# basICColor cockpit Manual

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# Chapter 1

# Preface

# 1. Preface

Color management is a topic with many facetes. It is supposed to reproduce color true to the original – whatever that may be. Restrictions in technology, in color gamuts and in real life workflows make it impossible to achieve this goal with 100% accuracy. Just think of newsprint – that will never be able to reproduce a photograph color-correctly.
The CIE L*a*b* system, which is the base for most ICC-based color management systems, often generates hue shifts or color differences (drift from red to orange or blue to purple, for example).
It is essential to predict these results in a simple and fast way, and the fastest method is appraising the results on a monitor. This soft proofing requires a complete chain of ICC profiles – input (camera/scanner) profile, output (printer) profile and of course a calibrated and profiled monitor. Many workflows require an additional working space profile.

*basICColor cockpit* helps you to visualize the result of any color transform instantaneously, regardless in which color space your originals are delivered – be it RGB, CMYK, MultiColor, spot colors, L*a*b* or even raw camera images or spectral data.

Images are organized in “Collections” which can hold images of one color model per Collection. Images can be synchronized across the entire Collection or treated individually.

- You can determine for the each step of the conversion which rendering intents are being applied

- *basICColor cockpit* shows the effects of a transform in a 3D graphical depiction.

- *basICColor cockpit* thus lets you decide upon the optimal rendering intent for a specific purpose.

- *basICColor cockpit* lets you perform these transforms either on a single image or even automatically in a batch process using a hot-folder mechanism.

Chapter 2

# ICC Profiles

## 2. ICC Profiles

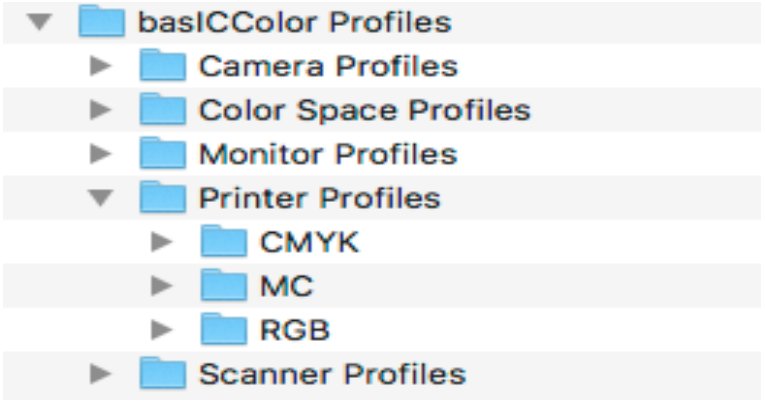
*basICColor cockpit* is an application that lets the users control their color management environment in general and performs many useful color management tasks in particular.

Profile Environment

The user can structure the Profiles folder into a multi-layered folder structure:

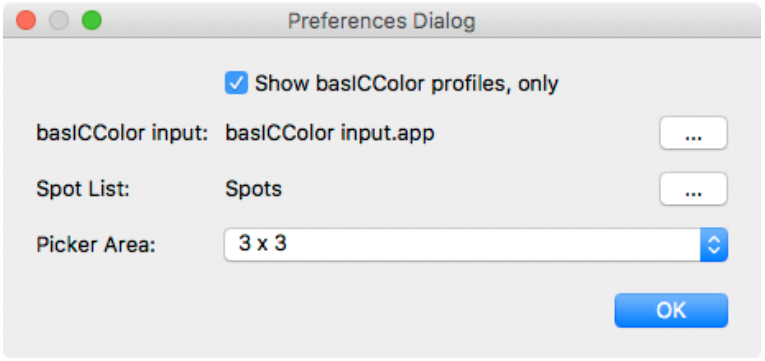
basICColor Profiles
- Camera Profiles
- Color Space Profiles
- Monitor Profiles
- Printer Profiles
  - CMYK
  - RGB
  - MC
- Scanner Profiles

This structure is recognized by *basICColor cockpit* and allows for the easy filtering of profiles by category.



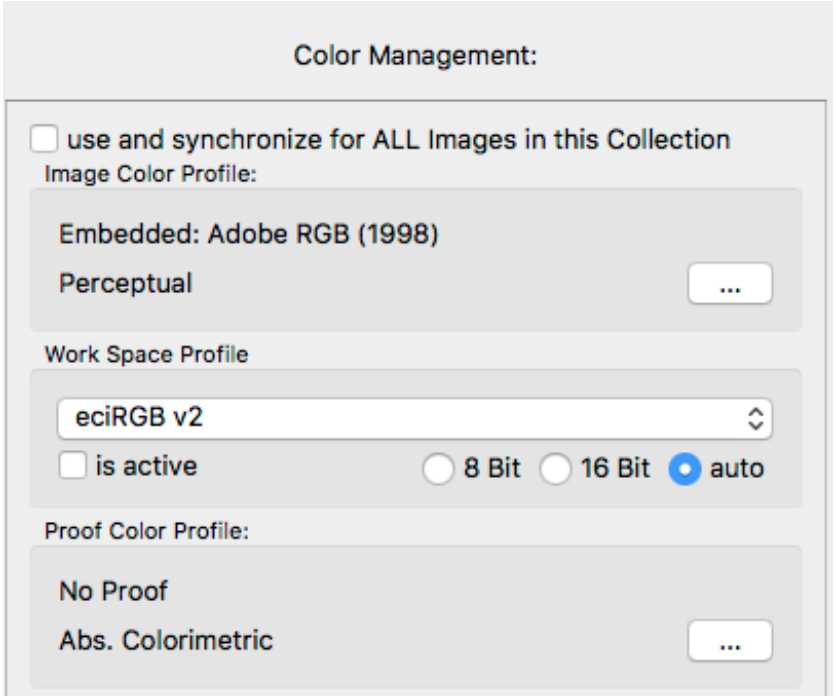

*Profiles folder structure*

If you check “basICColor profiles only” in the “Preferences” Dialog only profiles in this structure will be displayed.
If you uncheck this box, all the profiles in the Color/ColorSync folder will be shown.



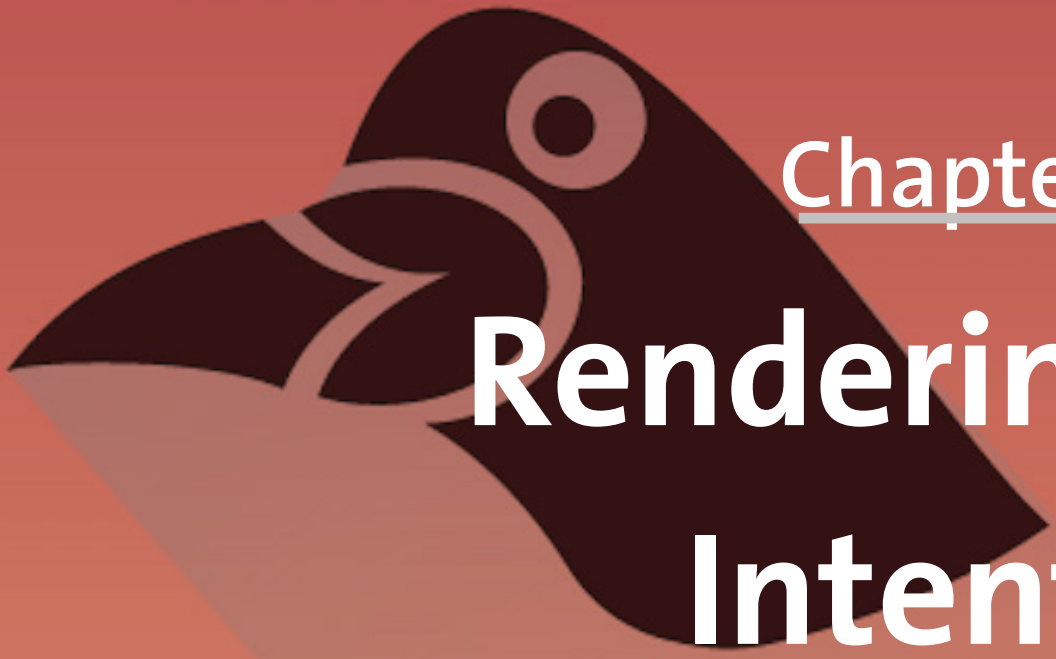

Even if you uncheck this box, *basICColor cockpit* will recognize the entries “Creator” and “Profile Type” and show all profiles in the correct category.

Digital Camera Profiles (DCP) made with *basICColor input 5* or *basICColor inputRAW* will be stored in „User -> Library -> Application Support -> Adobe -> CameraRaw -> CameraProfiles“ and will be read by *basICColor cockpit* from there. All ACR default profiles will also be recognized by *basICColor cockpit*.




The profile-tabs will show the following profile types:

| | |
|---|---|
| <Image Profile> | DCP, scnr, mntr, spac, prtr |
| <Working Space Profile> | mntr, spac, prtr |
| <Destination Profile> | prtr, nclr |
| <Monitor Profile> | mntr |



Chapter 3

# Rendering Intents

## 3. Rendering Intents

A rendering intent (RI) defines in which way a color transform from one color space to another one is being done,
Perceptual RI: All the colors of the source color space are mapped (compressed) into the destination space in a way that the perception of the colors is maintained. This RI is best used if the source color space is larger than the destination space.
Relative Colorimetric RI: All the colors of the source color space are mapped into the destination space at the same colorimetric spot. Colors that are out of gamut (OOG) are clipped. White of the destination is maintained.
Absolute Colorimetric RI: Similar to Relative Colorimetric RI but the white of the source color space is simulated on the destination. This RI is for proofing only.

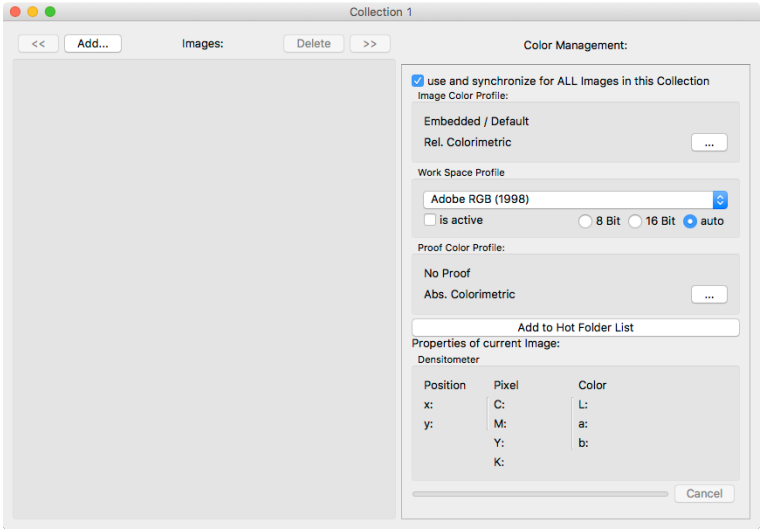
*basICColor cockpit* allows for individual rendering Intents (RI) to be applied to each step in the transformation process. The RI in the “Image Color Profile” selector determines how the transform into the “Work Space Profile” is performed, the RI in the “Output Color Profile” selector determines how the transform into this output space is performed.

Chapter 4

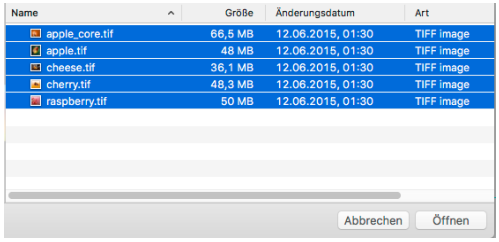
# Using basICColor cockpit

## 4. Starting cockpit

After launching *basICColor cockpit* you will see an empty Collection window "Collection 1".

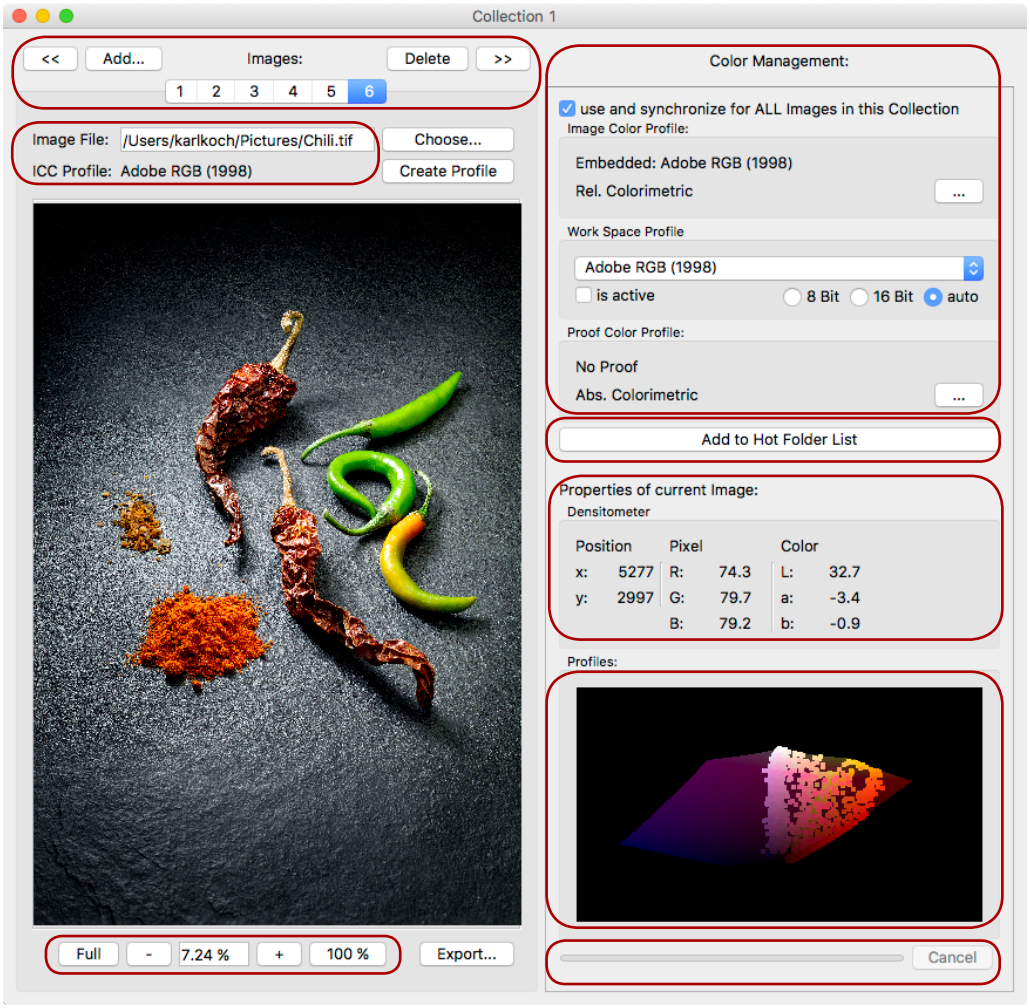


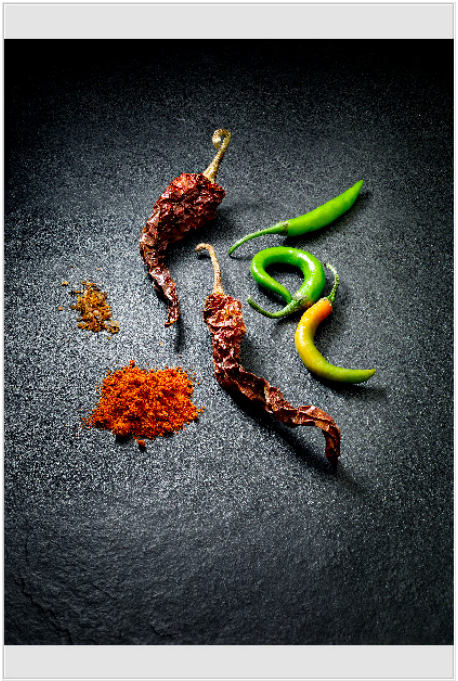

The "Add..." button is active, by clicking it you open the Finder/File Browser Window which lets you navigate to the image(s) you want to open. You can select one or multiple images and click "Open" to load them into the viewer.
Once you have opened the first image, this determines the color model of this Collection. You can only add images of the same color model, e.g. RGB.
By default the "Embedded" profiles of the images are being recognized and applied to each image individually.




*Open multiple Images of the same color/camera model..*

## 4.1. The Collection Window





## 4.2. Viewer

The Viewer is the integral part of the Collection window. It shows one image at a time. For adding images, navigating between images, controlling view and color settings, see the following paragraphs.

The Viewer shows images in a color correct manner. In order to achieve this, at least 2 profiles are required:

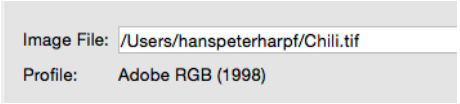
- Image Color Profile – this could be a Digital Camera Profile (DCP) or an ICC profile. There is one exception: spectral images do not require profiles.
- Monitor Profile – you will not be able to set a monitor profile, basICColor cockpit will detect and use the active system profile for displaying images.

For a complete color management environment you can select 2 more profiles:

- Work Space Profile – you normally do not want to work in a source color space like scanner or camera space, you will rather convert your images to a work space like eciRGB v2 or sRGB. In the viewer you will see the effect of a transformation immediately.
- Output Color Space – you may want to see the effect of a conversion to an output color space, e.g. offset printing on your monitor before converting (soft proof).

## 4.3. Image Controls

### *4.3.1. Information*

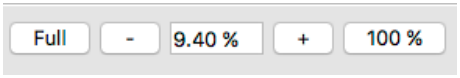


Above the viewer window you see the path and name of the active “Image File:” If an ICC profile is embedded in the file, “ICC Profile:” shows the name of the embedded profile.
In case there is no embedded profile, “ICC Profile:” shows <none>.

### *4.3.2. Navigation*

The header of the Collection window lets you navigate through the images of this collection with the ”<<” and “>>” buttons. The number of images and the active image are depicted in a tab bar underneath the controls. You can also select an image by clicking on the appropriate tab.
“Add...” adds another image to the Collection, “Delete” removes the active (visible) image from the Collection.
Of course your original file will remain untouched.

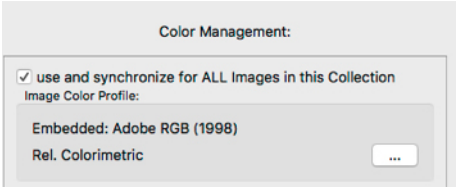
### *4.3.3. View Controls*




The buttons “+” and “-” under the viewer allow for zooming in/out. The “Full” button shows the entire image in the viewer window depending on the size of basICColor cockpit window which is fully adjustable in size.
The “100%” button shows the image pixel-correct 1:1.
The “__%” button shows and allows for entering a scaling factor in percent.

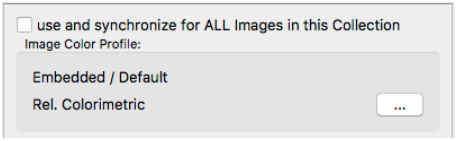
## 4.4 Color Controls

The right part of the Collection window shows all the controls for the "Color Management:" for this Collection. Each Collection use has its own individual Color Management settings – understandably, because each Collection can hold images in a different color space.

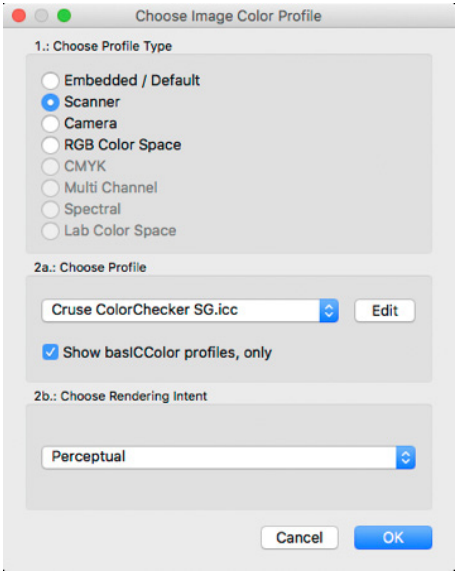



### *4.4.1. Synchronize*

The "use and synchronize for ALL images in this Collection" checkbox is active at program start. The default setting for "Image Color Profile" is "Embedded". If an ICC profile is embedded in the image which is visible in the viewer at that moment, the name of the embedded profile is shown. If you select a different image with a different profile embedded, this profile will be visible as "Embedded:", regardless if the checkbox is checked or not. The "Synchronize..." checkbox (on or off) will not change embedded profiles as long as "Embedded/Default" is selected in the color settings. (see 4.5.2)




ICC-based color management does not work without a source profile. So, in case there is no profile embedded in the image, Adobe RGB (1998) will be assumed as the source profile for displaying the image. Of course this can be color correct only if the color space of the image is Adobe RGB. In case you know the source color space e.g. a scanner profile you created, you will change the profile.




### *4.4.2. Image Color Profile*

If you click the "..." button in the "Image Color Profile" section of your Color Management controls, the "Choose Image Color Profile" window opens up.

The "Show basICColor profiles only" checkbox is checked by default. This allows for a clearer navigation in the profiles jungle that you may host on your computer. If unchecked you will see all profiles on that machine, regardless where they are located.

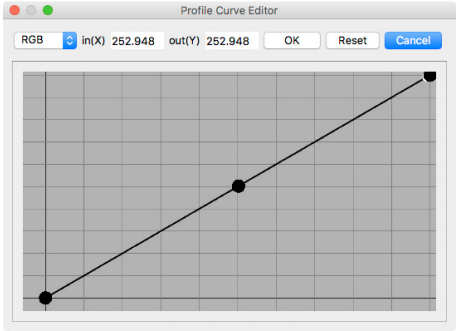
To further tidy up the profile selection,

1.: Choose Profile Type – by checking one of the options:

- Embedded / Default – checked by default
- Scanner – will show scanner (scnr) and camera ICC-profiles
- Camera – will show scanner and camera profiles as well as Digital Camera Profiles (DCP) for ACR workflows
- RGB Color Space – will show Color Space (spac) profiles as well as Monitor (mntr) profiles since many so called (and ...intended as such) Color Space Profiles hold the wrong tag.

2a.: Choose Profile – Select the appropriate profile from the drop-down list. If you do not see the profile in the list, uncheck "Show basICColor profiles only".

2b.: Choose Rendering Intent – this will determine the method of the transformation into the next active profile (see Chapter 3 for more information on Rendering Intents).




### *4.4.3. Profile Curve Editor*

Clicking the "Edit" button opens a simple Profile Curve Editor which allows for editing LUT-based RGB profiles only. You can click on any point of the curve (holding CRTL-key + click) and drag it up for lightening the image or down for darkening.

When you click "OK" you can save the edited profile under a new name and then use it on images you want to treat accordingly.

### *4.4.4. Profile Private Data*

Clicking the "Priv. Dat." button will display the "Profile Private Data" window with information saved in profiles made with basICColor input 5, inputRAW or display.

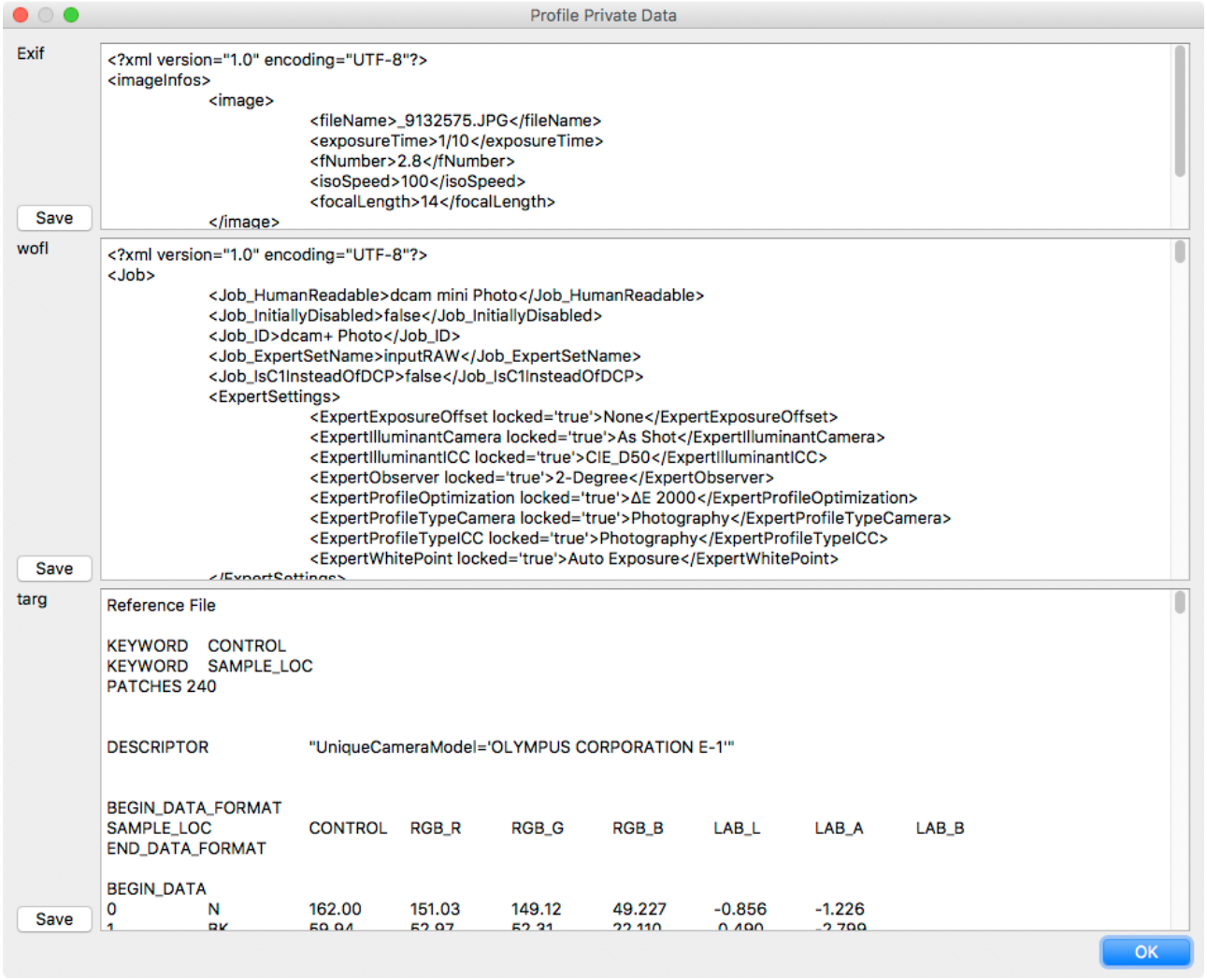
1. Exif – File name of the image, as well as camera data such as exposure time, aperture... which were read from the camera.

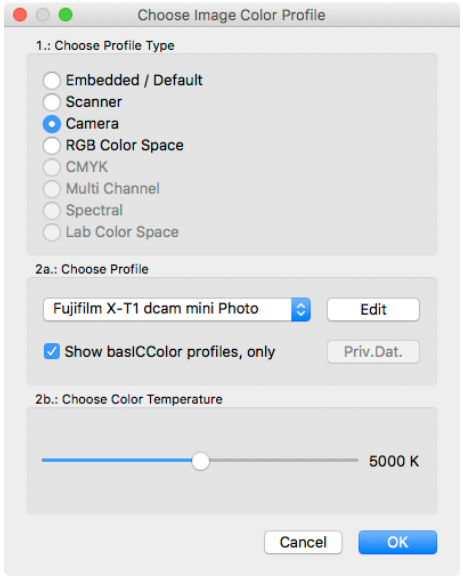
2. wofl – this is the complete WORKFLOW information of the input 5/inputRAW workflow, including spectral or colorimetric data of the target used to create the profile.

Copy this file to All Users -> basICColor Jobs - Jobs input 5 -> Jobs and you can execute the exact same workflow.

3. targ – this tag holds the colorimetric values of the profiling target and can be used to recreate a profile from the same data but with different settings

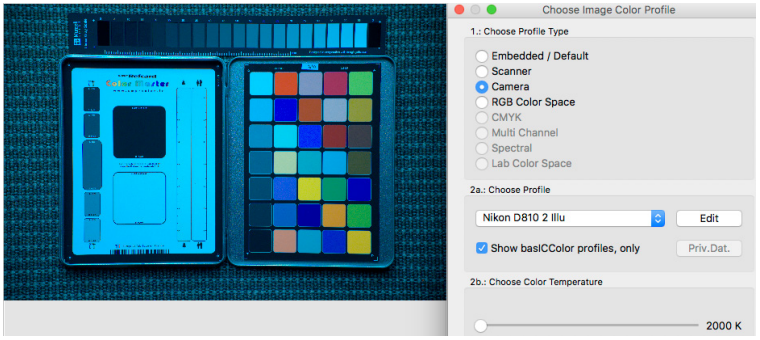
The "Save" buttons allow to save each of the tags as XML or ASCII files respectively.


Profile Private Data
Exif
Save
<?xml version="1.0" encoding="UTF-8"?>
<imageInfos>
<image>
<fileName>_9132575.JPG</fileName>
<exposureTime>1/10</exposureTime>
<fNumber>2.8</fNumber>
<isoSpeed>100</isoSpeed>
<focalLength>14</focalLength>
</image>
wofl
Save
<?xml version="1.0" encoding="UTF-8"?>
<Job>
<Job_HumanReadable>dcam mini Photo</Job_HumanReadable>
<Job_InitiallyDisabled>false</Job_InitiallyDisabled>
<Job_ID>dcam+ Photo</Job_ID>
<Job_ExpertSetName>inputRAW</Job_ExpertSetName>
<Job_IsC1InsteadOfDCP>false</Job_IsC1InsteadOfDCP>
<ExpertSettings>
<ExpertExposureOffset locked='true'>None</ExpertExposureOffset>
<ExpertIlluminantCamera locked='true'>As Shot</ExpertIlluminantCamera>
<ExpertIlluminantICC locked='true'>CIE_D50</ExpertIlluminantICC>
<ExpertObserver locked='true'>2-Degree</ExpertObserver>
<ExpertProfileOptimization locked='true'>ΔE 2000</ExpertProfileOptimization>
<ExpertProfileTypeCamera locked='true'>Photography</ExpertProfileTypeCamera>
<ExpertProfileTypeICC locked='true'>Photography</ExpertProfileTypeICC>
<ExpertWhitePoint locked='true'>Auto Exposure</ExpertWhitePoint>
targ
Save
Reference File
KEYWORD CONTROL
KEYWORD SAMPLE_LOC
PATCHES 240
DESCRIPTOR "UniqueCameraModel='OLYMPUS CORPORATION E-1'"
BEGIN_DATA_FORMAT
SAMPLE_LOC CONTROL RGB_R RGB_G RGB_B LAB_L LAB_A LAB_B
END_DATA_FORMAT
BEGIN_DATA
0 N 162.00 151.03 149.12 49.227 -0.856 -1.226
OK

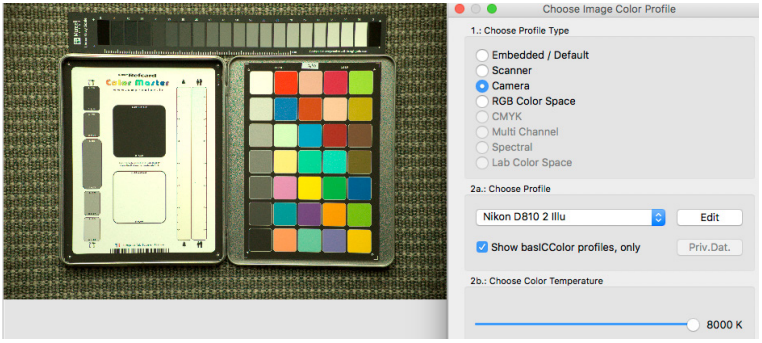



### *4.4.5. Choose Color Temperature*

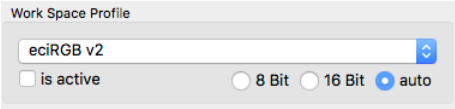
If your Collection holds Raw files from a digital camera and you have selected the correct DCP (no embedded profiles in Raw images!) you can change the color temperature with the slider in section 2b. of the "Choose Image Profile" window, provided the DCP was made with 2 illuminants (Tungsten and D65). The effect is immediately visible in the viewer.




*Color Temperature set to 2000K, correct temperature would be 5500K (flash)*

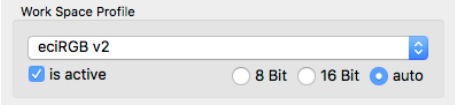



*Color Temperature set to 8000K*



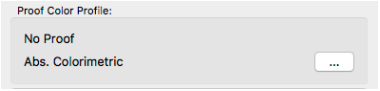

### *4.4.6. Work Space Profile*

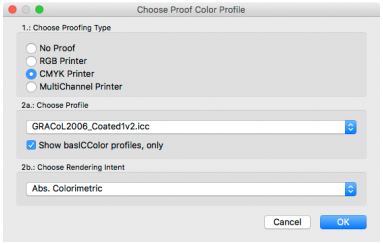
The drop-down menu allows for selecting a so called Work Space Profile from a selection of color space type profiles (spac) and monitor type profiles (mntr) since a lot of so called color space profiles are wrongly coded as monitor profiles. You should avoid, though, to select a true monitor profile as a Work Space Profile.




The profile only becomes active if you check the “is active” checkbox. You will immediately see the effect of this transformation.

If the box is unchecked, you can convert directly to the Output Color Profile or not convert at all.
If you export or batch-process images while the box is unchecked and no Output Color Profile is selected, the active Image Color Profile will be embedded in the image file. (see Chapter 5 for more information on workflows).
The Rendering Intent for the conversion is selected in the Image Color Profile controls.
The bit-depth of the Work Space Profile is defined by the radio buttons “8 Bit”, “16 Bit” and “auto”. The latter will use the native bit-depth of the selected profile.




### *4.4.7. Output Color Profile*

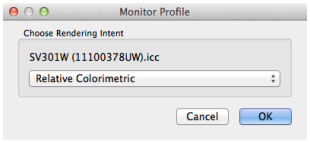
By clicking the "..." button you open the Output Profile selector.

By default no output profile is selected.

1. In order to tidy up the selection you can select "RGB Printer", "CMYK Printer" or "MultiChannel Printer" for converting your images.

2a. will show the appropriate profiles and let you select one.

2b.: allows for selecting the desired Rendering Intent (see Chapter 5. Profile Viewer for more information on how to choose the best Rendering Intent for your images and your output situation).




### *4.4.8 Monitor Profile*

The monitor profile is automatically read by the operating system - the so-called system profile. It is not advisable to select this profile individually, because the images are always displayed through the system profile.

If you want to see the effect of another monitor on an image, do it via the working color space by selecting the appropriate monitor profile temporarily.

.

However, you can specify the type of visualization on your monitor by selecting the RI.

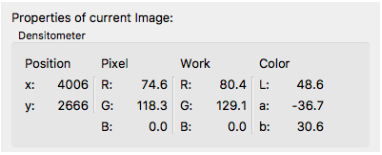
To do this, click the "..." button and the "Monitor Profile" window opens.

Please note that if you select the absolute colorimetric rendering intent for source (picture) profiles that have a white point other than the D50, *cockpit* actually converts absolutely colorimetric, i. e. the white point of the source profile to the target color space.

This can be seen in the Adobe RGB profile for example, which has a D65 white point. Here, with absolute colorimetric RI, the visualization is tinted bluish.

Users of Adobe® products are not used to this, because they have been avoiding “user errors” for years, by converting relatively colorimetric in such cases although the absolute colorimetric RI was selected.
It should also be noted that matrix profiles don’t know any perceptive RI. You can see this, if you are using the RI, e. g. when converting to Adobe RGB Color space (working color space profile), from relative colorimetric to perceptive. The appearance of the image will not change. It is always converted colorimetric into these color spaces.

In order to make a perceptive adjustment, the target profile always requires a LUT (or table) profile. Recognize a LUT profile by its file size, which is a multiple size compared to the size of matrix profiles.



## 4.5 Image Properties

### *4.5.1. Densitometer*

This section gives you information on the position of the cursor when you move it across the image.

The densitometer readings show in the “Pixel” column the original device data depending on the color space of the image, e.g. RGB, CMYK, Lab, MultiChannel or the Spectrum in case of spectral images..

If Work Space is active, the “Work” column shows the color values in Work Space color.

The “Color” column shows the lab values at the cursor location.

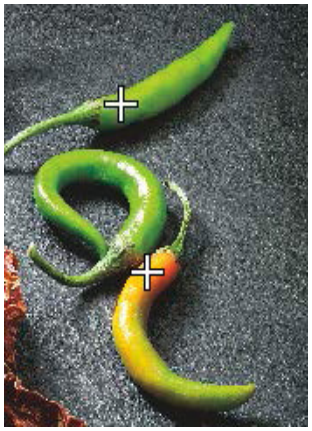
### *4.5.2. Profiles*

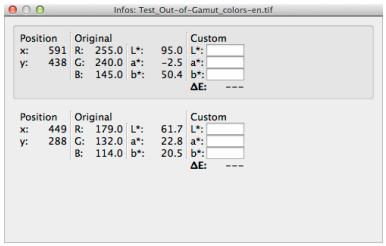
The “Profiles” section shows an animated graph of the Image Colors as dots in Lab color space and the Image Color Profile as a transparent graph. You can stop the rotation or rotate the graph manually by clicking into the “Profiles” area. If the “Work Space” checkbox is active you will also see a wireframe of the Work Space Profile overlayed on the image colors and the Image Color Profile.

This give you a rough idea of the sizes of the respective color gamuts.

See more on Profiles in Chapter 4.7. Profiles Viewer

## 4.6 Eyedropper tool






### *4.6.1 Mouse cursor*

If you move the mouse pointer over the image, the hand icon appears to move the image if it has been enlarged so it does not fit into the picture window.

If you also press the Shift key on the keypad, the mouse pointer changes to the eyedropper.

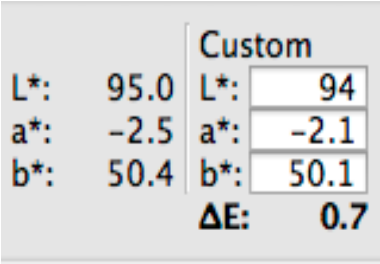
### *4.6.2 Measuring point*

Press the shift key at one point while holding down the <Shift> key in the image to set a measuring point marked by a white cross. You can set any number of measuring points. <Shift> key + click on a measuring point to remove it.

### *4.6.3 Info Window*

At the same time, a window opens showing the color values and all properties for each measuring point like the “Info” in the main window. When a working color space is active, the RGB values and L*a*b* color values in the working color space are displayed. By switching the working color space on and off it can be checked quickly and easily whether the color values change and thus the working color space for the image is too small.

A click on a measuring point stores the display for this dot is light grey.
If the info window is closed, it can be opened with a click on one of the measuring points.
Individual measuring points can be set on each image. If you switch images with the info window open, the corresponding content for each image is shown.

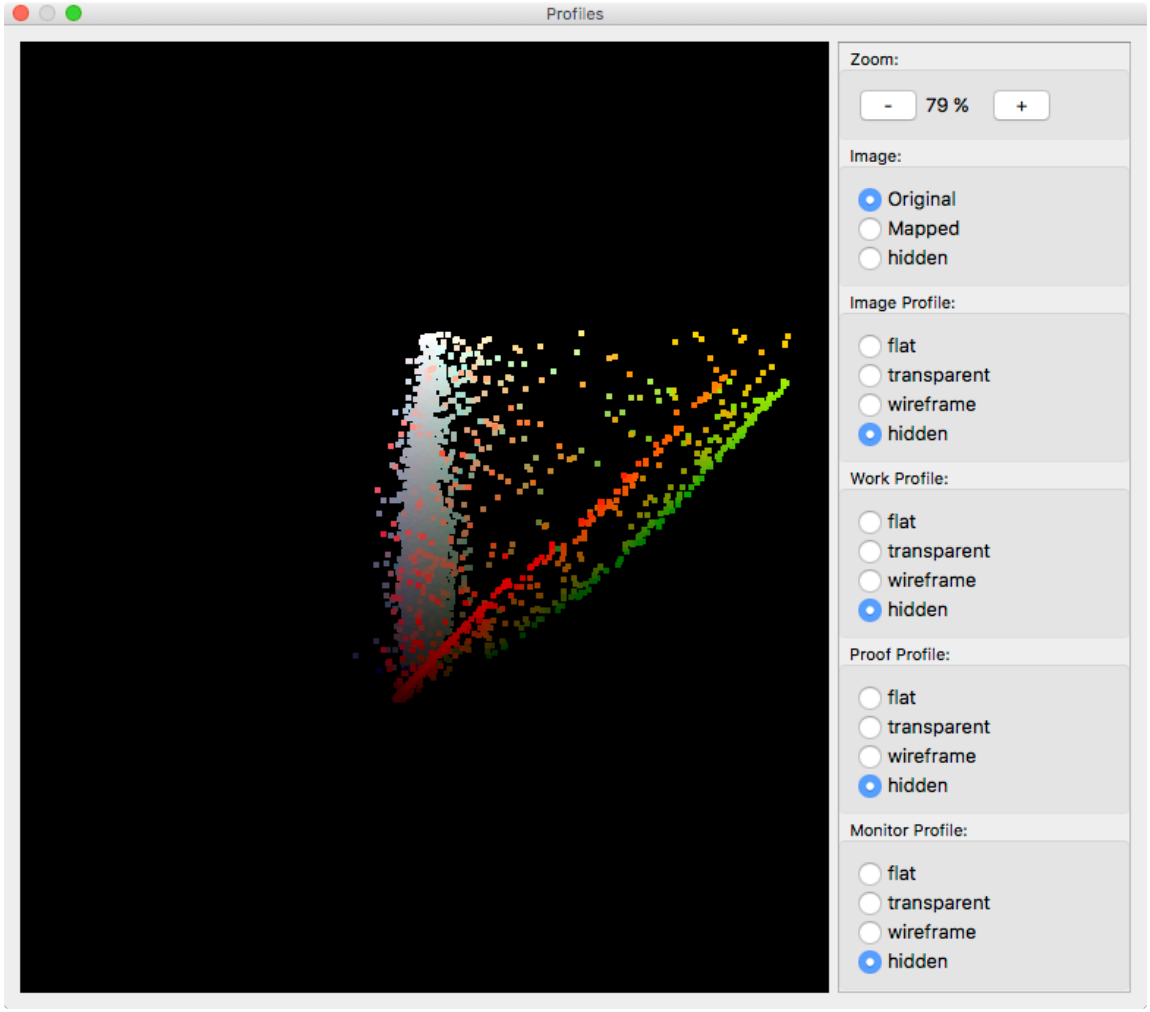


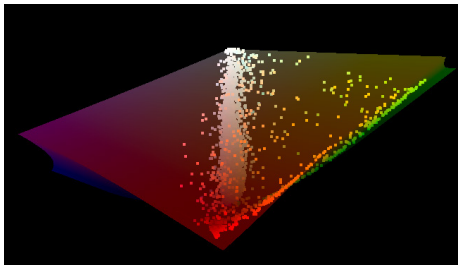

### *4.6.4. Colour comparison*

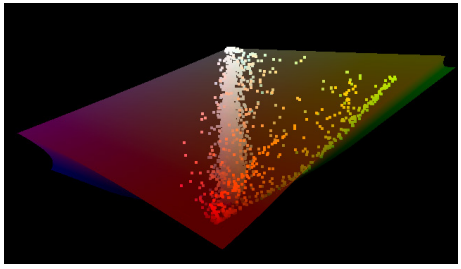
In addition to the color information in the info window, you can see 3 initially empty fields, in which you can enter a reference color in the L*a*b* color model to calculate color differences between the colors.
A “Delta E” value is shown beneath these fields.
This value is calculated with the ΔE00 (ΔE2000) color distance formula.

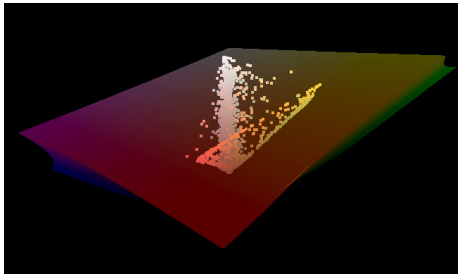
## 4.7 Profiles Viewer

If you check “Profiles” under “View” in the Menu Bar, the “Profiles” Window opens.









The “Profiles” Window gives you a much more detailed view of the profiles and Rendering Intents associated with your images. If you select a different image in the viewer, the “Profiles” window will adjust to the state of the new image immediately. You can enlarge the “Profiles” window for even better detail.

***4.7.1. Zoom***

The “Zoom” control lets you define the size of your profile graph by clicking “+” or “-” or by entering a percentage.

***4.7.2. Image***

The “Image” control has 3 radio buttons:

“Original” shows the colors of the image in their original color space (“Input Color Profile”)

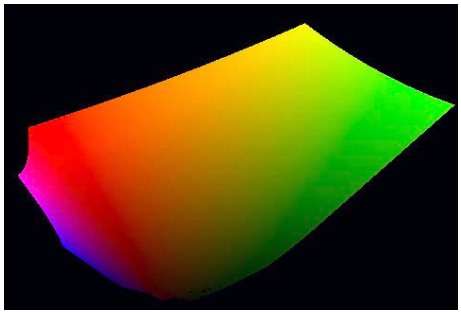
“Mapped” will map the colors to the active “Work Space Profile” using the RI defined in “Image Color Profile” if “is active” is checked.

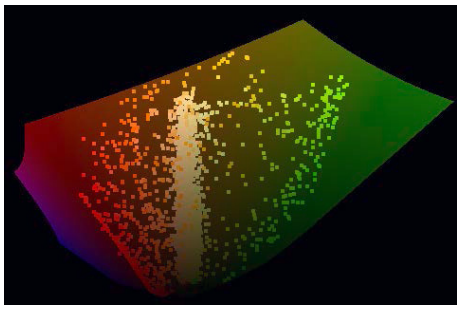
If an “Output Profile” is selected, mapping will be shown to the output color space. The RI is the one selected in the “Output Profile” window.

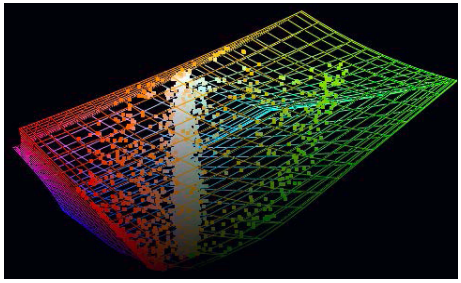
In case both, “Work Space” and “Output Profile” are selected, the mapping through the “Work Space Profile” to the “Output Profile” with both Rendering Intents applied.

This allows you to assess the color shifts caused by conversions to different color spaces.

“Hidden” hides the image colors if you just want to compare profile sizes (see below).







***4.7.3. Image Profile***

The “Image Profile” control has 4 radio buttons which allow to tailor the appearance of the profile gamut graph:

“Flat” shows a solid graph of the image profile gamut. This option should only be used for the smallest gamut in a workflow because it hides all underlying gamuts.

“Transparent” lets the image colors shine through.

“Wireframe” shows a wireframe model of the color space and lets you see all the smaller gamuts within. This option should be used for the largest gamut

“hidden” hides the graph of the “Image Profile”. If the image comes from a camera or scanner, the associated profile does not really depict the gamut of the device. Input profiles are made with printed or photographic targets which cover a part of the real world gamut only. Thus, camera profiles are extrapolated to a larger gamut. You will most probably want to hide these gamuts in your graph.

***4.7.4. Work Profile***

Shows the gamut of your “Work Space Profile”. Same controls apply as above.

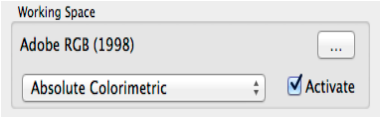
***4.7.5. Output Profile***

Shows the gamut of your “Output Profile”. Same controls apply as above.

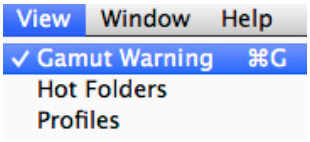
***4.7.6. Monitor Profile***

Shows the gamut of your “Monitor Profile”. Same controls apply as above.

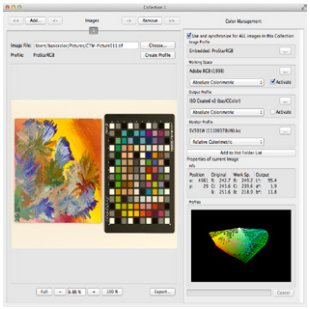
## 4.8 Gamut Warning



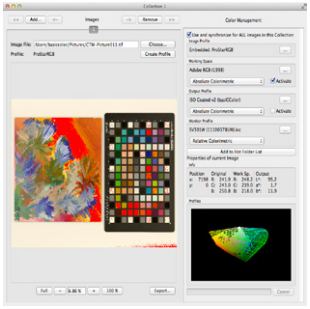

For Gamut Warning viewing please ensure the “Working Space” is active. Enable the “Activate” checkbox..



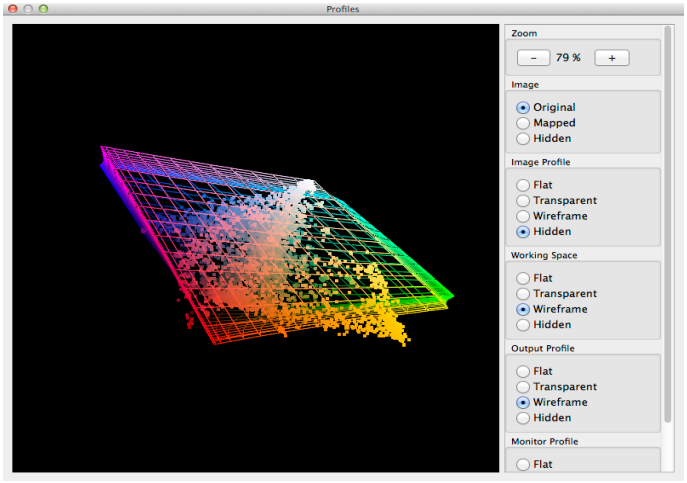

View the Gamut Warning by selecting “View” --> Gamut Warning in the menu bar.



The out-of -gamut areas are shown instantly.

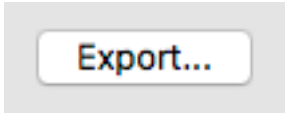


In our example the colors outside the gamut are clearly visible in the “Profiles Viewer” also.



# Chapter 5

# Workflow



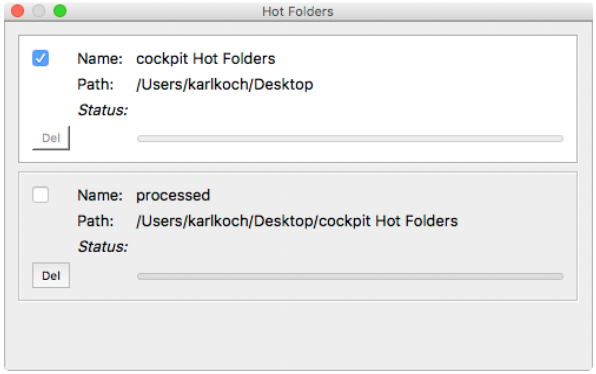

# 5. Workflow

## 5.1 Export

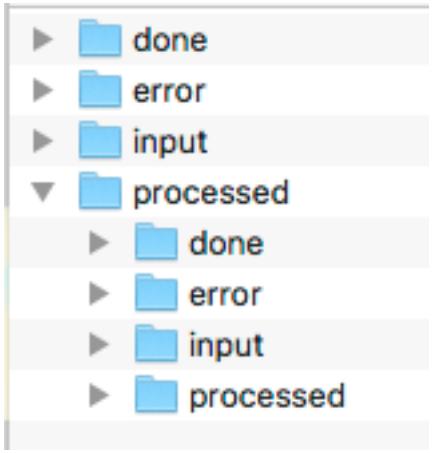
The “Export” button, located below the Viewer, lets you convert and save the image which is displayed in the Viewer with all the active Color Management settings.

## 5.2 Hot Folders

For mass conversion of images the batch mechanism via Hot Folders is much more convenient. Once set up you can copy, move, scan, shoot images directly into an input folder. If activated this folder will automatically start conversion. The “Add to Hot Folder List” lets you select a folder where to set up your Hot Folders for batch processing.




You can even nest Hot Folders in order to perform several conversions in a row, e.g. to a working space first, then to an output color space.




***5.2.1. Hot Folder Structure***

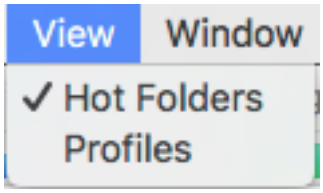
cockpit creates 4 folders at the location you selected:

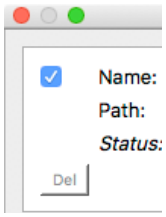
• input – you put all the images you want to convert into this folder. All images need to be in the same color space and this must be the color space of the collection from which you created the Hot Folders. After conversion, the images will be deleted from this folder.

• processed – all the images which were converted correctly will be saved to this folder. The Output Color Profile will be embedded as the new Image Color Profile in order to characterize the image correctly. If your Collection doesn´t have Work Space or Output Color Profiles activated, the Image Color Profile selected for this Collection will be embedded, no further conversion will take place. This is especially suited for non-color-managed workflows. e.g. scan applications that cannot handle ICC profiles.

• done – the original files will be copied to this folder. Even if you do not copy but move the originals to the input folder, they will not get lost.

• error – if images of a different color space are put into the input folder, they cannot be converted with the profiles of the Collection from which the Hot Folder was created. These images will be copied to the error folder. In very rare cases other reasons may prohibit a correct conversion which also may result in an image ending up in the error folder.

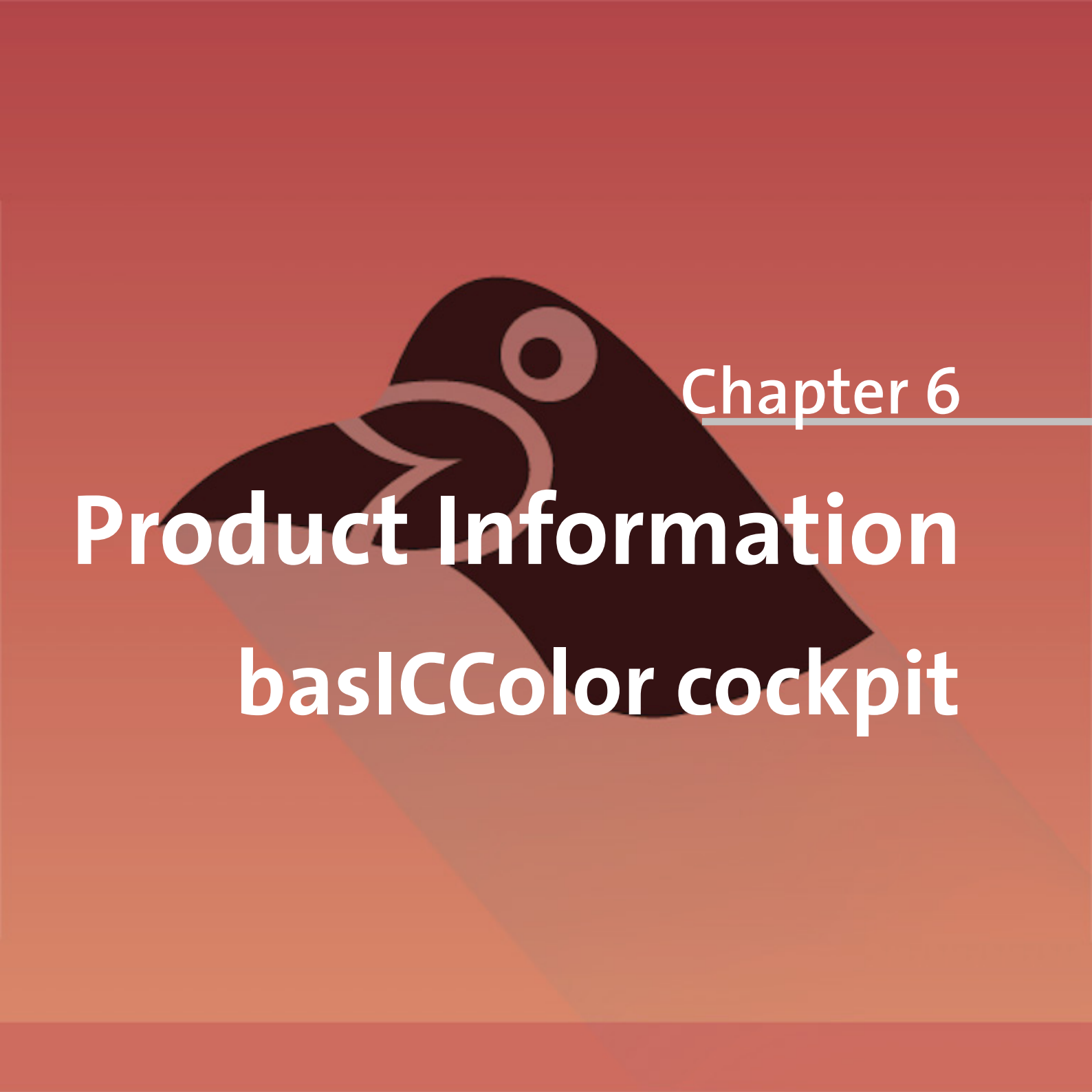



### *5.2.2. Hot Folder Management*

If you check or uncheck “Hot Folders” under “View” in the Menu Bar, you can open or close the Hot Folder view.
In order to activate one or more Hot Folders, you need to check the checkbox in the respective Hot Folder box.

The “Del” button will delete the Hot Folder from the list without further warning.
The Hot Folder structure will remain intact, you will not lose the results of your file conversions nor your original images.
You can recover the Hot Folder to your list by just clicking the “Add to Hot Folder List” again and navigating to the existing Hot Folder structure.
If you want to delete the Hot Folders permanently, you should first delete them from the Hot Folder list and then delete the folders physically.



Chapter 6

# Product Information basICColor cockpit

# 6. Product Information basICColor cockpit

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