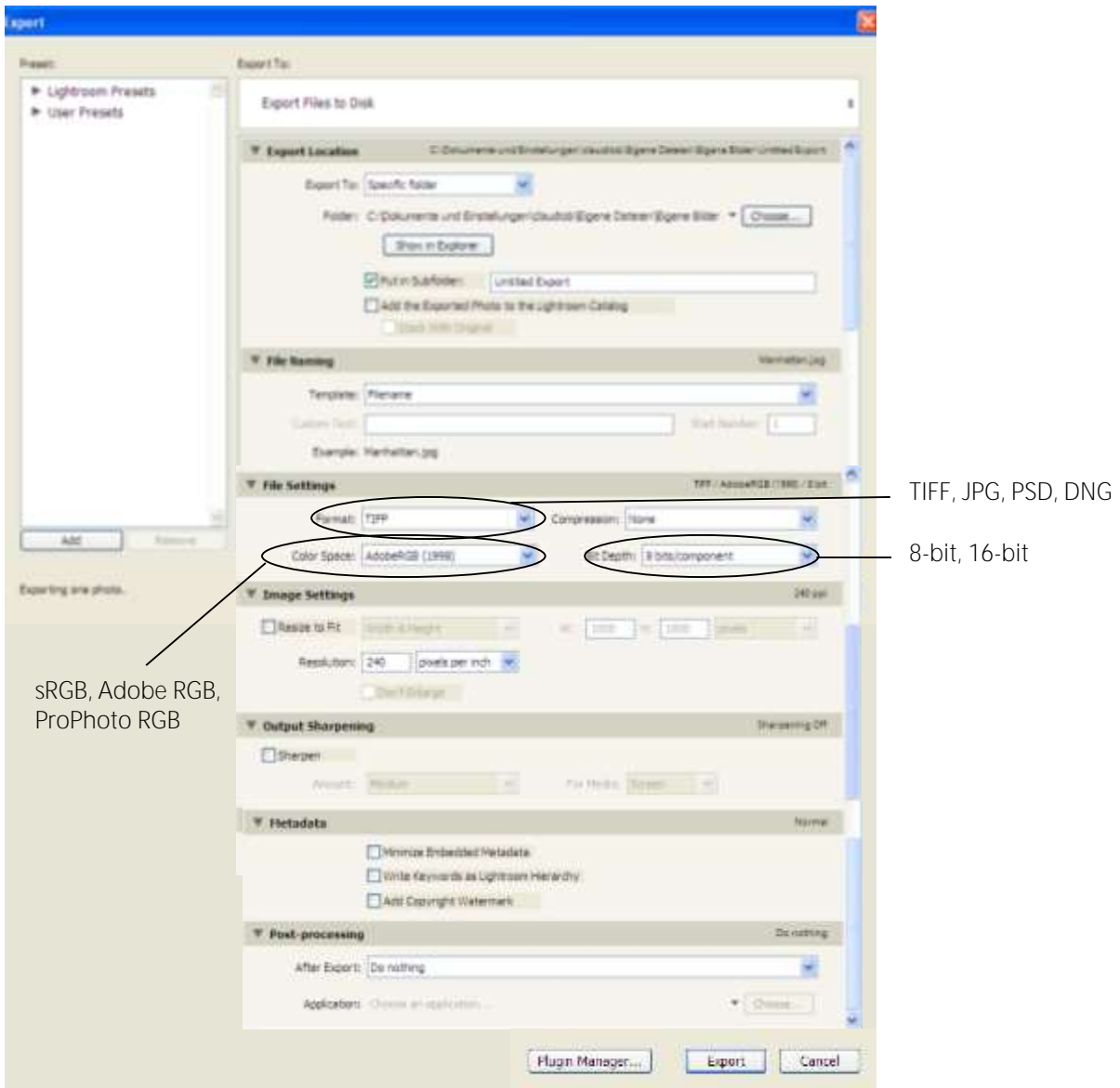
Press **"Export"** to start the conversion into an RGB file (interpolation of RGB layers) for TIFF, JPG and PDS files. All adjustments and optimisations are applied at once.

Continue the post production in Photoshop if required. Save the image as a 16-bit tiff, 8-bit jpg or in other file formats.

5.3 RGB workflow

In the RGB workflow image capture and RGB conversion are done in one step in the Seitz Roundshot capture software. This workflow is ideal for applications where speed and minimal post production are important.

5.3.1 Full resolution RGB workflow
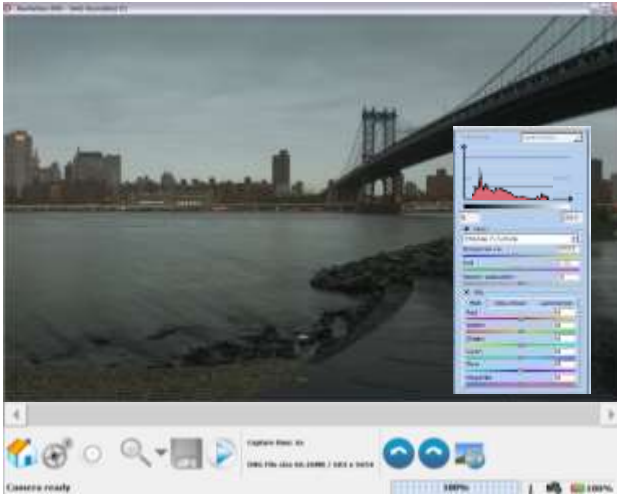
Once the image is captured and displayed in the preview window, complete the following post-production steps:

• White balancing
• Tone mapping
• Histogram stretching
• Optional: noise removal

White balancing
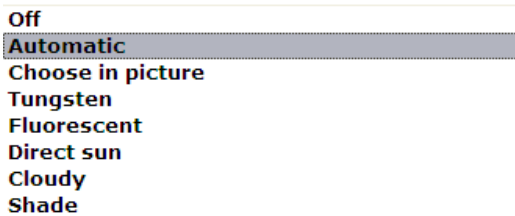
Tone mapping (s-curve)
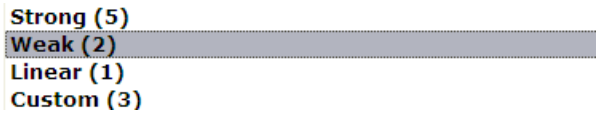
Histogram stretching
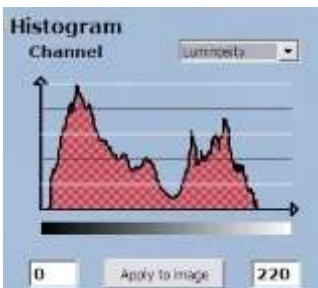
Optional: sharpening / noise removal
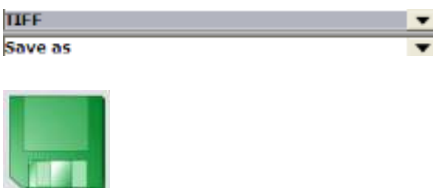
Select file type "TIFF" or "JPG" and save the image.
The dng file is converted into an RGB file (interpolation of RGB layers). Continue the post production in Photoshop (colour adjustments/tone-mapping, sharpening).

5.3 RGB workflow (continued)

5.3.2 Reduced resolution RGB workflow (fast RGB workflow)

For projects which require a fast image taking/processing/saving rhythm at reduced resolution the fast RGB workflow is ideal. This is achieved by selecting an automatic exposure (spot, prescan or variation) a reduced resolution and selecting **"auto save"**:
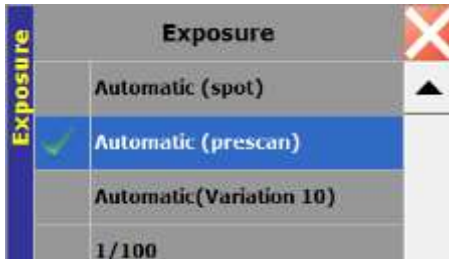
"Automatic (prescan)" is more accurate, but is more time-consuming than **"Automatic (spot)"**, as it requires a 360° turn of the camera head for light metering. **"Automatic (variation)"** change the exposure time within the image.

The Roundshot D2x allows seven resolution options:
• XXL **(1x1 / 2'048 pixels vertical resolution)**
• XL **(2x2 / 1'024 pixels vertical resolution)**
• L (3x3 / 682 pixels vertical resolution)
• M (4x4 / 512 pixels vertical resolution)
• S (6x6 / 341 pixels vertical resolution)
• XS (9x9 / 227 pixels vertical resolution)
• XXS (12 x 12 / 170 pixels vertical resolution)

Auto Save saves the image directly after image taking without pressing the „save" button. It names the file automatically.

Set all other parameters to the desired value (format, distance, ISO/ASA, File type TIFF or JPG).

> The resulting TIFF or JPG files cannot be reopened by the Seitz Roundshot software or other raw converters. Post-processing needs to be done entirely in Photoshop.

5.4 HDR workflow

5.4.1 HDR overview

The graph below contains an overview of the different possible HDR techniques. However, only the multiple HDR solution - mixing differently exposed images - can lead to a 32bit HDR file with extreme dynamic range.

| single scan |
| HDR tone mapping |

dng
Tiff
jpeg
16-bit

tone-mapping = luminance adjustment on a single image

HDR scene

| multiple scans |

| HDR tone mapping |

dng
Tiff
jpeg
16-bit

hdr
exr
32-bit (in progress)

combination of various under- and over-exposed images in a new 32 bits raw image
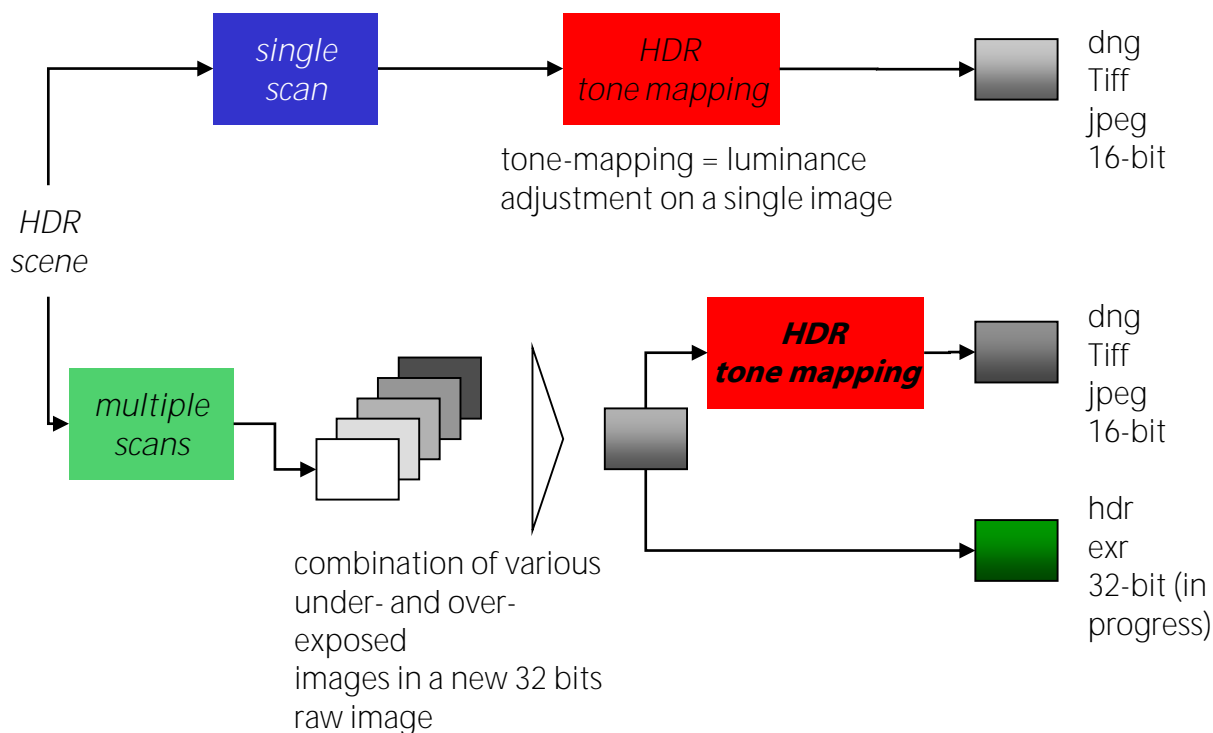
	Single HDR	Multiple HDR
Image capture	• One image	• Several images
Rendering process	• Tone-mapping of the raw image	• Combination of under-/over-exposed images into one HDR image (raw), tone-mapping of the raw image (optional)
Photography	• Action photography possible (moving scenes)	• Only still photography possible (no moving scenes)
Noise	• Amplification of noise	• No additional noise
Dynamic range	• 11 f-stops (1:2600)	• A multiple of 11 f-stops
Colour depth	• 16-bit	• 16-bit or 32-bit
File formats	• dng, tiff, or jpg	• dng, tiff, jpg, hdr or exr

5.4 HDR workflow

5.4.2 Image capture

Step 1: Take a test image to determine exposure

Example:

Exp1=1/250s
Exp2=1/63s
Exp3=1/16s

Either take an image with medium exposure and optimise the histogram or create a fast exposure and reduce the light source (sun) to the minimum. This will determine the base for bracketing.

Step 2: Set the white balance

There are three possible options for white balance:
• **"choose in picture"** – for point white balance
• **"custom"** – using temperature & tint (manual)
• **"presets"** (direct sunlight, shade, tungsten, fluorescent)

The above white balance options will keep the temperature & tint values exactly the **same for every panorama. "Choose in picture" is the most visual or intuitive tool.**

There is always the possibility to readjust the white balance afterwards. However, the fastest and most accurate workflow is to have a uniform white balance from the beginning.

> **Do not use "automatic white balance" as this will create different colour** temperatures and hues for every image. As a consequence, the HDR mixing will lead to artefacts.

5.4 HDR workflow (continued)

5.4.2 Image capture (continued)

Step 3: Check the "shoot settings"
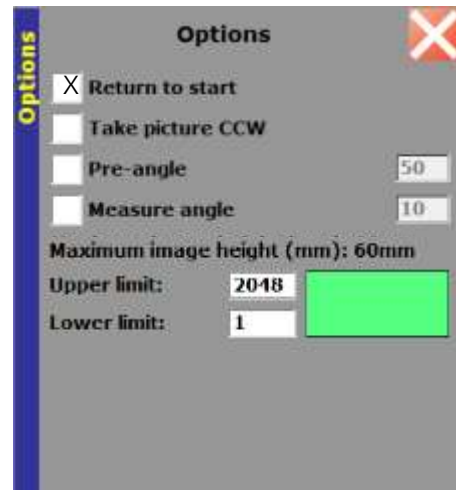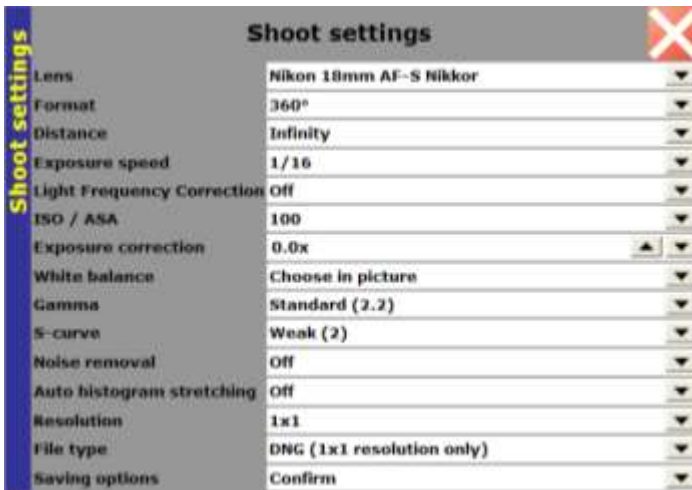
For example:

- 18mm Nikon AF-S Nikkor lens
- 360°
- Distance equal to focusing on lens
- Exposure speed according to bracketing table
- ISO set to 100 as higher ISO does not allow better information for 32-bit
- **White balance: "choose in picture", "custom" or "presets"**
- Gamma, S-curve, sharpening & noise removal will be set automatically to default when saving DNG
- Auto histogram stretching: off
- File type: DNG
- Saving options: automatic

Do not forget to activate **"return to start"** in **the "Format/Options"** menu. This makes the camera return anti-clockwise to the starting position, thus ensuring a perfectly uniform pixel registration for every image.

5.4 HDR workflow (continued)

5.4.2 Image capture (continued)
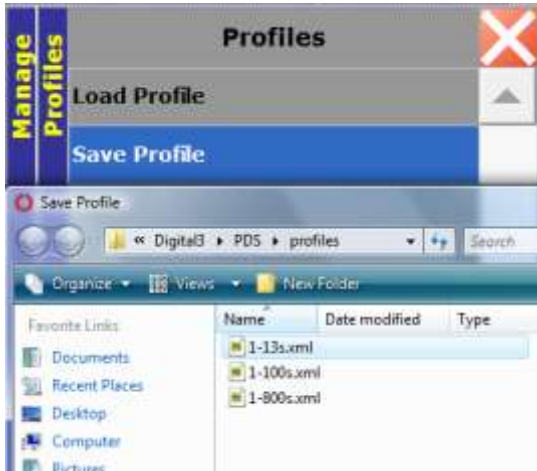
Step 4: Program the scheduler for HDR imaging

Open the **"Profiles"** menu and create one profile per image. In this example, three profiles are programmed. The bracketing is done by changing only exposure time.

Exp1=1/250s
Exp2=1/63s
Exp3=1/16s

Open the **"Scheduler/Jobs"** menu and create three **"Photo continuous jobs"** using the three profiles.
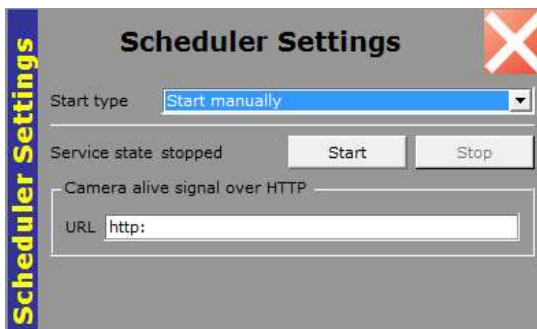
Open the **"Scheduler Settings"** menu and select the option "start manually". Then press the button start.

The camera will start image-taking in the defined sequence.

5.4 HDR workflow (continued)

5.4.3 32bit HDR generation: image mixing

Photomatix

This software is recommended for 32bit EXR generation. It is able to read dng or tiff files. It also contains very useful tools especially for outdoor images:

• Align source images - in case any external factor (wind, vibration on floor) moved the camera from its position during image capture
• Reduce chromatic aberration at the edge of objects or buildings
• Attempt to remove ghosting artefacts - in case of non static scenes either for background or object movement
• Process images by stripe allowing the processing of very big tiff files
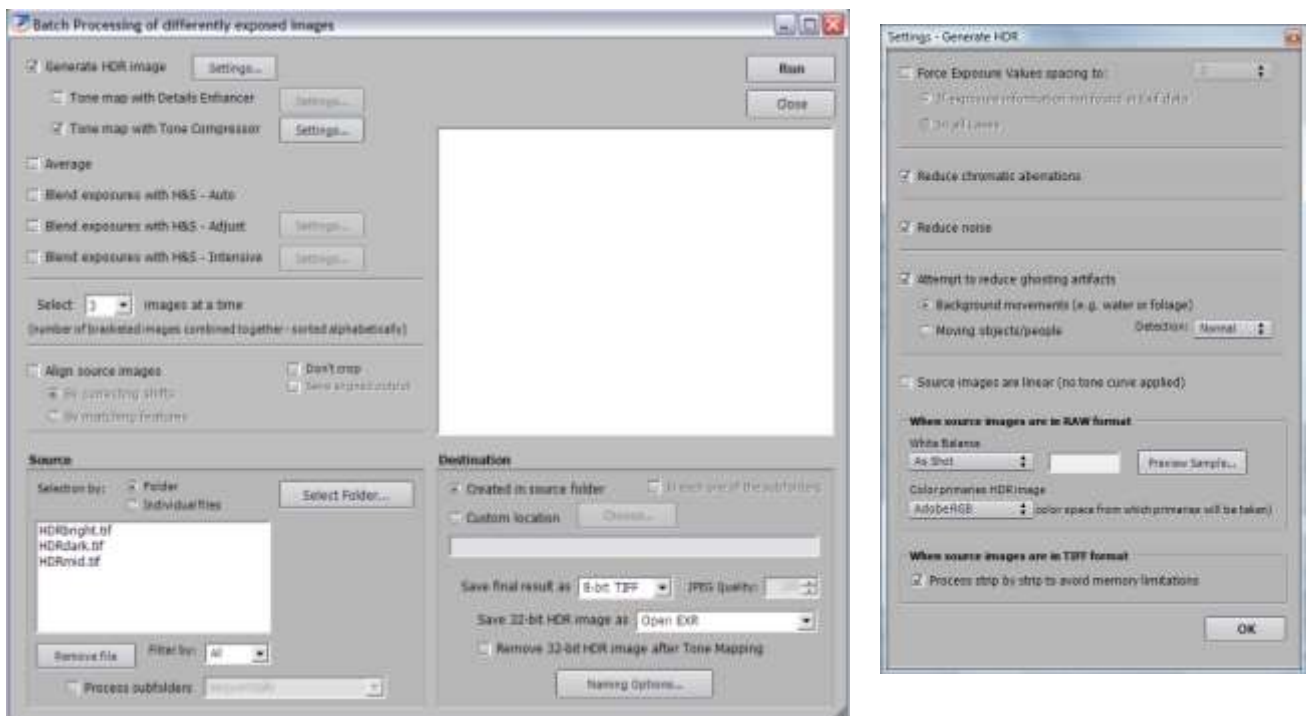
Please note that in case of using Tiff files, all conversion options must be turned off and the S-curve needs to be set to 1. The less processing the image contains, the higher 32bit image quality is generated.

5.4 HDR workflow (continued)

5.4.3 32bit HDR generation: image mixing (continued)

Seitz Roundshot software*

Press the **"HDR"** to access to the HDR mixer menu

Select "Generate HDR" to access to the HDR mixing tool .
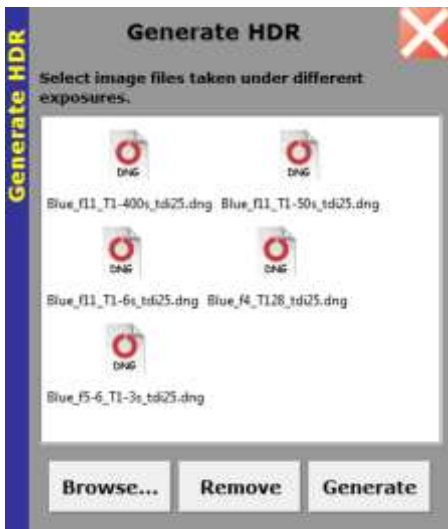
Press **"Browse"** and select a set of differently exposed images of the same scene. Only DNG files are usable.

All the parameters necessary for the HDR generation are stored in the images metadata.

Click **"Generate".** After a few minutes (depending on the size and number of images) the progress bar will reach100%.

A 32bit EXR file is saved according to the selected image saving path.

> The Seitz Roundshot HDR mixing tool is able to process all dng file resolutions. However it does not contain any ghost removal or image alignment tools.
>
> Therefore it is recommended to use this tool only for static scenes (mainly indoors). For the outdoor scenes please use Photomatix or other HDR mixing tools (Photoshop for example).

* HDR mixing tool is not available for the 3.2 software version. It will be activated in a future software release.

6. Maintenance

6.1 Power supply: AC power adaptor and battery charger

The Roundshot D2x camera can be operated either with the battery or by connecting the camera to a permanent power supply.

Power supply: Battery

interchangeable

Socket
for
battery
charger

Socket for external
power cable

Important: make sure that the power supply is not plugged into the battery socket as a malfunction may occur.

A single charge of the NiMh 12V 4.5A battery usually last for 5-6 hours of operation. The camera has a built-in power save feature and shuts down all non essential camera functions when idle.

Charging the 12V 4.5A battery

Standby
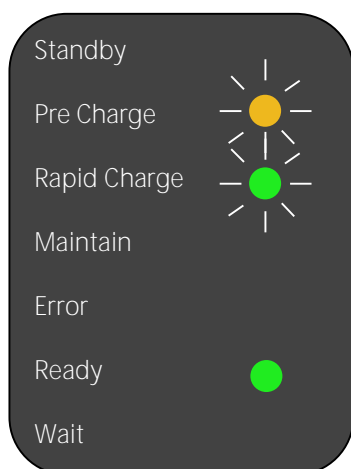
Pre Charge   **Start of charging process (about 5 min.)**

Rapid Charge   **Main charging process (about 4-5 hours)**   **about 4-5 hours**

Maintain

Error

Ready   **Charge complete**

Wait

6.2 Possible error messages

In this section we have summarised possible errors of the Roundshot D2x camera system. In case the error cannot be solved please contact your distributor or a Seitz Roundshot technician in Switzerland.

6.2.1 Exposure and data transfer errors

These errors occur when the exposure (capture time) is not ideal or when the data cannot be transferred between camera and computer (RAM).

	Root cause	Solution
Timeout error	The image capture exceeds 3 minutes	Increase capture speed by changing aperture, exposure time, or ISO/ASA
Not enough light	**In exposure „automatic" or when** focusing: Maximum read-out speed reached; sensor cannot process data	Increase capture time by changing aperture, exposure time or ISO/ASA
Too much light	**In exposure „automatic" or when** focusing: Minimum read-out speed reached; sensor cannot process data	Decrease capture time by changing aperture, exposure time or ISO/ASA
Not enough memory	Roundshot software does not receive enough RAM to process the image; the image is too large	Decrease RAM requirements by using a shorter focal length, decreasing the image angle or by using a lower resolution (binning)
DNG image > 65,000 pixels	The raw (dng) image cannot be opened by raw converters if it has more than 65,000 horizontal pixels	Convert the dng file in the Seitz Roundshot software or save the image as tiff or jpg
JPEG image > 65,500 pixels	The jpeg image cannot go beyond 65,500 pixels in width	Save the image as tiff

6.2.1 Exposure and data transfer errors (continued)

	Root cause	Solution
Error in data transfer	Either the data to be transferred is corrupt or incomplete	Rescan
Error in data transfer sensor/module and board	The data cannot be transferred within the D2x camera, for example because of a power shortage	Check and recharge the battery, check the power supply
Not enough CCD lines received	The image could not be transferred entirely from the camera RAM to the computer RAM	Rescan

6.2.2 Network connection errors

The following errors describe situations where the computer cannot establish any connection to the camera.

	Root cause	Solution
Camera not connected	The connection between computer and camera cannot be established	Check: - power supply of camera - cabling (ethernet, power) - network card (activated? Gigabit ethernet?) - IP and subnet mask of camera and computer
Flash IP error	Reallocation of camera IP in: „Manage/Settings/Search camera" has failed	Repeat the command to change the camera IP
Connection refused error	The D3 imaging server is not running	Close the program and open it again

6.2.2 Network connection errors (continued)

The following errors describe situations where the computer cannot establish any connection to the camera.

	Root cause	Solution
Socket resource error	The computer does not have enough socket connections available	Reconfigure computer to make more socket connections available (for example, remove HTTP server socket connection)
Socket in use error	The socket binding address is already used by another application	Reconfigure computer to make the required socket connection available
Socket operation not supported	The required socket operation is not supported by the computer operating system (for example: no IPv6 support)	Reconfigure computer operating system
Unknown socket error	A non-specified socket error has occurred	Try again or restart the system
Reference sensor not found	Hardware problem within D2x camera: sensor and/or camera module is not connected to the board	Establish connection between sensor, camera module and board; if no connection can be established please send camera back to the factory for repair

6.2.3 Camera flash errors

Flashing the camera is required from time to time to update the software on the Roundshot D2x. Camera flash errors occur when these updates fail.

	Root cause	Solution
Flash path incorrect	The path of the flash file on the computer does not exist	Select valid flash file or reinstall flash file
Flash file access denied	There are no access rights to the flash file	Attribute „read" rights to the flash file
Flash file empty	The flash file contains no information	Download a new flash file and reinstall
Flash prepare error	The flash process could not be initialised	Restart camera flash
Flash verify error	The camera program update failed (verification failed)	Restart camera flash
Unknown flash type	The flash type is wrong	Reinstall the flash file (download)
Flash abort	The flash process was interrupted	Restart camera flash
Cam system file path incorrect	The path to the camera system file on the computer does not exist	Select valid cam system file
Cam system file access denied	There are no access rights to the cam system file	Attribute „read" rights to the cam systems file
Cam system file empty	The cam system file contains no information	Reinstall the cam system file

6.2.4 D3 software errors

The following errors occur when the Roundshot software is damaged and cannot operate correctly.

	Root cause	Solution
Parameter file not found	Software incomplete and factory parameter file not accessible	Reinstall the software
XML file not valid	The XML file has been damaged	Reinstall the software

6.2.5 System errors

System errors are caused by an incompatible operating system.

	Root cause	Solution
Reference sensor always on	Positioning sensor (motor) is defective	Please send the camera back to the factory for repair
Network packages too large	The network packages (datagrams) are larger than what is accepted by the computer operating system	Reconfigure the computer operating system
Socket access error	The socket operation failed because the application lacked the required privileges	Reconfigure the computer operating system or reinstall the software with the right privileges

6.3 Camera maintenance

The Roundshot D2x contains high-tech electronic components. Therefore it is important to handle the camera with care, in particular:

- Make sure that all releases (for example tilt release) are securely fastened, especially for image taking
- Do not use the camera in rain or snow without any special weatherproof case
- Keep the camera in a cool and dry place for storage (ideally in the original case supplied with the camera)
- Do not expose the camera to excessive heat or cold for extended periods of time
- Prevent exposure to dust, as an accumulation of dust particles on the digital sensor may impair image quality
- Make sure not to drop the equipment
- When unplugging cables pull at the plug not at the cable

Very important:

Do not store the camera below -5° or above 40° C as the ultra-thin optical filters of the camera may be damaged.

This means, for example, not to leave the equipment in the car when temperatures are below 0° C or above 30° C as the temperature swings inside a car may be larger than on the outside.

6.3 Camera maintenance (continued)

Camera

The motor and battery units as well as the Seitz D3 digital scan back are covered with a special coating.

Over time dust and other particles may accumulate on the rubber coating. Remove them with a soft water-drenched cloth.

Computer

Handle the tablet PC with care. Wipe the screen from time to time with a wet microfibre cleaning cloth. Be sure to download and install regular updates (operating system, Seitz Roundshot D3 software).

6.4 „Club D3"

6.4.1 International warranty & product registration

Your Roundshot D2x camera is covered by the international 2-year Seitz warranty. The warranty is linked to the serial number of the camera directly and is stored in our database.

If there is any malfunction or defect of the equipment we will repair the camera at no cost. The warranty extends to technical defaults that are not caused by inproper use, damage by transportation or other defaults not related to the manufacturing of the camera.

The warranty is void if the camera has not been handled with care (has been dropped) or if it has been stored at below -5° C or above 40° C.

Delivered components for which separate warranty agreements are issued (for example for computers) bear the warranty of the manufacturer.

We invite you to register your product with us. Registering your product has several advantages:

- Free access to the latest software downloads and instruction manuals
- Email software update alerts + release notes
- Direct technical assistance in case of a problem
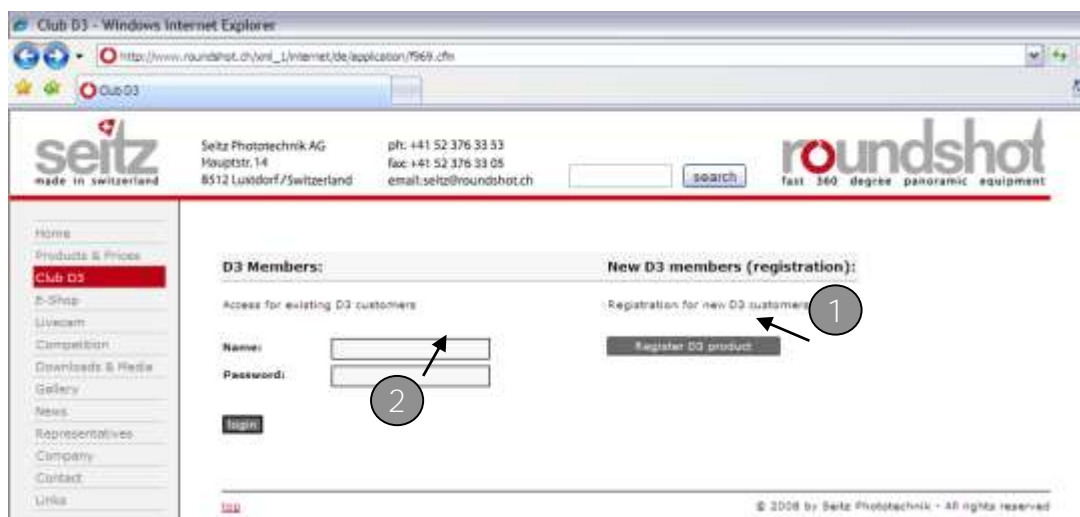
Registering your product is a simple 2-step process:

1 Go to the „Club D3" section at www.roundshot.ch and register your D3 product.

2 We will activate your membership and confirm your registration by email.

Then go to the „Club D3" section at www.roundshot.ch, log in with your member ID and password and download new software or instruction manuals.

6.4 „Club D3" (continued)

6.4.2 Software & firmware updates

Sometimes copying programs or flash files on USB sticks can damage them.
Therefore we recommend downloading the software directly to your computer from
our website.

The Seitz Roundshot D3 software runs on Windows PCs (XP and VISTA) as well as on
Mac computers (OS 10.4 and 10.5) with 32-bit Intel processors.

To update the firmware (within Seitz D3 digital scan back) and Seitz Roundshot D3
software proceed as follows:

- Set the LAN connection properties to: detect IP and DNS server address automatically
- Connect to the www.roundshot.ch website and enter 'Club D3'
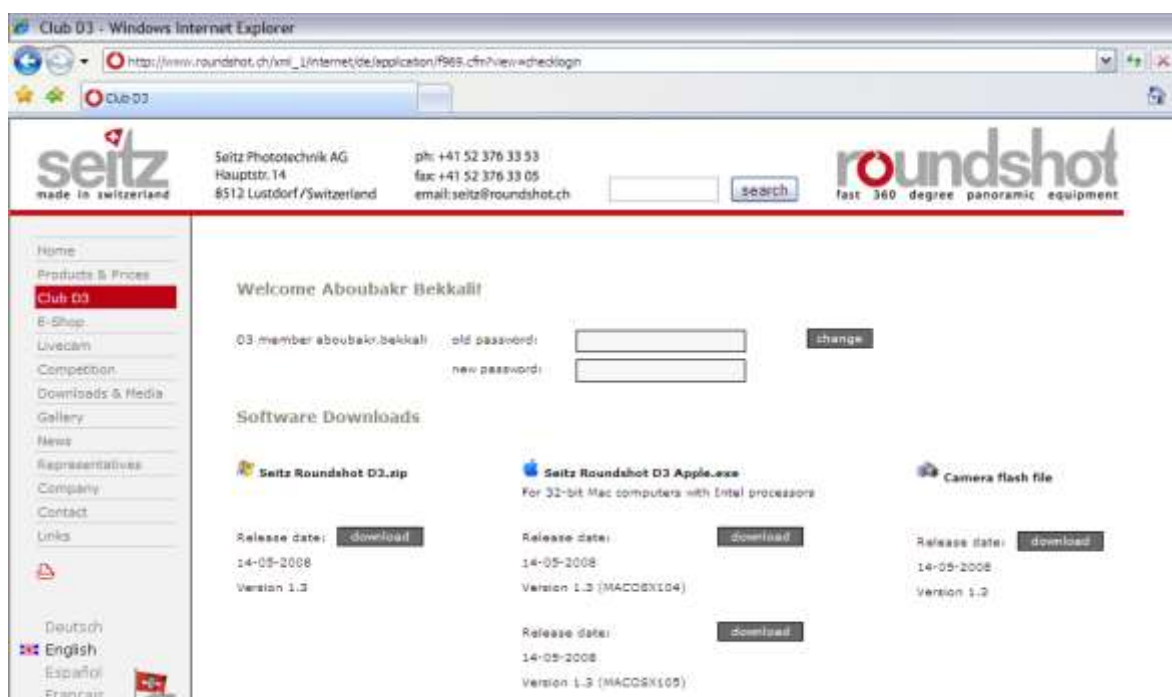
- Download the latest software directly to your computer
- Make sure that the active account has Administrator rights (otherwise restart the computer and log on)
- Unzip the new installation exe file to your desktop, launch the installation file
- Choose your favorite language and follow the instructions
- Set the LAN connection properties again to: 10.0.0.20, 255.0.0.0 (or your personal settings)
- Connect to the camera by choosing Manage/Settings/Search cameras

6.5 Return of equipment / recycling

Your Roundshot product and the accessories are produced from highest quality materials and parts and will provide you continued pleasure. Should you nevertheless want to dispose of your Roundshot equipment one day, it should not be placed in normal waste. The correct disposal of your old equipment is a contribution to preventing possible negative causes for the environment.

For optimum recycling we kindly ask you to return us your camera (with accessories) to the following address:

Seitz Phototechnik AG
Environment & Recycling Department
Hauptstr. 14
8512 Lustdorf / Switzerland

This return shipment to the manufacturer is free of charge. The service is available worldwide.

Please contact us to arrange the return shipment and prepare the materials for the delivery. Your camera and accessories will be picked up by our courier service and will be recycled in our factory.

We wish you continued success and fun with your Roundshot D2x!

7. Technical data

Technical Data Roundshot D2x + D2xs

Sensor type	3-linear RGB
Vertical resolution	2'048 pixels (2x full HD)
Dynamic range	9 f-stops
Lens brand	Nikon
Focal length	8mm to 150mm
Exposure times	From 1/333 sec. up to 10 seconds
Exposure	automatic with prescan, automatic with variation or manual
Sensitivity control	ISO/ASA (100, 200, 300, 400, 600, 800)
Image format	adjustable vertically and horizontally
Image angle	from 1° to 360° (selectable in steps of 1°)
- dimensions	height: 30 cm, length: 10 cm, depth: 15 cm
- weight	3.1 kg
Camera control	with connected 32-bit or 64-bit Intel-based PC (Windows XP, VISTA, Windows 7) or Mac (OSX 10.5 or 10.6) computer
Electronics + data transfer	
- Roundshot D2x	- ethernet + 256 MB RAM
- Roundshot D2xs	- gigabit ethernet + 1 GB RAM
Hardware	Professional 360° panorama camera, ethernet cable (any length) NiMh battery, mains adaptor (power), charger, without Nikkor lenses, without computer
Software	Roundshot capture software
Possible accessories	See price list

* without computer

Resolution, file/print size examples Roundshot D2x + D2xs

vertical resolution	2,048 pixels
resolution examples (at 360°)	10.5mm Nikkor DX lens: 10 million pixels (in 5 seconds) 80mm Nikkor DX lens: 74 million pixels (in 13 seconds) 150mm Nikkor DX lens: 138 million pixels (in 24 seconds)
file size examples (dng / raw 16-bit)	10.5mm Nikkor DX lens: 55 MB 80mm Nikkor DX lens: 420 MB 150mm Nikkor DX lens: 789 MB
file size examples (tiff 48-bit)	10.5mm Nikkor DX lens: 55 MB 80mm Nikkor DX lens: 422 MB 150mm Nikkor DX lens: 792 MB
possible print size (at 300 dpi) - vertical - horizontal	17 cm (6.8 inches) depending on lens, for example with 80mm lens: 298 cm (117 inches)

	Roundshot D2x:	Roundshot D2xs:
electronics transfer speed camera-computer	100MB ethernet /256 MB RAM* 10 seconds (10.5mm Nikkor DX lens)	GB ethernet / 1 GB RAM 5 seconds (10.5mm Nikkor DX lens)

*D2x: with longer focal lengths (>100mm) fastest exposure speeds are not possible because the RAM buffer is too limited (256 MB)

Technical changes reserved

Impressum