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Importing ICC Profiles

When you need to add ICC profiles for a device, use the Import function.

1. Choose Color Profiler from the Setup Menu.
2. Choose a device from the Printer list.
3. Click the Import button.
4. The Import dialog box opens.
5. Find the ICC profile you wish to import. Click Open.
6. The ICC Profile Settings dialog box opens.
7. The ICC profile is added to your device's list of profiles.

Exporting ICC Profiles

You may want to export ICC profiles for use in other applications, or to create an alternate version of an existing profile.

1. Choose Setup>Color Calibration.
2. Click on the Device from which you want to export a profile.
3. Select the ICC profile to be exported.
4. Click the Export button.
5. The Export dialog box opens.
6. Choose a Save location for the ICC profile.
7. If you are making an alternate version of the profile, give the profile a new name in this dialog box.

Creating an ICC Profile

RCC II Plus gives you several options when creating ICC profiles. The steps for creating different profiles will vary depending on which option you choose. Remember that when reading swatches, you should always place a number of layers of white paper under your print, to insure that you are not measuring the color of your desk through your printed sheet.

Note- Swatches are printed with no color correction. You should not attempt to manually enable color correction for swatch prints from within Job Properties.

Understanding Ink limits

During the ICC profile creation process, you may be asked to print an Ink Limit Test to determine whether the media is capable of handling the amount of ink being printed. Ink limits will vary depending on the selected printer resolution. Higher resolutions will generally have more trouble with ink absorption, because the ink droplet size is not adjusted to compensate for the increase in the number of dots. When looking at the Test Print, you should check the print to see if the swatches are over saturated. Symptoms of over saturation include: ink bleeding, color mixing, and ink that take an excessive amount of time to dry.
If your Test Print looks fine, and colors do not appear to be over saturated, you can continue creating a profile

If you see over saturation in your Test Print, then you will need to determine which colors are over saturated, and the level where the saturation or bleeding occurs. You may need to do one or more Ink Limit Test Prints to determine the appropriate percentages. Be careful not to over-limit the swatches. Over limiting will reduce the number of viable points with which to produce a profile.

1. Select the swatch before the over saturation or bleeding occurs. Each swatch is located in a column numbered 1-20. Each column number represents 5% increments of saturation.

2. Multiply the column number of your swatch by five to determine the percentage to enter into the Ink Limit dialog. For example, if you notice that bleeding occurs in the Cyan channel in column 18, you should enter 90 as the cyan ink limit.

3. Do this for each channel that is over saturated.

4. Print the Ink Limits again, make sure that the checkbox "apply the ink limit to the test print swatches" is checked. Applying the new ink limits to the test print swatches will help you determine if you have limited the inks properly.

5. The swatches will print with the new ink limits applied. Check the printed swatches for any over saturation.

6. Once you have acceptable ink limits, you may continue creating a profile.

Understanding GCR

GCR stands for Gray Component Replacement. The GCR settings determine the amount of black (K) that is used to replace black made by mixing CMY inks. When CMY are all-present in a color there is a graying component. The greater the amount of CMY in a color, the darker the color is; however the combination of CMY does not produce a true black. The higher the GCR is set, the more CMY black is replaced with K black.

GCR settings will help control print quality, and reduce the amount of ink necessary for creating composite colors. When black is created by mixing three inks (CMY), often papers cannot handle having 300% ink saturation. A full saturation of 100% Cyan, 100% Magenta and 100% Yellow, will leave most papers wet, and may cause bleeding or unintentional mixing of colors. Replacing 300% ink coverage (CMY) with 100% coverage of K will produce a black using only 100% ink coverage, instead of 300%. It is also more economical to replace CMY with K, because you are printing with one ink instead of three.

GCR Options

In most cases the default options will produce excellent results. If you need to adjust the GCR, you can adjust the following options:

Total Ink Limit- This is a sum of the ink limit values for C, M, Y and K. Each color can have an ink limit of up to 100%; the total ink limit is a maximum of 300%. Increasing total ink limit may improve contrast of the print.

Black Ink Start- This determines at which percentage of gray the black (K) channel begins to replace CMY.

Black Ink Limit- This determines the maximum percentage of gray that the black (K) channel will replace CMY

Understanding Advanced Options

Before generating ICC profiles, you may choose to use the advanced options offered by RCC II Plus. Click the Advanced button in the generate profile dialog of Color Profiler.

In most cases the default options will produce a quality ICC profile; however, if you need to adjust the advanced options you can adjust the following options:

Option	Definition
Quality	Specify whether you want a small, medium or large LUT (Look Up Table). Small LUT Profiles have a small file size, but are coarsely sampled. Large LUT Profiles have larger file sizes, but have fine sampling.
LUT Smoothing	Choose whether you want no smoothing, mid, moderate, or heavy smoothing. This option will remove noise from the LUT. Use smoothing if the print shows sudden transitions, or banding.
Create perceptual LUT	This creates a different LUT specifically for the perceptual rendering intent (used for photographic images). If 'create perceptual LUT' is not checked, then relative colorimetric rendering intent will be used to create the LUT, and the profile will be smaller in size.
Create saturation LUT	This creates a different LUT specifically for the saturation rendering intent (used for business graphics). If 'create saturation LUT' is not checked, then relative colorimetric rendering intent will be used to create the LUT, and the profile will be smaller in size.
Create preview tags	This creates ICC preview tags ('pre0', 'pre1', 'pre2') which contain preview LUT's. An ICC-compliant application may use these LUT's to perform printer output simulation (soft proofing).
Save raw data-	This option will save density and colorimetric data in the ICC profile. The data will identify the profile as a profile created by Color Profiler. Raw data provides support of the spot color rendering intent. If you

Option	Definition
	wish to edit this profile in the future (change GCR or ink limits), then the raw data must be saved in the profile.
Use private tags	This option produces files with a smaller size. Private tags are used to identify profiles shipped with RCC II Plus software.
Use ICC tags	Resulting profile is an ICC profile with a larger file size and a correct hifi-color space. In addition, you can specify the hifi-color space signature.
Color Mapping	Allows you to create a customized gamut map that will map the primary colors to colors that can be achieved by the printer. The gamut map will be used whenever the input color is outside of the printer gamut.
Source color	Contain the 6 primary colors which you can specify in the device-independent L*a*b* space color space.
Destination colors	Contain the corresponding colors to which you want the source colors to be mapped. You can specify these colors either in device-independent L*a*b* space, or in the printer's native color space. However, the actual color used in gamut mapping is always the L*a*b* color. Colors specified in the printer space will be converted to L*a*b* color first. For example, if you specify C 0% M 100% Y 100% K 0% for red, expect red to be printed with a similar color of red; however, do not expect the red to have the same exact values C 0% M 100% Y 100% K 0%.
RGB Setup	This allows you to set up the display so that it shows an accurate simulation of what the colors would look like if they were printed.

Creating a New Color Profile

1. Select the Color Profiler option from the Setup Menu

2. Select New Profile from the File Menu in Color Profiler

3. Choose how you want to build the ICC profile:

⚟   Linearization and characterization

- ✎   Re-linearize existing profile

- ✎   Characterization based on existing profile

- ✎   Characterization without linearization

When you choose an option to create a new ICC profile, you will be asked to supply some basic file information:

Filename create a name for the file. You may wish to include ink or media abbreviations as well as the resolution in the file name to make it easier to identify the profile later.

- ✎   Ink name of ink used

- ✎   Media name of media used

- ✎   Author who created the profile

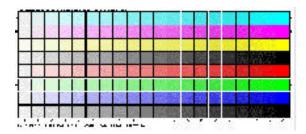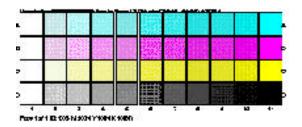| Option	Definition
Comments	Type any additional comments in this field.
The "Advanced" button	Brings up the Device ID dialog where you can fill in the printer Manufacturer and Model ICC signatures, which are four-character codes. If present, these may be used by OS-based drivers.
Printer type	"Color space" supported by the printer.
Printer technology	The type of ink used. CMYK, six color inks, thermal inks.
Percent increments:	5% or 10% steps for each ink. Setting applies only to the density swatches.
Target swatches:	Number of patches used in gamut sampling, setting applies to the # of swatches printed for the target characterization swatches.
Media size	Sets size of all swatches to fit on media.
Resolution	Printer resolution.
Color mode	This may not be the same as Printer type. For example, a CMYK Printer type may have more than one color depth, such as CMYK(1-bit) and CMYK(2-bit). You may adjust specific driver options for your printer by clicking the Driver Options button.

Linearization and Characterization

This option will give you a complete characterization, and is the recommended option for creating a new profile.

1. Supply Basic File Information- You supply the file, ink, media names, and any optional comments. In the next dialog, you should also supply printer information such as: printer type, printer technology, density swatches, target swatches, media size, and print options.

2. Check Ink Limits- Click the Test Print button and adjust ink limits if necessary. Below is an example of an ink limit test print.
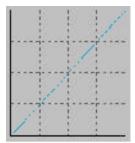

3. Print a Linearization Target - Choose to print a linearization target file (density file) by clicking the Print Target button. You may also choose to change your meter by clicking the Change button. Below is an example of a Linearization Target Print.
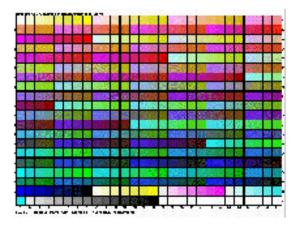

4. Measure Density- Allow some time for the printed target to dry. Then click the Measure button, to launch the "Data Measurements" dialog. Click the Start button to begin measuring with your meter. If you wish to import data from another source instead, click the Import Data button and select the data you wish to import.

5. Adjust Density Curves - The Color Profiler dialog displays the density data gathered from your measurements. In most cases, you will not need to adjust the density curves; however, if you suspect that the density data is incorrect, you can edit curves by clicking and dragging points on the curve to a new value. You can also type in specific values in the entry boxes to the right of the graph. To delete a point, select it and click the Delete button.

Note- Editing should be done sparingly, and only if you know that the data is incorrect. Even if the density curve does not appear to be smooth, it may still reflect the true state of the printer.

Below is an example of a Density curve.

Print Characterization Target - Choose to print a characterization target file (swatch table) by clicking the Print Target button. You may also choose to change your meter by clicking the Change button. Below is an example of a characterization target print.

Note- this characterization target may appear different depending on the type of output device, the number of swatches you print, and the meter you are using.

6. Measure Characterization Swatches - Allow some time for the printed target to dry. Then click the Measure button, to launch the "Data Measurements" dialog. Click the Start button to begin measuring with your meter. If you wish to import data from another source instead, click the Import Data button and select the data you wish to import.

Note- when measuring swatches on backlit media, you should measure the swatches from the side that will be viewed. Do not measure the side on which the ink prints.

7. Adjust GCR options - (if necessary) you may also enter percent values for total ink limits, black ink start, and black ink limit.

8. Generate Profile - Choose from advanced options before generating the profile, or simply generate a profile using default options by clicking the Generate button.

Re-linearize Existing Profile

This option allows you to relinearize, or adjust an existing profile to the current condition of the printer. You can also use this option to compensate for density variation among different units of the same printer model.

Note- You can only relinearize an existing profile if the existing profile was created with the "Linearization and Characterization" option.

1. Locate the Profile you wish to re-linearize, by clicking the Browse button.
2. Edit the basic file information.
3. Check Ink Limits
4. Print a Linearization Target
5. Measure Density.
6. Adjust Density Curves if necessary
7. Adjust GCR options if necessary.
8. Generate Profile

Characterization Based on Existing Profile

This option will build a characterization profile from an existing profile. To obtain a good profile, the printer and media must have similar characteristics to the existing profile. A typical application is to create a profile using a different print mode or different resolution.

1. Locate the Profile you wish to characterize, by clicking the Browse button.
2. Edit the basic file information.
3. Check Ink Limits.
4. Print a Linearization Target
5. Measure Density
6. Adjust Density Curves if necessary.
7. Adjust GCR options if necessary.
8. Generate Profile.

Characterization without Linearization

This option will build a new characterization profile, by skipping the Linearization. This method is not recommended unless your meter does not support density measurements.

1. Supply Basic File Information
2. Check Ink Limits
3. Print a Characterization Target
4. Measure Characterization Swatches
5. Adjust GCR options if necessary.
6. Generate Profile

Editing ICC Profiles

After an ICC profile has been created, you may edit some of the settings. The settings you may change include: File, Ink, media, author names, GCR settings, and ink limits. Editing a profile will overwrite the existing ICC profile unless you change the file name.

To edit a profile:
1. Select the output device from which you wish to edit an ICC profile.
2. Select Color Calibration from the Setup menu.
3. Select the ICC profile you wish to edit from the list.
4. Select Profile Properties from the Edit Menu
5. The ICC Profile Settings dialog box opens.
6. Change the available settings as desired
7. RCC II Plus regenerates the ICC profile to match the new settings.

Deleting ICC Profiles

When profiles are outdated or no longer useful, you can delete them from the list.

1. Select the output device from which you wish to delete an ICC profile.

2. Select Color Calibration from the Setup menu.

3. Select the ICC profile you wish to delete from the list.

4. Click the Delete button.

Factors Affecting Color Calibration

Before you print test swatches, consider the following factors to maximize the quality of your color calibration:

Option	Definition
Ink	Each printer is designed with specific kinds of ink; therefore you should use the manufacturer-recommended inks. Also, make sure the inks are filled and properly primed as instructed by the manufacturer.
Media	Media is the most important part of the ink and media interaction. This interaction between the ink and media coating affects every aspect of print quality, including color accuracy, vividness and durability, as well as the sharpness of your print. If the ink and media are not properly matched, potential problems include bleeding and smearing.
Resolution	Resolution is the measure of the dots per inch (DPI) of the printer. Changing the resolution affects the dot placement and the amount of ink laid down on the media by the printer.
Environment	Humidity and temperature affect the drying time for a print, which affects the ink and media interaction. A longer drying time can cause ink bleeding or intentional ink mixing.
Print mode	For the best results, calibrate using the printer's highest quality print mode. Using the quality mode will reduce banding.
Print heads	Print heads should be properly primed and all nozzles should be firing. The heads also need to be in alignment. Consult the printer manufacturer's documentation for instructions.
Meter	The spectrophotometer, colorimeter or densitometer needs to be calibrated properly for white points and black points. See your device's documentation for calibration instructions.

Creating a Density Profile

1. Select Density Adjustment from the Setup Menu

2. Select New from the File Menu in Density Adjustment

3. Choose how you want to create the density profile:

   ✍ Densitometer readings

   ✍ User specified values

   ✍ Calibrate existing ICC profile

Densitometer Readings

1. Supply Basic File Information- You supply the file, ink, media names, and any optional comments. In the next dialog, you should also supply printer information such as: printer type, printer technology, density swatches, target swatches, media size, and print options.

2. Print a Linearization Target - Choose to print a linearization target file by clicking the Print Target button. You may also choose to change your meter by clicking the Change button.

3. Measure Density- Allow some time for the printed target to dry. Then click the Measure button, to launch the "Data Measurements" dialog. Click the Start button to begin measuring with your meter. If you wish to import data from another source instead, click the Import Data button and select the data you wish to import.

4. Adjust Density Curves - The Color Profiler dialog displays the density data gathered from your measurements. Edit curves by clicking and dragging points on the curve to a new value, or type in values in the entry boxes to the right of the graph. To delete a point, select it and click the Delete button.

Note- Editing should be done sparingly, and only if you know that the data is incorrect. Even if the density curve does not appear to be smooth, it may still reflect the true state of the printer.

1. Generate Density file by clicking the Finish button.
User Specified Values
1. Supply Basic File Information

2. Adjust Density Curves

3. Generate Density file.

Calibrate Existing ICC Profile

1. Locate the profile you wish to calibrate, by clicking the Browse button.

2. Supply Basic File Information.

3. Print a Linearization Target.

4. Measure Density.

5. Adjust Density Curves.

6. Generate Density file.

Editing Existing Density Profiles

There are two ways to edit density profiles:

? Individual CMYK values

? All Channels

Individual CMYK values

1. Select the profile you wish to edit from the list.

2. Select Properties from the Edit Menu

3. Edit file information or click on the Colorant field to select a color channel.

4. Click the Edit button and edit curves by clicking and dragging points on the curve to a new value, or type in values in the entry boxes to the right of the graph. To delete a point, select it and click the Delete button.

All Channels

1. Select the profile you wish to edit from the list.

2. Select Properties from the Edit Menu

3. Edit file information or click on the Colorant field to select a color channel.

4. Click the Edit button and edit curves by clicking and dragging points on the curve to a new value, or type in values in the entry boxes to the right of the graph. To delete a point, select it and click the Delete button.

5. Check the "apply curve to all channels checkbox.

Note- Any modifications made to all channels will override changes you may have made to the individual channels.

Using your Density Profile

Density Adjustments can be routinely created to make adjustments for mechanical deterioration, such as old print heads, or varying environmental conditions.
To use your Density profile:

1. Select your output device and then choose the Setup Properties option from the Setup Menu.

2. From the Print tab, select your density file from the Density adjustment field.

3. All jobs sent to this setup will have this density adjustment applied to them, including any Ink Limit and Color Calibration swatches.