
SetGoldPro 4.0 User Manual

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SetGoldPro 4.0 User Manual

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1

Introducing SetGoldPro

SetGoldPro™ is a wizard-based color utility designed to create high quality gray balance or “Golden State”, input, emulation and output profiles, optimized for the Harlequin® RIP, in order to satisfy today’s color accurate proofing requirements. Color accurate proofing is only possible if devices can be calibrated, and profiles are optimized for a given ink, substrate, screening and resolution combination. SetGoldPro incorporates many solutions for color profile making by drawing from the latest Graphic Arts community research resulting in higher levels of color accuracy. Using SetGoldPro profiles along with the Harlequin RIP ColorPro™ feature set, you can solve any workflow requirements your situation may demand.

1.1 Using SetGoldPro profiles

SetGoldPro profiles can be used for the following purposes:

- To improve color quality and accuracy of your printed output, especially when used with Harlequin ColorPro™, Global Graphics’ full featured color solution for the Harlequin RIP. For more information on ColorPro see, *“Harlequin ColorPro Users Guide”*.

- To build Gray Balance reference profiles—also known as *golden state* profiles. These adjust the printer’s raw state to a repeatable optimized gray-balance state. Once the printer is in this state you can use it to produce a print-color characterization target.
- Gray Balance profiles improve color output quality without the use of color management in the Harlequin RIP. Results are greatly improved when using a Gray Balance profile which, after the initial setup, is mainly used to compensate for the day-to-day variation of the output device. It is also possible for multiple users to calibrate their printers to match the reference, or Golden State. That is, different users can get similar results by using the same Gray Balance profile.
- To build input, emulation and output profiles for use in ColorPro. By using the different profile types you can build sophisticated workflows that handle various types of incoming data including RGB, CMYK, LAB, Named Colors and Gray.

1.2 Merging ICC and SetGoldPro profiles

New in SetGoldPro 4.0 is the ability to create profiles directly from CGATS IT8 files containing IT8.74 and ECI data sets, allowing many external data sets to be used directly, such as those from the www.color.org, www.fogra.org or www.ideal-liance.org websites.

In addition, SetGoldPro 4.0 contains an improved ink limiting algorithm, and new larger targets, which together allow you to characterize your printer much more accurately and create correspondingly more accurate color profiles. SetGoldPro 4.0 was used to create the color profiles used to obtain a Fogra Graphic Technology Research Association (Fogra) certification to ISO 12647-7 for Harlequin Server RIP v9.0 for several different color characterizations including, for example, Fogra39.

You may, therefore, find that you have less need to create ICC profiles from SetGoldPro 4.0 onwards. You should however be aware that the profiles created by SetGoldPro are not the same as ICC profiles: SetGoldPro profiles contain gray-balance and device calibration information (ICC profiles do not); ICC profiles contain measurement data and CRD’s based on parameters set in the profiling package (SetGoldPro profiles do not).

However, SetGoldPro profiles *are* compatible with ICC profiles, and, if you would like to use SetGoldPro and ICC profiles together in the Harlequin RIP, it is recommended that for best all-round results, you follow the advice in “Creating an ICC profile” on page 52.

2

Getting started

This section describes how to get started with SetGoldPro and includes a list of additional components and system resources required to run it.

2.1 Requirements for running SetGoldPro

The following components and system resources are required to install and run SetGoldPro:

- Harlequin RIP version 5.5r1c or greater.
- Harlequin ColorPro.
- Output plug-in for target printer. Target printer must be equipped with correct paper and ink that you are creating the profile for.
- Windows® /2000/XP/Vista/ Windows 7.
- Mac OS X 10.3.9 or later.
- A spectrophotometer that is able to produce Lab and Status T measurements. Note that all references in this manual to the Gretag Macbeth device apply to the Gretag or Gretag Macbeth SpectroScan spectrophotometer. In addition, all references to a hand-held device apply to the Gretag Macbeth Eye-One models.

2.2 What's new in SetGoldPro v4.0

- Support for the following additional targets: GG4374, GG1426, IT8.74 and ECI. The corresponding data sets are supported via CGATS IT8 files allowing profiles to be created for many external data sets based on IT8.74 or ECI, such as from www.color.org.

The new GG4374 and GG1426 targets are designed to allow very accurate color profiling for proofing purposes, and/or to obtain contract proofing certification against ISO 12647-7.

In addition, patches not present on the targets are now interpolated in Lab rather than XYZ, resulting in accuracy improvements for all existing targets.

- Improve the ink limiting algorithm to produced better start points for the ink limiting stage. Limit Cyan based on changes in Chroma, Magenta based on changes in LAB 'a' value and Yellow based on changes in LAB 'b' value.

2.3 Installing SetGoldPro

Follow these steps to install SetGoldPro on Windows or Mac OS X.

1. Insert the media that contains Doc and Tools installer into your system and open it to show its contents. On Mac OS X the installer is in a ZIP file called `DocTools_XX.zip` which should be extracted.
2. Depending on your system, run `DocTools_XX.exe` (Windows) or `install_XX.app` (Mac OS X) to start the installation procedure.

On Windows 7 you should click Yes if a User Access Control message appears.

3. When the Introduction dialog appears click **Next** to move onto the next dialog or **Previous** to return to the previous dialog.
4. In the Choose Features screen select **SetGold** along with any other options you require. Click **Next**.
5. In the Choose Install Folder screen you can use the default installation path or change it using the **Choose** button. We selected click **Next**.

6. In the Choose Shortcut Folder screen select your preferred options and click **Next**.
7. The Pre-Installation Summary screen displays your selected options. If these options are correct click **Install** to start the installation. If not, use the **Previous** button to change your selections.
8. When the install is complete select Done to close the installer.

2.4 Starting SetGoldPro

To start SetGoldPro on Windows: select **Start > All Programs > Global Graphics > Harlequin RIP vX.xx > SetGold**.

To start SetGoldPro on Mac OS X: select **Applications:Harlequin RIP_X_X_DocTools:setgold:SetGold**.

Unless you want to run SetGoldPro in demonstration mode, it is essential to enter your SetGoldPro password when prompted *and* to have your Harlequin RIP dongle attached. See “Evaluating SetGoldPro (demo mode)” below.

2.4.1 Entering your SetGoldPro password

When you start SetGoldPro you will be prompted to enter your SetGoldPro password. If you do not have a password, you can obtain one from your Harlequin RIP supplier, or directly from Global Graphics at either of the following addresses:

UK customers: sales-admin-uk@globalgraphics.com

US customers: sales-admin-us@globalgraphics.com

2.4.2 Evaluating SetGoldPro (demo mode)

You may evaluate SetGoldPro by running the application in demonstration mode (demo mode). Demo mode allows you to step through all the procedures for creating profiles without requiring any input data. Of course, without input data the application is unable to produce any profiles, but it will give you a good idea of the application’s capabilities.

To enter demo mode, enter an invalid SetGoldPro serial number (such as 0) when prompted for a serial number to enable the application. If you decide to go ahead and purchase a password for SetGoldPro, you may enter it by choosing **Options > Upgrade** in SetGoldPro.

3

Preparing your printer and target reader

To achieve a consistent level of accuracy when creating profiles it is essential to prepare your printer and spectrophotometer correctly, before using them to create profiles in SetGoldPro.

3.1 Checklist of items

The following items are required to create SetGoldPro profiles:

- A printing press or proofing printer.
- A spectrophotometer, such as the instruments made by Gretag Macbeth and X-Rite, for measuring light intensity.
- Harlequin RIP operating with plugins for color management, screening and printer.
- SetGoldPro to create gray-balance profiles, or SetGoldPro to create gray-balance, input, output and emulation profiles.

3.2 Printer checklist

To prepare a printer/press for making SetGoldPro profiles, complete this checklist:

- Load the correct ink and paper into the printer. Since each ink type and paper type will produce a different profile, create your profiles using the same ink and paper as you will be using to produce your proofs. If producing profiles for a press, the press should be loaded with plates made with the correct screening and resolution.
- The ink delivery system is clean and distributing inks evenly. You may wish to cycle through the printer's head cleaning cycle a few times.
- Use the printer to output a test page with areas of solid color, fine lines and patterns. Then check that:
 - All colorants are being delivered evenly.
 - Color spectrum is correct.
 - No banding appears in areas of solid colors.
 - Heads are aligned correctly (check this by printing a head alignment test page).
- Allow sufficient time for the printer to reach its optimum operating temperature (consult your printer manual).

3.3 Spectrophotometer checklist

To prepare a spectrophotometer for making SetGoldPro profiles, complete this checklist:

- Calibrate the spectrophotometer using the calibration plaque supplied by the manufacturer.
- Allow ample time for the prints to dry before measuring them with the spectrophotometer. The time varies depending on which ink and paper types you are using, but 30 – 60 mins is normal (even longer for the final IT8 profile).

- In SetGoldPro, specify your spectrophotometer device in the Options screen. If you intend to add calibration data from a file, select the “Import data from IT8 file...” option.

It has been found that using a white backing produces a more visually acceptable match on some print comparisons. The white backing should meet the description for opacity and whiteness as defined in the CGATS.5 standards document: *“Graphic technology — Spectral measurement and colorimetric computation for graphic arts images”*.

4

Creating input profiles

This chapter describes how to create input profiles with SetGoldPro. Once created, the input profile can be used with a color management utility, such as Harlequin ColorPro™, to produce accurate, consistent and predictable color reproduction for a wide range of workflows.

4.1 Creating characterization targets

Input profiles are usually obtained from color characterization target sheets, which are produced from a print run that is representative of the type of printing that future proofs are intended to match. Sample readings are typically obtained every five or so sheets to obtain data that is representative of a complete job run.

If you intend to make an input profile from an external data set, such as characterization data published on the www.color.org website, you can omit this step. Otherwise plan and execute a job run when calibrating a press or imagesetter that includes at least one of the targets installed in the `set-gold\data\Target_Files` folder.

For more information on the targets see “Color characterization targets” on page 77.

The available targets are:

```
754_patch.ps
845_patch.ps
928_patch.ps
GG_iliO_Target1426_A.pdf
GG_iliO_Target4374.pdf
HQ_1426_A_v1.ps
```

Alternatively, use the following four targets (which together make up one large target):

```
HQ_4374_P1.ps
HQ_4374_P2.ps
HQ_4374_P3.ps
HQ_4374_P4.ps
```

Random targets:

```
\color_targets\754_patch_random.zip
\color_targets\845_patch_random.zip
```

Or use the following two targets (which together make up one large target):

```
HQ_1617R_p1.ps
HQ_1617R_p2.ps
```

Note: The 754 and 845 patch random zip files (when uncompressed) become `754_patch_random.eps` and `845_patch_random.eps`. These files can be placed into a page using a desktop publishing application and output through your normal workflow. Use a random target if you are using a press with ink keys.

After the press run, confirm that your process control aims were met in terms of CMYK ink densities, dot gain, plus any other metrics used for process control at your site. Then measure the targets with your Gretag Macbeth reader and save the resulting IT8 data files.

4.2 Creating an input profile

To create an input profile with SetGoldPro:

1. Choose **Options** in SetGoldPro and select the appropriate device settings for your current hardware setup. Click **Home** to return to the first screen when you have done this.

2. Choose **Create Input Profile** to begin the procedure. The first screen reminds you that you must allow sufficient time for the ink to completely dry before attempting to read it with a spectrophotometer. Click **Next** to advance to the next screen.
3. From the list of options that are available, choose how you wish to measure the characterization target.

Make sure you choose the option that matches the type of target that you measured. For example, if you measured one of the 1426 patch targets such as the `GG_i1i0_Target1426_A.pdf` or the `HQ_1426_A_v1.ps` target, select **Import GG 1426 target from IT8 files**.

If you are using an external data set such as one from the www.color.org website, you will need to choose one of the following options at this stage:

For IT8.73 data, select **Import 928 target from IT8 files**.

For IT8.74 data, select **Import IT8.7/4 target from IT8 files**.

For ECI data, select **Import ECI target from IT8 files**.

4. Depending on how you are measuring the targets, either browse to the IT8 data file or files, or read the target with your spectrophotometer, as directed by SetGoldPro.

If you use a target consisting of multiple files, such as the `HQ_1617R` or `HQ_4374`, you can select all the files at once when browsing to the file location, or if you prefer you can select them one at a time by using the **Iterate** button.

If you are using an external data set, select the IT8 data file.

5. Use **Iterate** to repeat the measuring procedure for other targets/data files that you wish to input.
6. Lastly, after measuring all the targets click **Gold** to make the input profile. Give it a meaningful name to help identify its purpose, for instance, *"GRACol SID (24 Gloss)"* for GRACol solid ink densities on 24 pound gloss paper.

The input profile will be automatically installed in the RIP if you chose **Install profiles in RIP** in the SetGoldPro Options screen. Otherwise, you must install it manually, as described next.

7. Create a page setup that uses the “Preview” device. There must be no color management, calibration or page features selected in the page setup.
8. Use the page setup to process your input profile. The RIP will output the results to:

```
<HarlequinRIP>\SW\colorspaces\DeviceCMYK\
```

That’s it. The profile is now ready to be used with color management software, such as Harlequin Color, as described next.

4.3 Using an input profile

Here’s how to use your new input profile in the Harlequin RIP.

1. In the RIP, open the Color SetUp Manager by choosing **Color > Color Setup Manager**.

- From the **Device** list, choose the device you are outputting to, and choose **New** **ColorPro Setup**. The dialog shown in Figure 4.1 opens.

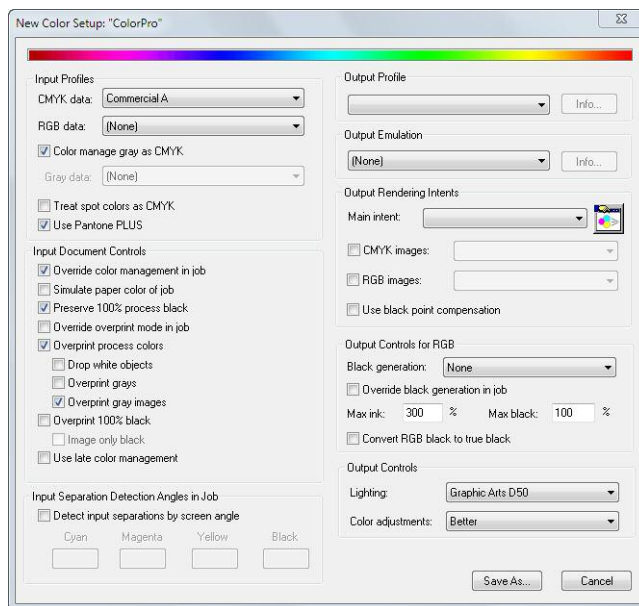


Figure 4.1 The ColorPro Setup dialog

- From the **CMYK data** drop-down list, select the input profile you wish to use. Other color management options can be chosen as required.
- Choose **Save as** and enter a name for the color setup. The name of the ColorPro setup will now be available in the **Color** drop-down list in a Harlequin page setup when the target device is selected.

5

Creating emulation profiles

In today's digital environment the RGB image format is quickly replacing the traditional CMYK format. Many magazine and newspaper pages are created using a combination of copy, CMYK adverts, editorial graphics and RGB images, all on the same page. The only way to make a digital proof of such a page on a proofing device and maintain color accuracy, is to use an emulation profile in the color stream.

5.1 Using emulation profiles

When an emulation profile is used, the CMYK and RGB content are treated separately to produce a proof that accurately represents the press. This is done by selecting an input profile, emulation profile and an output profile as follows:

- CMYK data follows this route: through the input profile selected such as for web offset (fogra BVD, for example); via absolute colorimetric rendering for CMYK data, through the emulation profile and then the output profile that meets the parameters of the inkjet printer being used for proofing; namely ink, paper, resolution and screening.

- RGB data follows this route: through the RGB input profile via perceptual rendering intent to the emulation profile space (which should define the gamut of the press and is often the same space as the CMYK data from above); then through the output profile selected above.

In essence, this process maps RGB images to the gamut of the intended press, via the emulation profile, using perceptual rendering to achieve the best color for the pictorial image, within the intended press gamut. The CMYK data is then mapped colorimetrically to achieve the most accurate color match throughout the process. Finally, once the CMYK and RGB data have all been mapped to the press gamut, the data is then all mapped colorimetrically to the proofing device allowing for a color accurate proof for all page elements.

Note that this is just one example of emulation. Other emulation processes, such as CMYK to CMYK transforms, make it possible to print the same page on slightly different presses, or on more than one paper stock.

5.2 Creating emulation profiles

Follow these procedures to create emulation profiles. To get started, click **Create Emulation Profile** in SetGoldPro.

5.2.1 Entering press conditions

To create a properly labeled profile SetGoldPro needs to know your press conditions. In the dialog box (shown in Figure 5.2), enter details of your press setup and choose an output folder for the emulation profile.



Figure 5.2 Press conditions dialog

Complete the details in the fields as follows:

- Press** Enter the press device you will enter IT8 data from, for example Heidelberg 2100 Web Press.
- Serial No** Enter the device's serial number to ensure the correct profile is used with the appropriate printer.
- Media** Enter the substrate used on the press.
- Resolution** From the menu select the correct printing resolution for your setup.
- Screening** From the menu select the appropriate screening method for your setup. This field must be completed.

- Ink Set** Enter the manufacturer's inks codes.
- Comments** Enter any general press run data.
- Output Folder** Select an output folder for the emulation profile, but do not choose the SetGoldPro application folder. To keep your profiles separate, use a different folder for each profile that you create. This field must be completed.
- The output folder is where all the files to be printed are located as well as where folders for input Profiles, output profile and emulation Profiles are created. It is a good idea to copy to this folder the IT8 files that you will later import.
- A file called **Data** is also located here. This file contains all the details you have entered for the profile you are making. If you change the working folder, this information is updated if there is already a **Data** file in the new working folder, otherwise it will create a new **Data** file.
- The current working folder is remembered from a previous session.

Restore defaults

If you would like to restore the system defaults click **Restore**.

Click **Next** when you have entered all the details. If **Next** is not displayed, ensure your Output folder is different from the SetGoldPro application folder.

5.2.2 Printing and measuring IT8 Press targets

To create an emulation profile SetGoldPro needs to take measurements from one or more IT8 press targets. Alternatively, if you intend making an emulation profile to emulate a press characterization such as those that are available on the www.color.org website, you do not need to measure any IT8 press targets. Click **Next** to continue.

Suitable press targets have been installed in the SetGoldPro installation folder.

For more information on the targets see “Color characterization targets” on page 77.

These targets should be added to a test page that is going to be run on press and are found in the folder `setgold\data\Target_Files\`:

```
754_patch.ps
845_patch.ps
928_patch.ps
GG_iliO_Target1426_A.pdf
GG_iliO_Target4374.pdf
HQ_1426_A_v1.ps
```

Or use the following four targets (which together make up one large target):

```
HQ_4374_P1.ps
HQ_4374_P2.ps
HQ_4374_P3.ps
HQ_4374_P4.ps
```

Random targets:

```
\color_targets\754_patch_random.zip
\color_targets\845_patch_random.zip
```

Or use the following two targets (which together make up one large target):

```
HQ_1617R_p1.ps
HQ_1617R_p2.ps
```

At this point you should decide whether you will import IT8 files from a Gretag Macbeth device or read the targets using a hand held reader.

If you are using a Gretag Macbeth device, print one or more IT8 press targets (you may have already done this if you are calibrating a press or image setter).

If you are using a hand held reader as specified in the **Device** field of Options screen, print the supplied strip targets (for example `754strip.ps`).

Click **Next** to continue.



Figure 5.3 Read an IT8 target

5.2.3 Importing or reading the IT8 data files

The next step is to either import the IT8 data files or read the strip targets into SetGoldPro so the emulation profile can be created.

1. Choose how you would like to measure your characterization targets. You have the option to either read one of the strip targets using the reader device specified in the **Device** field of the Options dialog, or to select one of the options to import the data from an IT8 file, to import data from files created on another type of spectrophotometer that SetGoldPro is unable to read from directly, such as the Gretag Macbeth SpectroScan.

If you are creating an emulation profile from an external data set such as those available on the www.color.org website, you will need to choose one of the following options at this stage:

For IT8.73 data, select **Import 928 target from IT8 files**

For IT8.74 data, select **Import IT8.7/4 target from IT8 files**

For ECI data, select **Import ECI target from IT8 files.**



Figure 5.4 Import the IT8 file into SetGoldPro

2. Click **Next** to advance to the next procedure.
3. Click **Next** to read the IT8 files or scan the target with the specified reader. When reading IT8 files you are presented with a browse dialog to locate the file. When scanning a target you are presented with a number of dialogs to guide you through the process.
4. To import the IT8 files, click **Next** and in the dialog box select the target you want to import, and click **Import**. If you have more than one file to import, click **Back** and repeat this procedure.

If you use a target consisting of multiple files, such as the HQ_1617R or HQ_4374, you can select all the files at once when browsing to the file location, or if you prefer you can select them one at a time by using the **Iterate** button.

If you are using an external data set, select the IT8 data file.

When you have finished, click **Next** and SetGoldPro will create the emulation profile.

5. To read the targets, choose the target from the menu and click **Next**. Print the target and then following the instructions in the dialogs, read each target using your selected device.
6. When the IT8 data is imported or the patches are read you have the option to either **Iterate** and repeat the process or click **Gold** to create the profile.

5.2.4 Saving the emulation profile

We recommend that you store the emulation profile in the profile's working folder; then make a copy and store this in the Harlequin RIP. To save the profile, click **Next** and enter a folder and file name (it is not necessary to specify a file name extension), and then click **Save** in the dialog box.

All operations are now complete and a Harlequin RIP emulation profile has been created.



Figure 5.5 Save the emulation profile

If in the Options dialog you chose the **Install profiles in RIP** option, the emulation profile will be automatically installed into the selected RIP. If however, you chose not to install the profiles into the RIP or you want to install the profiles in a pre Eclipse release SP3 RIP, use the following procedure.

5.2.5 Installing the emulation profile in the Harlequin RIP

If you have chosen not to automatically install profiles into the RIP or you want to install the profile in a pre Eclipse Release SP3 RIP, it must be installed correctly before it can be used in a color management setup.

You will find your emulation profile in your specified Output folder. Place a copy of the emulation profile in the following location:

HarlequinRIP<FOLDER>\SW\Config\emulation\Profiles\CMYK\emulation

You should note that an emulation profile will not work unless an input profile with the same name is installed in the RIP.

When an emulation profile is created an input profile is automatically created. You install this profile by running it through the RIP:

1. Create a page setup in the Harlequin RIP that uses the *Preview* device and has no color management, calibration or page features selected.
2. Print the input profile using the new page setup. The profile is a Post-Script language file.

The input profile will be installed into the RIP.

6

Creating gray balance profiles

Gray balance profiles determine the correct inking, gray balance and tonal scale values for a new device—the so-called “Golden State” of the printer. They are also used as the first step to building an output profiles are a new device.

Calibration tables can be created for up to four device types and/or measurement systems, so that any non-reference printer can be adjusted to this “Golden State”.

6.1 Creating gray balance profiles

To create gray balance profiles, do the following:

1. Start SetGoldPro (or SetGold). Click **Options** to access settings for your current hardware setup.
2. Choose the correct device and port that your spectrophotometer reader is connected to. If the reader is not connected to this computer, choose **None** and select the **Import data from IT8 file** check box instead. Even if you have a reader connected, you may still select this check box to read additional IT8 data files; the information will be incorporated into the profile along with the data from the reader.

3. Click **Home** to return to the home screen, and click **Create Output profile** to start creating a gray balance profile.
4. SetGoldPro needs to know about your printing conditions so it can create a properly labelled profile. On the screen shown in Figure 6.6, enter as much information about your printing conditions as you can.



Figure 6.6 Enter details of your printing conditions

5. Enter a location in **Output Folder** for the profile information generated by SetGoldPro (you will not be able to advance to the next screen unless you have selected an output folder). SetGoldPro uses this folder to create the initial calibration target (`calibrat.ps`), as well as target files containing 754, 845 and 928 color patches.

Click **Next** when you have entered the requested information.

6. You now have the option of entering an existing gray balance profile. To do this, click **Select** and enter the profile. The import profile must be in a format that SetGoldPro can work with, and have been created for the same media. Existing profiles may also work for similar media from dif-

ferent vendors, provided the inks, resolution, and screening remain constant (although color accuracy may be compromised). Click **Next** to go to the next step.

6.1.1 Printing an initial target



Figure 6.7 The Print initial target screen

The state of the printer is determined by printing and measuring an initial target as follows:

1. Create a Harlequin RIP page setup that has no color or calibration settings applied to it.
2. Use the page setup to print `calibrat.ps`, which can be found in your output folder. Click **Next** to continue.

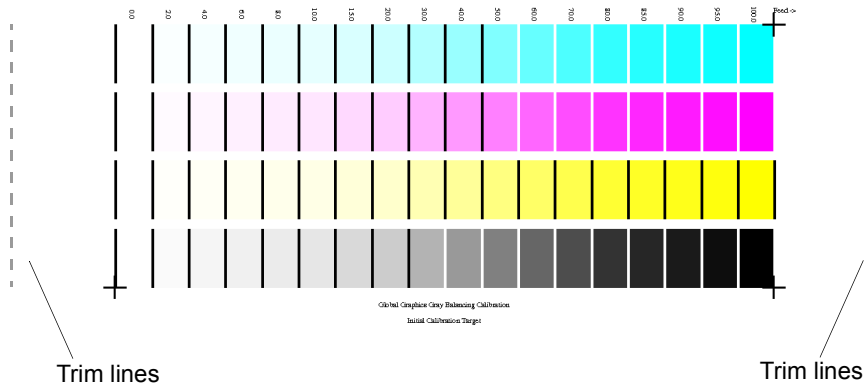


Figure 6.8 The initial target trim to lines

Note: From v8.1 the date and device name are printed on the calibration target.

3. SetGoldPro will now prompt you to read the initial target. Make sure the ink is completely dry before you do this. For correct reading of the target you must scan it from dark to light, otherwise the profile SetGoldPro produces will not be correct.

If you selected the option to read calibration readings from IT8 data files, you will at this point be prompted for the first IT8 file, which must be called **CALIBRAT.IT8** in order for SetGoldPro to be able to use it correctly.

Note: From v8.1 a **calibration.csv** file is provided which contains the spectra readings. This file can be read into your database application. If multiple readings are made, they accumulate in the file, newer ones at the end. The first column in the file is the percentage ink for the patch; the remaining data represents the measured value.

6.1.2 Determining inking limits



Figure 6.9 The Ink Limits screen

By measuring chromaticity values on a specially prepared target, SetGoldPro is able to determine the extent of your ink limits and calculate the minimum amount of ink needed to achieve the maximum gamut for the inkset, paper, screening and resolution combination in use. In some combinations, however, over-inking may still occur. Reducing inking further will reduce the gamut on the output device, which in rare cases may reduce portions of the gamut inside the press gamut. This results in unprintable colors on the subsequent proof and therefore a potentially poor color match for some colors. Through additional testing, you must decide whether a different paper or ink is required to meet the gamut requirements of the press condition you are proofing to.

If you already know your printer's inking limits you can enter them yourself, by choosing **Skip** in step 3 (Figure 6.9) and entering the values into the fields shown in Figure 6.10.

Note: From v8.1 a `chroma.csv` file is created which can be read into a database application and allows you to analysis the results. If multiple readings are made, they accumulate in the file, newer ones at the end. The first column in the file is the percentage ink for the patch; the remaining data represents the measured value.

For more information on inking limits, see “Inking limits” on page 61.

Inking Limits	
Max Cyan :	66.00 Percent
Max Magenta :	66.00 Percent
Max Yellow :	66.00 Percent
Max Black :	100.00 Percent

System Setup	
Tolerance :	1.00 (Maximum dE)
Changeover :	76.00 (Nominal %)

Figure 6.10 Entering printer inking limits

To have SetGoldPro determine your printer’s inking limits, do the following:

1. Using a Harlequin RIP page setup that has no color and calibration settings applied, print the job called `CHROMA.PS` that can be found in your SetGoldPro output folder. Ensure the target is fully dry before attempting to measure it.
2. Click **Next** to continue.
3. If you have opted to use a spectrophotometer device that is connected to the computer to read targets, SetGoldPro will prompt you to read the first strip. Otherwise, you will need to read the target and create an IT8 file called `CHROMA.IT8`, and then import it when prompted by SetGoldPro.

Note: From v8.1 a `iteration.csv` file is provided which contains the spectra readings. This file can be read into your database application. If multiple readings are made, they accumulate in the file, newer ones at the end. The first column in the file is the percentage ink for the patch; the remaining data represents the measured value.

4. Click **Next** to continue.
5. Enter values for tolerance and changeover as follows:

Note: This step is not required when building a gray balance profile using the vDot plug-in.

Tolerance	Determines the acceptable tolerance between an ideal grayscale and the measured values. A tolerance of 1.0 dE is just visible to most observers, while most measuring instruments show a variation of 0.2 or 0.3 dE when repeating a measurement of the same color patch. (In general, the smaller the tolerance the more measurements you will need to make later in this procedure.) A higher tolerance setting (2.0 dE or more), may be required for some combinations of media, ink and printer. This tolerance setting is a guideline and you can choose at a later stage to create a Golden State profile that attains a larger or smaller tolerance. A value of about 1.00 dE is usually a good choice.
Changeover	Defines a percentage point on the Gray Balance target at which SetGoldPro will switch from producing as perfect a neutral color as possible to progressively approaching the color of the solid CMY overprint. A high value means the highlight and midtones remain neutral for longer. A lower value results in smoother midtones and shadow tones, at the expense of neutrality.

6. Click **Next** to continue.

6.1.3 Printing and measuring gray balance targets

The process of printing a gray balance target, measuring it and then producing a new target based on these measurements is the basis for creating a gray balanced profile. The process is repeated until the defined tolerances are unable to be improved any further, at which point the profile is said to be optimized.

Note: If using the HQ vDot4 plug-in for the Epson Stylus Pro 4900, 7880, 9880, 7900 and/or 9900 this step should be omitted. With the proper ink limits set by the previous step, along with the further ink mixing done by the Epson Halftone Module (HTM), the result will be a gray balance suitable for producing an optimized printing state for color characterization

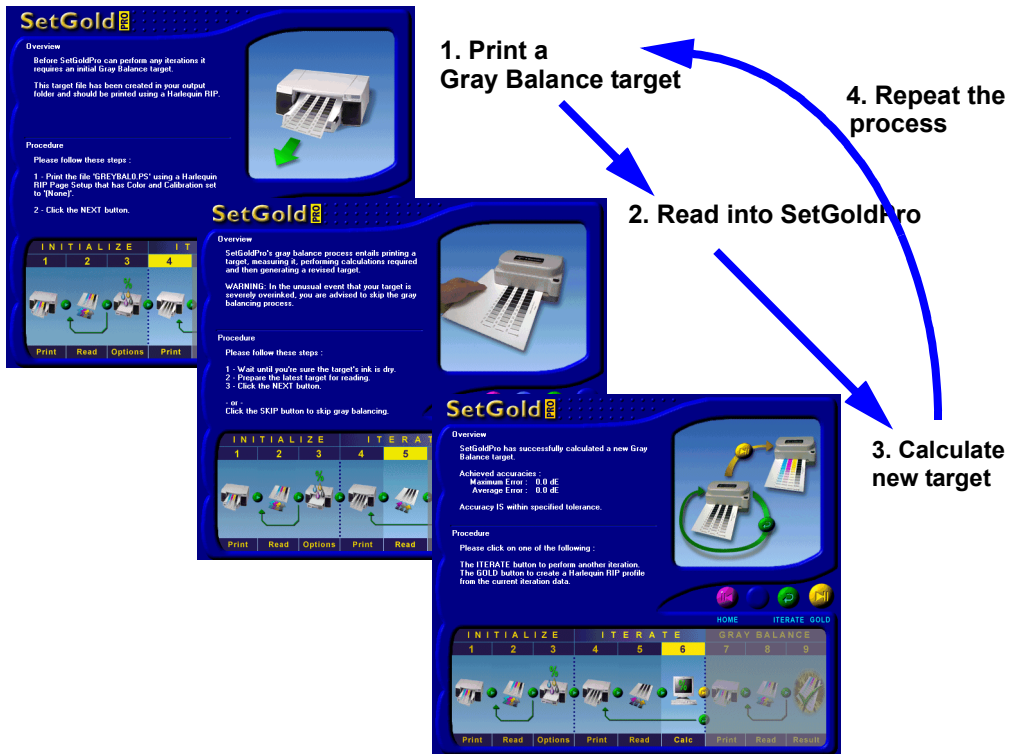


Figure 6.11 The Iteration process

In cases of severe over-inking, such as when the inks flows between patches on the target, there is little to be gained from gray balancing. For these situations we suggest that you try a lower resolution setting and/or different paper type, as a profile that has not been gray-balanced will severely limit the output quality produced by the printer.

To print and measure gray balance targets, do the following:

1. Using a Harlequin RIP page setup that has no color and calibration settings applied, print the job called **GREYBAL(x).PS** (where x is the target number, 0 being the first one) that can be found in your SetGoldPro output folder. Ensure the target is fully dry before attempting to measure it.
2. Click **Next** to continue.
3. If you have opted to use a spectrophotometer device that is connected to the computer to read targets, SetGoldPro will prompt you to read the first strip. Otherwise, you will need to read the target and create an IT8 file called **GREYBAL(x).IT8**, and then import it when prompted by SetGoldPro.
4. Click **Next** to continue.
5. If the achieved accuracies are within your acceptable tolerances, click **Gold** to proceed to the next phase of the process, where you will use the golden state profile to create a golden state target to configure the final Harlequin RIP profile. Otherwise, if the tolerances are not acceptable and there is still room for improvement in the profile, click **Iterate** and repeat step 1 again.

6.1.4 Creating a gray balance profile

Now that you have a golden state profile you can use it to create a gray balance profile that can be used in the Harlequin RIP, as described in “Using a gray balance profile in the RIP” on page 45.



Figure 6.12 Creating a gray balance profile

To create a gray balance profile, do the following:

1. Using a Harlequin RIP page setup that has no color and calibration settings applied, print the job called **GOLDEN.PS** (where x is the target number, 0 being the first one) that can be found in your SetGoldPro output folder. Ensure the target is fully dry before attempting to measure it.
2. Click **Next** to continue.
3. If you have opted to use a spectrophotometer device that is connected to the computer to read targets, SetGoldPro will prompt you to read the first strip. Otherwise, you will need to read the target and create an IT8 file called **GOLDEN.IT8**, and then import it when prompted.

To handle different density standards (Status T, Din) and measurement devices, you may include up to four sets of measurements in your “golden state”, gray-balanced profile.

4. Click **Next** to create a gray-balance profile in your output folder with the name `%%Title: Gray-balanced profile`.
5. Click **Exit** to close the application or **Home** to create another profile.

6.2 Using a gray balance profile in the RIP

Now that you have created a gray balance profile, you can use it in the RIP to manage color output. To do this, first copy the profile to your **Profiles** folder (`\sw\devices\plugin\Profiles\device\`) and then use it in the RIP as follows:

1. Open the RIP Calibration Manager.
2. From the device list, select the device that you wish to use.
3. Click **New** to open the *Edit uncalibrated target* screen.
4. Enter a name for the calibration set.
5. From the **Profile** list, select the gray balance profile that you wish to use.
6. Make sure the **Force Solid Colors** option is not selected. This is important.
7. Choose **OK** to close the window, and then **OK** to close the Calibration Manager.
8. To implement the new calibration profile, open or create a new page setup that uses the target device and choose the profile from the **Calibration** list.

Once this procedure has been completed, ICC color characterization targets from your preferred profiling package should be printed from this state, or continue onto “Creating output profiles” on page 47 if making SetGoldPro output profiles.

7

Creating output profiles

Output profiles must be built on sound color science principles to produce color accurate proofs or final print color gamuts. SetGoldPro profiles can include “golden state” curve data, calibration data and color characterization target data. Once an output profile has been created for your printer all of the features of the ColorPro™ in-RIP color technology can be used to optimize printing.

7.1 SetGoldPro procedure

SetGoldPro includes a set of color characterization targets. To create an output profile you will need to take measurements from one or more of these targets.

1. Using your proofing printer, print one or more of the color characterization targets that can be found in the folder `setgold\data\Target_Files`, or, if these are unsuitable for your reader, print the targets that have been supplied with your reader.

For more information on the targets see “Color characterization targets” on page 77.

```
754_patch.ps  
845_patch.ps  
928_patch.ps  
GG_iliO_Target1426_A.pdf  
GG_iliO_Target4374.pdf  
HQ_1426_A_v1.ps
```

Or use the following four targets (which together make up one large target):

```
HQ_4374_P1.ps  
HQ_4374_P2.ps  
HQ_4374_P3.ps  
HQ_4374_P4.ps
```

Random targets:

```
\color_targets\754_patch_random.zip  
\color_targets\845_patch_random.zip
```

Or use the following two targets (which together make up one large target):

```
HQ_1617R_p1.ps  
HQ_1617R_p2.ps
```

Important: To ensure a full gamut range, you will need to print the targets using a gray balanced profile that has been created for the paper and ink installed in the printer. See “Creating gray balance profiles” on page 35 for details.

2. Allow sufficient time for the ink to dry before measuring the targets.

3. Choose **Create Output Profile**. If a gray balance profile exists in your output folder, the application advances to the step shown in Figure 7.13. Now go to step 6.



Figure 7.13 Creating an output profile

- If a gray balance profile does not exist, however, SetGoldPro assumes you have not created one and starts from the beginning. In this case SetGoldPro needs to know about your printing conditions so it can create a properly labelled profile. On the screen shown in Figure 7.14, enter as much information about your printing conditions as you can.



Figure 7.14 Enter details of your printing conditions

Note: The v8.0 Harlequin PLUS Server RIP needs to know which colorants are set in the printer. From v8.1 The names of the screens have changed and you have to select the full colorant style “HEDS1 PhotoInk 2211” or “HEDS2 PhotoInk 2213” rather than “HEDS2”.

- Enter a location in **Output Folder** for the profile information generated by SetGoldPro (you will not be able to advance to the next screen unless you have selected an output folder). Click **Next** when you have entered the requested information.

Now perform the various steps as described in “Entering printer inking limits” on page 40. Then proceed to step 6 below.

- From the drop-down list, choose how you would like to measure your characterization targets, and then click **Next** to continue.

7. From the list of options that are available, choose how you wish to measure the characterization target.

For more information on the targets see “Color characterization targets” on page 77.

Make sure you choose the option that matches the type of target that you measured. For example, if you measured one of the 1426 patch targets such as the `GG_i1i0_Target1426_A.pdf` or the `HQ_1426_A_v1.ps` target, select **Import GG 1426 target from IT8 files**.

If you are using an external data set such as one from the www.color.org website, you will need to choose one of the following options at this stage:

For IT8.73 data, select **Import 928 target from IT8 files**.

For IT8.74 data, select **Import IT8.7/4 target from IT8 files**.

For ECI data, select **Import ECI target from IT8 files**.

8. Depending on how you are measuring the targets, either browse to the IT8 data file or files, or read the target with your spectrophotometer, as directed by SetGoldPro.

If you use a target consisting of multiple files, such as the `HQ_1617R` or `HQ_4374`, you can select all the files at once when browsing to the file location, or if you prefer you can select them one at a time by using the **Iterate** button.

If you are using an external data set, select the IT8 data file.

9. Use **Iterate** to repeat the measuring procedure for other targets/data files that you wish to input.
10. . If using the reader’s own software to read the targets, use the appropriate `.csv` file from the `color_targets` folder to measure the targets.
11. After reading the targets, click **Gold** to create the output profile in your output folder with the name `%%Title: color output profile`.
12. Click **Exit** to close the application or **Home** to create another profile.

7.2 Using the output profile in the RIP

Once an output profile has been created it can be used by ColorPro™in-RIP color technology to optimize printing. Refer to the *Harlequin ColorPro* manual for details on how to use SetGoldPro output profiles along with rendering intents for optimal color managed output.

7.3 Creating an ICC profile

Before you create an ICC profile and import it into the RIP check that the TAC that you intend to implement in your profiling package is sufficient to limit the ink. The TAC that you should use may have changed because the SetGoldPro profile that you use to print has changed the response of the printer.

The exact procedure for creating an ICC profile varies between applications. However, the procedure described here is suitable for most applications.

1. Print the file `ProfileInkLimits.ps` which is located in the `misc` folder within SetGoldPro's application folder, using the page setup in which you have chosen your copied profile.
2. Inspect the Superblack patch on this target (C+M+Y+K) and choose the highest patch that produces acceptable output. The TAC of this patch should be your new profiling package TAC, unless you discover the need for a lower TAC when examining the double overprints in the next step.
3. Examine the double overprints (C+M, C+Y, M+Y) on this target for signs of over-inking below the TAC that you intend to set in your profiling package.

For example, if your intended profiling package TAC is 160% and you see over-inking in the M+Y patch at 75% (a TAC of 150%), you need to change your intended profiling package TAC to 140%.

4. If necessary, make a note of your new profiling package TAC.

Note: If you cannot reduce your profiling package TAC to this new limit, you need to create a new Golden State profile with lower ink limits. See "Method C" on page 65 for details.

Once you have checked your intended profiling package TAC, print the color profiling target using the page setup in which you have chosen the copied SetGoldPro profile.

If the color profiling target is still subject to over-inking, you may be able to use the special page feature **CMYKInkLimit**.

Note: This page feature can only be used when printing targets that use the **setcmykcolor** PostScript language operator: it cannot be used when printing color profiling targets that contain images. It limits the TAC of patches so that they do not exceed the TAC that you intend to use in your profiling system. This means that patches that would have been ignored by your profiling system are prevented from over-inking and ruining neighboring patches.

If necessary, follow the steps below to edit your page setup so that it uses the **CMYKInkLimit** page feature:

1. Move the **CMYKInkLimit** file from the **misc** folder within the SetGoldPro application folder into the **Page Features** folder within the Harlequin RIP application folder.
2. Open this file and edit the value for the key **/InkLimit** so that it matches your intended profiling package TAC.
For example, if you intend to implement a TAC of 140%, change the value to **1.4**.
3. Open the Page Setup Manager and select the page setup that you wish to edit and click **Edit**.
4. Select the **Enable Feature** check box in the Processing section and choose **CMYKInkLimit** from the accompanying menu.
5. Click **OK** twice to close the dialog boxes.
6. Use this edited page setup to print a target that can be successfully measured.

Once you have generated the ICC profile, using an appropriate TAC control, install it using the RIP menu option, **Color > Install ICC Profile**. In the **Linear Calibration From** list in the Install ICC Profile dialog box, you must select the

Golden State profile that you have created with SetGoldPro. All the important data from the Golden State profile is now associated with the installed ICC profile.

8

Troubleshooting

8.1 Error messages

The following is a list of possible error messages and symptoms that you may encounter when using SetGoldPro. Suggestions are also made for how you can overcome these errors.

You can inspect the `SetGoldPro.log` file, created in the SetGoldPro application folder or your chosen output folder, for details of error messages, such as those relayed from the reading device.

Error Bad reading

You should re-read the first patch again. If the error continues (and is device related as opposed to trimming the target inside of the dashed lines) then a re-calibration of the device has been known to correct this issue in some situations.

Error the strip last read is not correct

You have the choice to continue by either selecting **Next** or selecting **Back** to try again.

Error the selected RIP does not support profile install

You have selected a RIP which is not capable of supporting automatic profile install. You should reselect the RIP ensuring it is a Harlequin RIP Eclipse Release SP3 (or later) or manually install the profile as described

in “Creating an input profile” on page 20, “Installing the emulation profile in the Harlequin RIP” on page 33 or the Harlequin ColorPro manual.

Error creating setup data

Error writing setup data

Failed to save setup data

SetGoldPro creates a `setup` file in the `data` sub-folder of your application folder. This file records your choice of reading device and output folder. These messages appear if there is insufficient disk space to write to this file or if the disk or file is read-only. To prevent this error, ensure that enough disk space is available or change the disk and file properties.

Error creating Print-State data file

Error writing Print-State data

Error saving Print-State data file

SetGoldPro creates a `data` file in your chosen output folder. This file records printer setup information as well as your print options, such as inking limits. These messages appear when there is insufficient disk space to write to this file or if the disk or file is read-only. To prevent this error, ensure that enough disk space is available or change the disk and file properties.

Warning - Some default Print-State values used.

This message occurs when default values are used in place of missing information for the `data` file in your output folder. Inspect the file to see if the default values are applicable. If necessary, edit the values.

Error creating file 'C:\...\...\...\ANYFILE.ps'.

This message appears when the named file is read-only. To prevent this error change the properties of the file so that it is no longer read-only.

Status T Read error 'Bad reading'.

Status T Read error 'LAB read error'.

These messages occur if the reader is unable to correctly read the patch that it is measuring. To prevent this error, ensure that you feed the target into the reader at the correct angle. If necessary, re-align the target so that the middle of the patch that you are reading is in line with the alignment markings on your reader.

You may need to change the dividing lines on the target so that the reader can distinguish between neighboring patches. See Appendix B.3 “Editing the dividing lines on all targets” for details.

Status T Read error ‘Device needs calibrating’.

This message occurs if your device needs re-calibrating. When re-calibrating, ensure that you use the correct calibration plaque for the reader.

N point(s) corrected to make Output curve monotonic

This message occurs if SetGoldPro has modified the curve to ensure that ink saturation values increase rather than decrease for increasing percentage levels. *n* is the number of points on the curve that SetGoldPro has modified.

**Invalid min/max points in adjustment curve
End points of adjustment curve are invalid**

These messages appear when the curve for any of the channels is non-monotonic. If this message appears, SetGoldPro has been unable to correct the tone curve. This means that you will get an error if you try to use this profile in the Harlequin RIP. In the rare event that you see this message, you will need to create another profile.

8.2 Symptoms

Difficulty in reading calibration patches

You may have trimmed the target too much. The dashed lines used as trim marks must remain on the patch. Try adding a backing piece of the same type of paper and re-read the patch, or print another target.

You may have selected the wrong model of DTP41. When you click **Options** it is important to select the exact model that you are using.

You may have loaded the patch wrongly. Offer the patch up to the alignment mark on the spectrophotometer, inserting the target as far as it will go before you meet firm resistance. Then click **Next** to start the reading.

There may be insufficient contrast between the patches and the dividing lines. This is most likely to happen in the black patch of the Initial target, but is possible elsewhere. To cure the problem, you must edit the

`defaults.1g` file to make the dividing lines turn from black to white. See Appendix B.3 “Editing the dividing lines on all targets” for details.

Your reader may need re-calibrating if you repeatedly get read error messages. Ensure that you use the correct calibration plaque for the reader.

SetGoldPro may not be able to communicate with the reader due to the re-configuration of the communications port by another application. Use the Task Manager to close SetGoldPro and then close the application that you suspect is causing the conflict. If necessary reboot your computer. You can then restart SetGoldPro and configure the communications port by clicking **Options**.

Difficulty in achieving the required error tolerance

You may have specified too small a tolerance. Try a larger value. For example, you may not be able to achieve a tolerance of 1.0 dE for the combination of media, ink and printer that you are using.

You may have read the same patch twice or you may have read the patches in the wrong order. If you think this is the case, try re-reading the patches.

You may be allowing inadequate drying and stabilization time before measuring targets.

Difficulty seeing the created profile in the RIP

A small number of names seem to cause the name to be unlisted in the **Profile** list in the Edit Calibration dialog box. You may also see problems with names similar to the plugin device, but differing only in the use of uppercase or lowercase letters.

If you see this problem, try renaming the profile to a dissimilar name then close and re-open the Edit Calibration dialog box. Please report any such problems to Global Graphics.

Edit Calibration reports a problem with the profile

This may happen when you exit the repeated printing and measuring of `greyba1N.ps` files with a large error. The error may have led to invalid curves in the profile file, such as non-monotonic values.

Check that you intended to end the iterative measurements in SetGoldPro at the point that you did. It is possible to resume measurements from a previous session and it may be worth trying one iteration or more to reduce the reported error values.

Appendix A

Inking limits

A.1 Introduction

This appendix contains details on why you may wish to set ink limits in SetGoldPro (even if you are using a separate color profiling package, to, for example, create an ICC profile), and some guidelines on how to decide on these limits. Before examining the individual cases where you may need to use SetGoldPro's ink limiting functionality, it may be helpful to consider the following questions and answers.

Why are inking limits necessary?

It is sometimes necessary to limit the TAC (Total Area Coverage) to prevent paper from becoming oversaturated. Oversaturated paper may tear and signifies wastage of ink. In some extreme cases the ink may run and ruin an image or patches on a target.

In SetGoldPro 4.0 a new ink limiting algorithm should provide more suitable ink limits for proofing purposes, especially if you are using SetGoldPro to produce the final output profile. However, in some cases, you may still find it necessary to manually override the suggested ink limits, for example to provide the largest possible gamut for perceptual rendering, or if you are using SetGoldPro alongside another profiling package to create an ICC profile.

Why not limit the TAC in your color profiling package?

If you are using a separate color profiling package alongside SetGoldPro, it is likely that it will use one of two main methods for creating a color profile.

One method uses a RGB color profiling target as its starting point. The user then specifies the TAC as part of the conversion process from a RGB to a CMYK color profiling target. If using a suitable TAC, this method should result in a target that does not overink. However, if your profiling package cannot provide a low enough TAC limit, you may need to use SetGoldPro to help limit inking.

The second and more common method of creating a color profile uses a CMYK color profiling target as its starting point. This color profiling target may exhibit over-inking. In most cases, patches on an over-inked target that are above the specified TAC are ignored. However, severe over-inking may mean that it is not possible to measure some neighboring acceptable patches of the color profiling target.

Why not limit the TAC in SetGoldPro?

If you are using a separate color profiling package, for example to create an ICC profile, and you used just SetGoldPro to limit the TAC, you would prevent your color profiling package from producing saturated colors. For example, if you wanted to implement a TAC of 240% in SetGoldPro, each color component would be limited to approximately 60%. Your color profiling package cannot then use 80% Cyan and 90% Yellow to produce a bright green, even though this would require only 170% ink coverage. Instead your color profiling package must use the absolute limits set in SetGoldPro of 60% which would produce a much paler green.

Having considered the limitations of using just SetGoldPro or just your color profiling package to limit inking, let us look at some methods for determining ink limits in SetGoldPro.

A.2 Methods for determining SetGoldPro ink limits

The list below offers an overview of some possible methods for deciding on SetGoldPro ink limits. Choose the method that suits your needs and refer to the relevant section for further details.

- “Method A” on page 64
Use this method to ensure that the ink limits are not reduced below those of the eventual press, when using the printer as a proofing device. This method involves setting the ink limits to just above those of the eventual press.
- “Method B” on page 64
Use this method if you have already created a profile for one resolution with suitable ink limits and you wish to create a matching profile for another resolution. This method involves copying the maximum Status T value for each color component from the first profile for use in the other profile.
- “Method C” on page 65
If you are using a separate color profiling package alongside SetGoldPro, use this method to facilitate any of the following needs:
 - Establish what your profiling package TAC should be
 - Limit inking beyond the ability of your profiling package
 This method consists of two main stages.
The first stage involves following a procedure to establish a desired profiling package TAC.
If necessary, the second stage involves deciding on SetGoldPro ink limits to account for the difference between your desired profiling package TAC and the actual TAC control offered by your profiling package.

Note: You may still see over-inking when using a Golden State profile that includes ink limits to print a color profiling target. In most cases this over-inking can be ignored, as ink is limited by the TAC control of your profiling package. In some severe cases the ink may run and prevent acceptable patches from being read.

A.3 Method A

Use this method in a proofing situation where you know the solid ink densities for the printing system you wish to proof and where the primary objective is to ensure that the color gamut of your proofing device is not reduced below that of your eventual press.

This method involves setting ink limits in SetGoldPro to values just above those of the eventual press.

For example, you could take the maximum Status T values for each color component on a SWOP press and use slightly higher values in SetGoldPro. The amount by which you should increase the ink limits is a matter of experimentation and analysis.

Table 1.1 SWOP Press - CGATS Type 1

Color	Cyan	Magenta	Yellow	Black
Status T	1.22-1.36	1.33-1.47	0.94-1.08	1.52-1.66

The table shows some Status T values for a SWOP press.

A.4 Method B

If you have already created a Golden State profile for one resolution you can use the same inking limits when creating a matching profile for another resolution.

For a proofing environment this method ensures the color gamuts will match for a given ink, paper and screening combination, regardless of resolution setting.

To access the Status T values used in the first profile, follow these steps:

1. Open the Calibration Manager using the **Output>Calibration Manager** menu option.
2. Choose the **Device** for which the profile was created and click **New**.
3. Choose the **Profile** that you wish to copy values from.

4. Choose **Status T (X Rite)** from the **Measurements as** menu.
5. Choose **Cyan** from the **Channel** menu and note the Status T value within the **C100** field.
6. Repeat step 5 for the other channels.
7. Use these values in SetGoldPro.

A.5 Method C

Use this method if you are using SetGoldPro alongside another color profiling package. The method involves either one or two stages.

Stage 1 Complete stage 1 to establish what your profiling package TAC should be.

This stage involves printing a file that shows output for different levels of Cyan (C), Magenta (M), Yellow (Y), Black (K) and Superblack (C+M+Y+K). You decide on acceptable maximum ink limits for each of these patches and calculate your desired profiling package TAC on the basis of these limits.

Stage 1 includes steps 1-4 of the procedure.

Stage 2 Continue to stage 2 if your desired profiling package TAC is below the level of control offered by your color profiling package.

This stage involves following guidelines to decide on SetGoldPro ink limits that account for the difference between your desired and actual profiling package TAC.

Stage 2 includes steps 5-8 of the procedure.

Note: As discussed in the introduction, unnecessarily low ink limits in SetGoldPro prevent a color profiling package from producing saturated colors. Where possible, limit inking using your profiling package rather than SetGoldPro.

Follow steps 1-4 of the procedure to establish your desired profiling package TAC. Complete the whole procedure if your desired profiling package TAC is below the level of control offered by your color profiling package.

1. Print the file `setGoldLimits.ps` located in the `misc` folder within the Set-GoldPro application folder, using a page setup in the RIP where **Color** and **Calibration** are set to **(None)**.

The target contains patches for Cyan (C), Magenta (M), Yellow (Y), Black (K) and Superblack (C+M+Y+K). The percentage levels for the patches of the C, M, Y and K patches are indicated by the numbers to the left of the Cyan patch. Numbers to the right of the Superblack patch indicate the TAC levels for the Superblack patches.

2. Inspect the C, M, Y and K patches and record acceptable ink limits for each patch.

You should select the highest ink limits possible and use the printing of reversed text at a specific point size as a means of determining acceptable Output.

3. Inspect the Superblack patch and choose the highest patch that produces acceptable output. Note the TAC of this patch. This is your aim TAC.
4. If the C, M, Y and K inking limits that you chose in step 2 are all 100% then the aim TAC that you decided on in step 3 is equal to your desired profiling package TAC. Otherwise, determine your desired profiling package TAC using the formula:

$$\text{Desired Profiling Package TAC} = \left(\frac{\text{Aim TAC}}{\text{Sum of C, M, Y, K Limits}} \right) \times 400$$

Figure A.15 Desired profiling package TAC formula

For example, if the sum of the C, M, Y, and K inking limits is 370% and your aim TAC is 160% then your desired profiling package TAC is approximately 170% ((160/370) x 400 = 173%).

5. If your profiling package offers your desired TAC there is no need to set ink limits in SetGoldPro. Otherwise, calculate the difference between your desired profiling package TAC and the actual TAC control offered by your profiling package. In total, you need to reduce the C, M, Y and K inking limits by this amount.

For example, if your desired profiling package TAC is 170% and your profiling package only offers a TAC control of 220%, then the difference is 50%.

Note: If your desired profiling package TAC is close to the lowest TAC offered by your profiling package, then you should limit inking in SetGoldPro. This means that you can further limit your profiling package TAC, if necessary, at a later stage. The amount by which you should limit inking is a matter of judgement.

6. Try to account for this difference, for example 50%, by reducing the inking limit that you decided on for Black (K) in step 2.

Often, a range of similar patches can be seen in the Black patch. You can account for some if not all of this difference by choosing the lowest patch in the range. However, you should not limit any colorant more than necessary. For example, if the difference is only 10% do not limit Black by more than a further 10%.

7. If necessary, account for the remaining difference by reducing the C, M, Y inking limits that you chose in step 2.

You can either reduce these colorants equally or account for the remaining difference by choosing new CMY levels that attain a gray-balance. For example, if the difference you calculated in step 5 is 50% and you reduce the Black inking limit by a further 20% in step 6 then you can account for the remaining 30% difference by reducing each of the other colorants by 10%.

8. Record the revised ink limits that you decided on in steps 6 and 7.

Appendix B

Editing default values for targets

B.1 Introduction

This appendix describes how to edit some default values used for generating targets in SetGoldPro. The default values that you can edit are mainly associated with Gray Balance targets, although you can edit the color of dividing lines on all targets.

The default values used for generating targets are defined in a PostScript dictionary in the `defaults.1g` file, located in the `data` folder within your SetGoldPro application folder. Values within this dictionary are expressed as key-value pairs, which include a key that begins with a forward slash, such as `/IterationPrefix` and a value such as `Greybal`.

Note: If you edit the `defaults.1g` file and wish to return to the default values, delete the `defaults.1g` file and restart SetGoldPro. SetGoldPro will create a new `defaults.1g` file with default values if no existing file is found.

B.2 Editing the Gray Balance target

There are two main aspects of the Gray Balance target that you may edit:

- Percentages** You can change the percentage values of the patches for all the strips. See “Percentage values” on page 70 for details.
- Filenames** You can change the format of file names for both the Gray Balance target file and the IT8 import file. See “File names” on page 72 for details.

Refer to the individual sections for details on how and why to edit specific defaults.

B.2.1 Percentage values

You can change the percentage values of the patches for the *No Change* strip, as well as the percentage values that are used in the *Magenta Change* and *Yellow Change* strips when creating the first Gray Balance target. Also, you can specify the percentages to use on the chromaticity target.

No Change strip

The percentage values used for the patches of the No Change strip on the Gray Balance target are defined in an array with the key `/Percentage`.

```
/Percentage [ 100.0 95.0 90.0 85.0 80.0 70.0 60.0 50.0
40.0 30.0 20.0 15.0 10.0 8.0 6.0 4.0 2.0 0.0 ]
```

The default values range from 100-0%, with 5% and 10% increments. You can choose other values, but there must be 18 patches and the percentage values must range from 100.0 to 0.0.

Note: The percentage values reflect a percentage of the maximum amount of Cyan, Magenta and Yellow that you allow (see “Determining inking limits” on page 39). The maximum limits for CMY are indicated on the bottom right of the target. For example, if you set an inking limit of 40% for C, M and Y the target would read **max CMY (40, 40, 40)**.

Do not change the maximum percentage value 100.0 to a lower value. SetGoldPro already provides a mechanism for limiting inking, as described in “Determining inking limits” on page 39.

You may wish to change other values to place more patches in the highlights, midtones or shadow tones sections of the strip.

Magenta Change / Yellow Change strip

You can change the amount by which the percentage values for the Magenta Change and Yellow Change strips differ from those for the No Change strip during the first iteration. The amount by which the percentage values differ for the first iteration is known as the *range*.

The default values for the Magenta Change strip are:

```
/M_Range [ 0.0 -14.0 -10.0 -12.0 -14.0 -18.0 12.0
12.0 12.0 10.0 6.0 6.0 4.0 0.0 ]
```

The default values for the Yellow Change strip are:

```
/Y_Range [ 0.0 -12.0 -16.0 -18.0 -16.0 -16.0 12.0
12.0 8.0 8.0 4.0 4.0 4.0 0.0 ]
```

The arrays of values for the Magenta Change and Yellow Change strips directly correspond to the array of values for the No Change strip. In this case the range for both strips at 100% is 0.0. The range for the Magenta Change strip at 95% is -14.0 which produces a value of 81% for Magenta. Similarly, the range for the Yellow Change strip at 95% is -12.0 which produces a value of 83% for Yellow.

You can edit these values in order to optimize SetGoldPro and reduce the number of iterations that you need to perform to make a Golden State profile. For example, you can experiment with these values and analyze the number of iterations that are necessary for varying ranges.

If you change the percentage values for the patches of the No Change strip, you may wish to change the range for these strips. Determining suitable ranges for particular percentage levels is a matter of experimentation.

Chromaticity values

Default percentages that are used in the Chromaticity stage. You may find that you can fine tune the ink limits suggested by SetGoldPro, by editing these values to encompass likely ink limits for your printer. For example, if the likely ink limits for your printer range from 50% to 70%, you may wish to use values ranging from 40% to 80%. The steps do not have to be equal in size, or include 0% or 100%, as long as there are 18 in total.

```
/ChromaticityPercentage [ 100.0 98.0 96.0 94.0 92.0 90.0 88.0
86.0 84.0 80.0 75.0 70.0 65.0 60.0 55.0 50.0 45.0 40.0 ]
```

B.2.2 File names

You can change the file name prefix of the Gray Balance target from its default value of *Greybal*. You can also change the format of the file name of the IT8 file that is searched for when importing data.

Note to OEMs: If you change the stem of the file name for Gray Balance targets you need to edit the screen prompts detailed in this document to reflect this change.

B.2.2.1 Gray Balance target file name

You can change the file name prefix used to create the file name of the Gray Balance target file. The default value is:

```
/IterationPrefix Greybal
```

SetGoldPro appends the number of the iteration as well as the file extension **.ps** to this file name prefix to create the file name of the Gray Balance target file. For example, using the default settings, SetGoldPro produces the file **Greyba10.ps** the first time it generates a Gray Balance target. Successive iterations are then numbered accordingly, for example **Greyba11.ps** for the first iteration and so on.

You can edit the file name prefix to contain any text:

```
/IterationPrefix AnyPrefix
```


Note: SetGoldPro displays the file name in uppercase when it prompts you to print the Gray Balance target file. The file generated in your output folder uses the same case as the file prefix that you specify.

B.2.2.2 IT8 import file name

You can change the format of the file name of the IT8 file that is searched for when importing data. You can change the file name prefix of the IT8 file from its default value of:

```
/ImportPrefix Greybal
```

SetGoldPro expects the file name of the IT8 file to consist of the file prefix and the file extension `.it8`.

You can also choose whether the file name should use the same numbering convention as that used for the file names of Gray Balance target files. This choice is indicated by the value of `TRUE` or `FALSE` for the key `/ImportAppendNum`. The default value is:

```
/ImportAppendNum TRUE
```

When this value is `TRUE` you must include the number of the iteration for which the measurements apply in the file name of the IT8 file. For example, if the IT8 file contained data from measuring the target `Greyba11.ps` then you should save the file as `Greyba11.it8`.

If the value is `FALSE`, you can use the same file name each time you save IT8 files, for example `Greyba1.it8`.

Note: When you import data from an IT8 file this data is stored in the corresponding Gray Balance target file. This means that you can use a single file name for IT8 files and overwrite previously imported IT8 files, whilst still keeping track of iteration data.

B.3 Editing the dividing lines on all targets

On all targets, black or white lines separate the patches. The lines must have enough contrast for the reading device to detect the patch boundaries. You can change the point at which the dividing lines on a strip change from black to white for all of the targets used in SetGoldPro. Two main types of target are used in SetGoldPro:

Golden State/Initial targets

Contain four strips Cyan (C), Magenta (M), Yellow (Y) and Black (K).

Gray Balance targets

Contain three strips Magenta Change (M), No Change (N) and Yellow Change (Y).

B.3.1 Initial target and Golden State target

For the Initial target and the Golden State target the default values are:

```
/BlackStripsCMYK [ 8 8 15 6 ]
```

The values in the array correspond to the CMYK strips and specify how many black dividing lines should appear in each strip, counting upwards from the dividing line below the lowest percentage patch. There are a total of 15 dividing lines in each strip. The default values specify that all of the dividing lines in the Yellow strip (Y) are black, whereas only the first 6 dividing lines in the black strip are black.

You may need to modify the changeover point from black to white strips for targets that display relatively dark colors in the highlights section of the strip. For example, your reading device may not be able to use the dividing line to distinguish between neighboring patches. If this is the case reduce the number of black dividing lines.

B.3.2 Gray Balance targets

For the Gray Balance targets the default values are:

```
/BlackStripsMNY [5 5 5]
```

The default values specify that the first 5 dividing lines on all of the strips are black. The dividing lines are counted from below the lowest percentage patch, (as for the Initial target). This should restrict the black dividing lines to the highlights section of the target. However, if the target is relatively dark in the highlights section, you can use white dividing lines to distinguish between neighboring patches by reducing the numbers in this array.

Appendix C

Color characterization targets

C.1 Introduction

In SetGoldPro 4.0 the number of different color characterization target types supported has been increased, so that a wide range is now available. This section compares the different target types to help in your selection of a suitable target for your purposes.

C.1.1 Global Graphics 4374 patch target

The Global Graphics 4374 patch target is new for SetGoldPro 4.0 and results in high quality color profiles. It involves measuring a lot of patches and is mainly intended for creating output profiles, (which will benefit most from the higher accuracy), though it can also be used for emulation or input profiles. This is the recommended target for making the output profiles for you to gain an independent certification from one of the standards bodies (such as Fogra) for proofing accuracy to ISO 12647-7.

If you decide to use a 4374 patch target it is important to ensure that you select **Import GG 4374 target from IT8 files** in the drop-down menu when you import the IT8 file.

If you use a target consisting of multiple files, you can select all the files at once when browsing to the file location, or if you prefer you can select them one at a time by using the **Iterate** button.

Two versions of the 4374 patch target are included with SetGoldPro 4.0 in the `setgold\data\Target_Files` folder.

For an X-Rite i1-iO device use:

```
GG_i1iO_Target4374.pdf
```

The corresponding `.txt` file for the X-Rite i1-iO is:

```
5P_TC4374-CMYK_Eye-One_iO.txt
```

The `.txt` file is a reference file that describes the target and is used with the Gretag ProfileMaker Measure Tool application. It is placed in the reference file folder within the Measure Tool directory.

Alternatively, the following four files together make up one 4374 target intended for the Gretag Macbeth SpectroScan device:

```
HQ_4374_P1  
HQ_4374_P2  
HQ_4374_P3  
HQ_4374_P4
```

The corresponding `.csv` files are:

```
HQ_4374_P1_Target_1.csv  
HQ_4374_P2_Target_2.csv  
HQ_4374_P3_Target_3.csv  
HQ_4374_P4_Target_4.csv
```

Alternatively, you may create your own target using the same patch values as the Global Graphics 4374 patch targets and create an IT8 file for import into SetGoldPro.

C.1.2 Global Graphics 1426 patch target

The Global Graphics 1426 patch is new for SetGoldPro 4.0 and results in high quality color profiles, although not quite as high quality as the Global Graphics 4374 patch target. It is a very good all round color characterization

target, and in many cases an output profile created with this target should be good enough to obtain to an independent certification from one of the standards bodies (such as Fogra) for proofing accuracy to ISO 12647-7.

If you decide to use a 1426 patch target it is important to ensure that you select **Import GG 1426 target from IT8 files** from the drop-down menu when you import the IT8 file.

Two versions of the 1426 patch target are included with SetGoldPro 4.0 in the `setgold\data\Target_Files` folder.

For an X-Rite i1-iO device use:

`GG_i1iO_Target1426_A.pdf`

For a Gretag Macbeth SpectroScan device use:

`HQ_1426_A_v1.ps`

The corresponding `.txt` file for the X-Rite i1-iO is:

`2P_TC1426-CMYK_Eye-One_iO.txt`

The `.txt` file is a reference file that describes the target and is used with the Gretag ProfileMaker Measure Tool application. It is placed in the reference file folder within the Measure Tool directory.

The `.csv` file for the Gretag Macbeth SpectroScan is:

`HQ_1426_A_v1.csv.`

Alternatively, you may create your own target using the same patch values as the Global Graphics 1426 patch targets and create an IT8 file for import into SetGoldPro.

C.1.3 IT8.74 1617 patch targets and ECI 1485 patch targets

New for SetGoldPro 4.0 is the ability to import external data sets in IT8.74 and ECI format via IT8 files, by selecting either **Import IT8.7/4 target from IT8 files** or **Import ECI target from IT8 files** in the drop-down menu. This option is mainly intended for the creation of input or emulation profiles, such as those required to obtain an independent certification from one of the standards bodies (for example Fogra) for proofing accuracy to ISO 12647-7.

However, you can also print the following targets to create your own input, output or emulation profiles. No profile is provided for the X-Rite i1-iO device as this already has a built in target for IT8.74 and ECI profiles. No ECI target is provided but if you wish to make a profile based on printing an ECI data set you can print a 1617 patch target, and select **Import ECI target from IT8 files** from the drop-down menu when importing the IT8 file. However, you will generally obtain a more accurate profile if you choose to import such an IT8 file by selecting: **Import IT8.7/4 target from IT8 files**.

Note: If you use a target consisting of multiple files, you can select all the files at once when browsing to the file location, or if you prefer you can select them one at a time by using the **Iterate** button.

These are in the `setgold\data\Target_Files` folder.

Both these targets together make up a 1617 patch target for the Gretag Macbeth SpectroScan device:

```
HQ_1617R_p1.ps  
HQ_1617R_p2.ps
```

The corresponding `.csv` files are:

```
HQ_1617R_P1_Target.csv  
HQ_1617R_P2_Target.csv
```

Alternatively, you can create your own target using the IT8.74 patch values and create an IT8 file for import into SetGoldPro. Similarly, you can create your own target using the ECI patch values and create an IT8 file for import into SetGoldPro. In this case you should select **Import ECI target from IT8 files** from the drop-down menu when importing the IT8 file.

C.1.4 928, 845 and 754 patch targets

These targets can be used for input, output or emulation profiles. They involve less measuring than the targets above, but the results will be correspondingly less accurate. If you do this, select **Import IT8.7/4 target from IT8 files** when importing the IT8 file. Similarly, a 754 target will usually be less accurate than a 928 patch target. If you are importing an IT8.7/3 data set from an external data source, (for example to make an input profile for an independent certification for proofing accuracy to ISO 12647-7), you should select **Import 928 target from IT8 files** from the drop-down menu.

If you wish to print your own characterizations for these targets, they are available in strip form, by selecting, for example **Read 754 Strip Target** from the drop down menu.

Alternatively, the following targets are available for the Gretag Macbeth SpectroScan device in the `setgold\data\Target_Files` folder:

```
754_patch.ps  
845_patch.ps  
928_patch.ps
```

They are also available as randomized targets, (which can improve accuracy):

```
754_patch_random.ps  
845_patch_random.ps  
928_patch_random.ps
```

The corresponding .csv files are:

```
754_patch.csv  
845_patch.csv  
928_patch.csv
```

For the randomized target:

```
754_patch_random.csv  
845_patch_random.csv  
928_patch_random.csv
```

Alternatively, you can create your own targets using the same patch values as the 754, 845 or 928 patch targets and create IT8 files for import into SetGoldPro.

