

Using Photoshop to create custom ICC camera profiles

It is not uncommon to find a situation where conventional digital camera profiling tools don't work. It may be the software, the software settings (if there are any), the targets or any number of other issues. Some digital cameras only provide 8 bits per color and it is sometimes questionable if one should take such files and convert from an input space to a Working Space just to begin editing the files. Most of the consumer and Prosumer digital cameras produce RGB that is reasonably close to some of the better known RGB Working Spaces in Photoshop 6 (usually sRGB or ColorMatch RGB).

The following technique can be useful to people that have cameras who's raw data is somewhat close to a standardized RGB Working Space. It can work for people who simply do not have the budget to buy special targets and camera profiling software or for those that are not happy with the results using profiling packages. It should be pointed out that when the correct choice in target and software is found, AND the camera software provides data in which custom profiles are successfully built, this is the best way to produce input profiles for a digital camera.

IMPORTANT: For this to work properly, you must have a calibrated and profiled display! Also, the untagged image you use to create this profile should have a good deal of colors that are easy for you to identify as previewing correctly. We recommend you photograph a standard Macbeth Color Checker for use in building the profile using the techniques below. If possible, have the Color Checker in a D50 lightbox (preferably with dimmer) near your calibrated display so you can reference the screen and actual Color Checker.

Here is how to create a custom camera profile using just Photoshop 6/7!

1. Process the data from the digital camera so it can be opened in Photoshop 6/7. If there are various options for doing this, you may have to try different techniques but once you have the data, always use these settings in the camera software.
2. The file must be **UNTAGGED!** This is the key to our technique. If you open the file and Photoshop gives you a warning about the file being untagged, be sure to pick "Don't Color Manage" so the file opens in Photoshop untagged.
3. The preview you now see of the image is based on your preferred RGB Working Space in the Color Settings. We will try different RGB Working Spaces and pick the one we like the best. To do this, go into the Color Settings. In the RGB Popup Menu, try different RGB Working Spaces such as sRGB, Adobe RGB, ColorMatch RGB and so forth. **DO NOT** pick output spaces. You want to pick the one that produces the best overall preview. None may be perfect but pick the best one available.
4. Lets say you pick Adobe RGB as the Working Space that produces the best overall preview. We will now alter that Working Space while examining the preview of the camera file. To do this, pick "Custom" at the top of the RGB popup menu. It should look like Figure 1 (in this case we are working with Adobe RGB 1998). Notice that we have several fields where we can enter numeric values. The first and easiest is Gamma. In this case, Adobe RGB 1998 has a gamma of 2.2. You can alter these values until the overall tonal quality of the preview appears best. You might need to raise or lower the gamma value. Start with the number next to the first decimal point to change the preview

subtlety. At some point you should find a gamma value (for example 1.9) that produces the best image quality.

5. Next pick different primaries by using the Primary popup menu. Like picking the various RGB Working Space as you did in step 3, try different preset primary settings until you find one that produces the best overall color.

6. You can fine tune the X and Y values for Red, Green and Blue further as you desire. Be aware this is somewhat of a guessing game and that you'll likely only alter the last one or two values of numbers. A little goes a long way. If you don't like what you've done and want to go back to the original settings, pick the Primary originally selected to reset the values.

7. Like step 6, you can alter the white point but this produces a pretty subtle effect. Go ahead and experiment.

8. Once you have an image preview that looks as good as possible using the admittedly crude tools discussed above, you must save out these settings as a new ICC profile. First, change the name of the settings in the "Name" field from Adobe RGB to something descriptive (Andrew's digital camera). Then click on the OK button.

9. Those settings are in effect but not saved. To save the settings as an ICC profile, go back into the RGB Popup menu and select "Save RGB..." and when the save dialog opens, give it a name (Andrew's digital camera.icc). See figure 2. Save that ICC profile in the ColorSync folder. You have now created a custom ICC digital camera profile.

IMPORTANT: While still in the Color Settings, be sure to click on the Cancel button to set everything back to where it was! You do NOT want this new profile and settings to be loaded in the RGB PopUp menu.

If you have access to a profile editor that can edit INPUT profiles, you can further alter this profile to your liking. Usually some selective color tweaks will be necessary. At this time, ColorBlind Edit and ProfileMaker Pro's Profile Editor 4.0 can edit input profiles.

Since you based this profile on an exiting RGB Working Space, it is well behaved for editing (R=G=B). So you can simply tag all your camera files with this new profile and also edit them in this space. Eventually you will use an output profile to prepare the file for a printer. When you first open files from your digital camera, you will have to ASSIGN this new profile you made to all incoming files. You can do this within Photoshop when the Missing Profile dialog appears (see fig 3) or after using the Assign Profile command.

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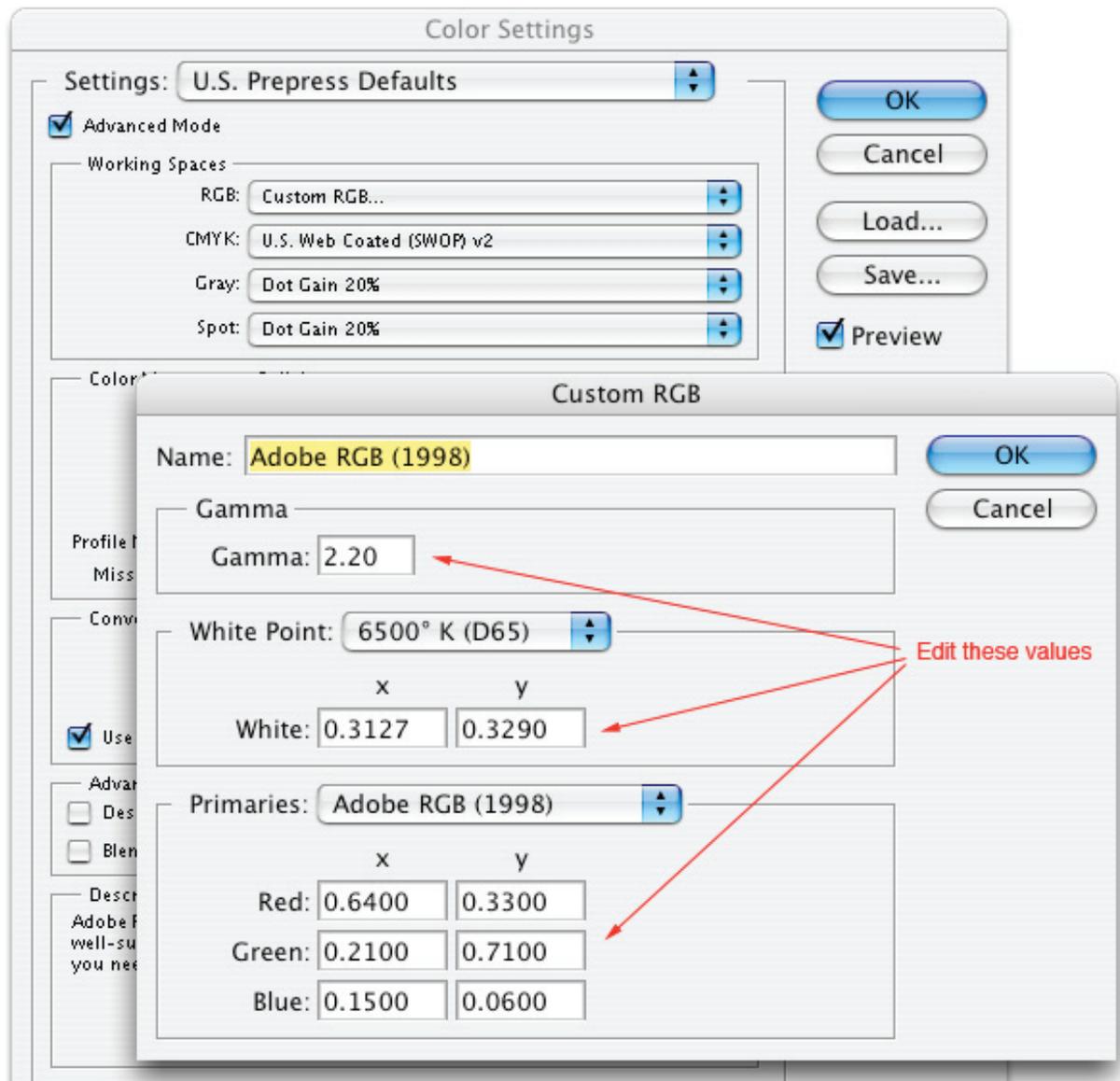


Figure 1. Alter the Working Space while looking at a preview of the camera file using the various fields above for best preview.

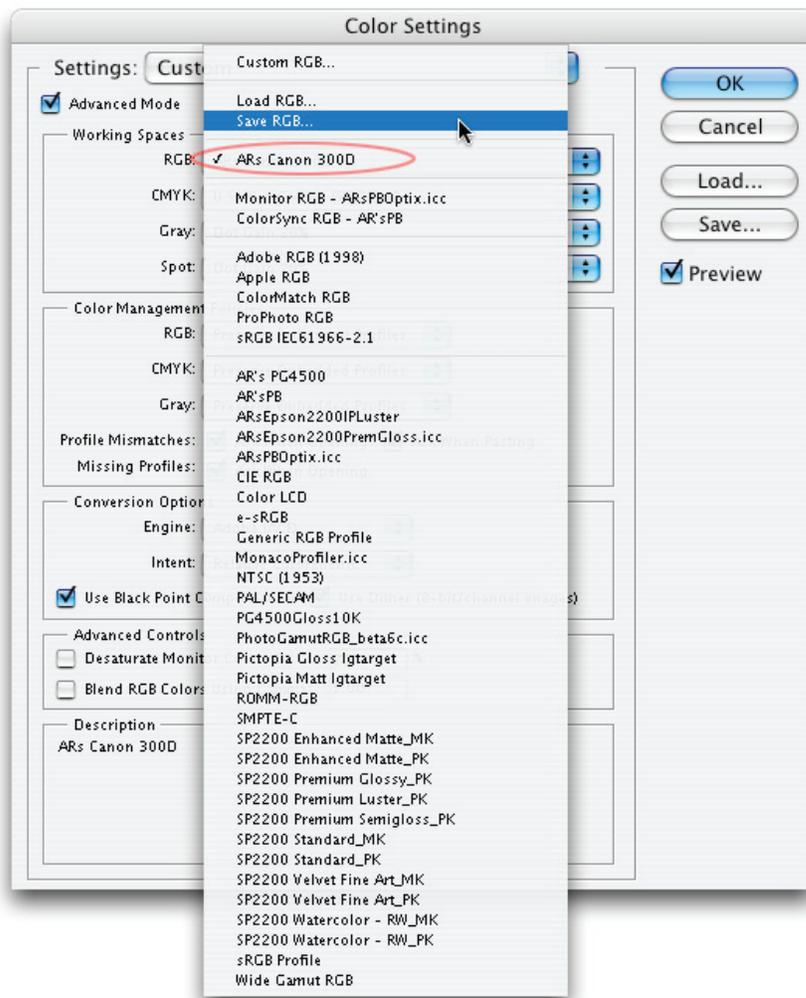
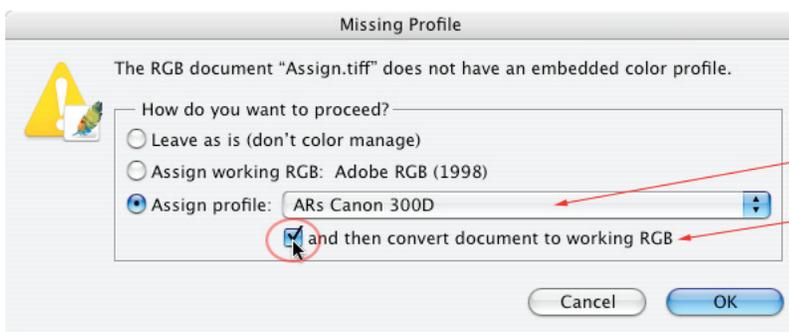
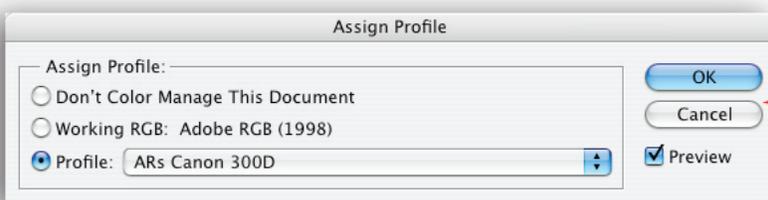


Figure 2. Save the settings of the ICC profile with a unique name.



Assign the profile on open....

Optionally convert into the working space



Assign AFTER opening

Figure 3. Assign your profile to all incoming files using one of these methods.