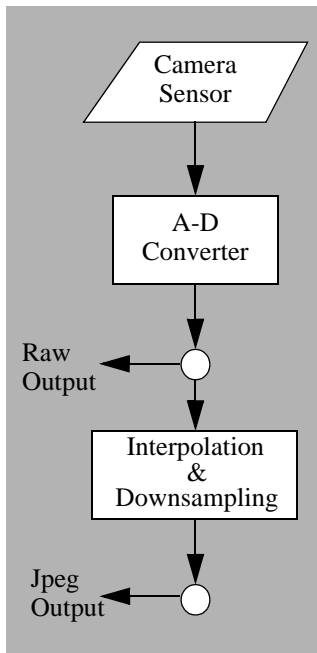

Raw Processing in Picture Window Pro 4.0

by Kiril Sinkel

Copyright © 2006 Digital Light & Color

5 May 2006



*Internal processing
in a typical camera*

Introduction

Picture Window Pro 4.0 is capable of opening RAW files created by many digital cameras. RAW files are created by digital cameras directly from the output of the camera's CCD or CMOS sensor with little post processing. As of this writing, most high-end cameras produce at least 12 bit images, with some producing 14 or even 16 bits. Usually raw files preserve this bit depth and have little or no sharpening or other corrections applied to them. In contrast the JPEG output must be down-sampled to fit into JPEG's eight bit format. Frequently other automatic corrections are applied as well. The result is that some information originally captured by the camera is irretrievably lost in the process. So for photographers looking for the greatest output quality, RAW is the best choice.

RAW Conversion in PWP

To provide the greatest fidelity, PWP converts RAW files to 48 bit images. It applies gamma correction to the image and adds a moderate amount of contrast expansion to improve the appearance of low contrast images. It also applies an ICC profile if one is specified. Gamma correction, contrast expansion and profiles are all user-settable. A different setting can be made for images of each camera model.

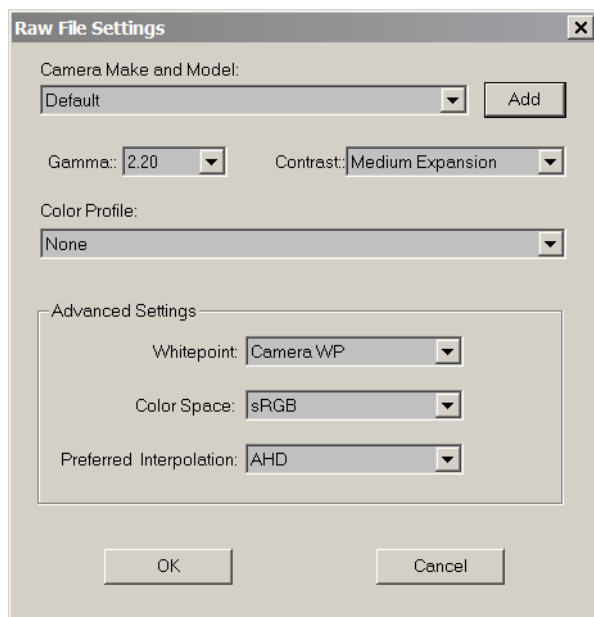
Once the image is opened, it can be operated on just like any other image, using all the editing tools available in PWP. Thus there is really no difference in workflow

between RAW and non-RAW images. In contrast, many other programs convert RAW images to 24 bit formats. Since they are downsampling, they must make decisions of how to position or compress the image information within the available 24 bit range. Typically they accomplish this by having a pre-conversion workflow where the user makes brightness and contrast adjustments that then guide the downsampling.

Setting RAW Parameters

Picture Window Pro allows the user to customize RAW file settings. Because the RAW files for each camera model are unique, a separate set of settings can be made for each camera model. The available settings are gamma, contrast expansion and a color profile. Here are the default values and descriptions of the settings:

- **Gamma:** This is a measure of the shape of the brightness curve with a gamma of 1.0 indicating a linear curve. However, since our vision is non-linear, higher values of gamma result in more natural-looking images. The default setting is 2.2, the Windows standard.
Gamma affects the darker and middle tones most. You can reduce the gamma setting if you find they look too bright or increase it if they are too dark.
- **Contrast expansion: Medium.** A moderate amount of contrast expansion is added. Because RAW images have a potential for a large dynamic range, most images appear to have low contrast unless their range is expanded. This control is adaptive—it is only applied when an image actually needs it, so there is no clipping of high contrast images. In fact, if you typically expand contrast to full scale during editing, you can change the setting to full scale. Alternately, you can turn off automatic contrast expansion entirely and apply any required expansion manually during the editing process. However, be warned that many images will initially come out looking bland.
- **Color Profile: None.** No default color profile is applied. Using a profile to open a RAW file improves image quality in the same way a profile improves the quality of non-raw files. Profiles for RAW conversion are specific to each camera model. and gamma setting.
- Profiles for a number of popular DSLRs are available for download from the PWP 4.0 beta web page. You can also create your own profile for the camera you use by photographing a target and then creating a profile in a program such as our Profile Mechanic - Scanner



Raw Settings Dialog

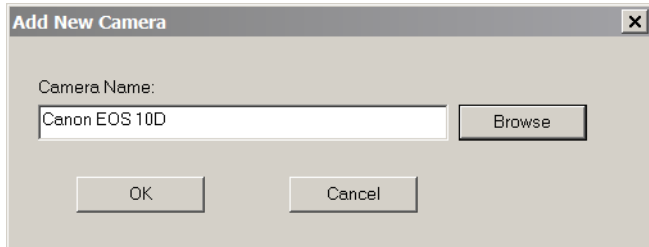
The RAW Settings dialog let's you set default and camera-specific gamma, contrast expansion and a profile.

Here is the procedure to make the settings.

1. **Select File/Raw Settings** from the main menu to display the dialog.
2. Select the camera make and model whose settings you want to specify. Select **Default** to specify the settings for cameras not specifically covered. If the camera is not in the list, click the **Add** button to add the camera. (See below.)
3. Choose the gamma and contrast expansion. A gamma of 2.2 is the Windows standard. **Medium Expansion** is recommended for most images.
4. If you want to use a color profile, choose profile from the drop down lists. If you do not want to apply a profile, set the profile to **None**.

If you are adding a new profile, install the profile first. See [Installing an ICC Profile](#). Also, make sure that Color Management is Enabled in the File/Color Management dialog.

5. Select **Camera WP** if you want to automatically adjust the image according to the camera whitepoint setting. Otherwise select **No adjustment**.
6. Select the preferred interpolation technique. The choices are VNG and AHD. The interpolation technique chosen mainly affects the appearance of fine structure in the image, analogous to grain shape in film photography. AHD interpolation is most commonly used. Please note that for some camera types only one of the techniques is available. In that case, the available technique is used regardless of the setting.
7. Set the desired output color space. If you are using a profile, the space should match that used to generate the profile. If you are not using a profile, use either sRGB or Adobe RGB; Using **no adjustment** is not recommended.
8. Make settings for other cameras, if desired.
9. Click **OK** to save the settings.



Add Camera Dialog

Cameras are added by selecting a raw image created by the camera. This is done to ensure that the camera's name and model are specified exactly as they appear in the metadata in the image file.

1. Click the Browse button. the file open dialog is displayed.
2. Navigate to any RAW image taken by the desired camera.
3. Select the image and click OK. The camera make and model is extracted from the image. (The image itself is not opened.)
4. Click OK to return to the Raw File Settings dialog and make settings for the new camera.

Raw settings information is stored in the Windows Registry.

Creating a RAW Workflow

A convenient way to transfer RAW images from your camera to your computer is to use a standard workflow. By using a standard workflow you can simply pop your camera card into a reader and let PWP read the card, convert the images to 48 bit tiffs and store them on your computer automatically, ready for further work. Reading RAW images does take longer than normal images because much more processing is involved. Using a workflow can save you time, since you can start it and then do something else while the workflow runs.

Here are some considerations in designing a workflow to meet your needs.

- **Brightness and Color Balance:** If you are converting from RAW without a profile, use the Brightness Curve and the Color Balance widgets to optimize images.
- **Sharpening:** RAW conversion does not include any sharpening. Therefore you should add a sharpening stage to the workflow.
- **EXIF Comments:** Consider adding an EXIF description, artist and copyright to your images. The description can be general so that it is applicable to all images being transferred. For instance it might be the location or event at which the images were taken.

- **Saving the images:** Finally terminate the workflow with a Save File widget. If you want the destination folder to be set automatically, define it using a macro expression. That way you do not have to reset the folder name each time you use the workflow. For the filename, you can accept the cryptic numbering your camera uses or perhaps use a more meaningful keyword followed by a sequence number. Finally, if you plan to work on the images right away, you may want to direct them to a new workflow window.

Once you have settled on your workflow, save it. You can also make it the default workflow, so that it will be automatically loaded when you launch a workflow by inserting a camera card into your system.

To save the workflow as the default:

1. In the lower pane of the Workflow window, click Options.
2. Select **Set Defaults**. The Set Defaults dialog is displayed.
3. Set the default workflow for Autoplay and click OK.

This workflow will now be loaded automatically whenever you load new images from a camera card.

Appendix

Installing an ICC Profile

1. Copy the profile to your Color folder. (On Windows XP this folder is under Windows\System32\Spool\Drivers\Color.)
2. Right click on the profile file and select Install Profile. The profile is installed.

Installation enters the profile into the registry so that it can be found by application programs.