Application Note #10

Exporting to the CxF3 and i1Profiler file formats with PatchTool

1. Introduction

PatchTool Version 4.0 introduced the capability to **extract data** from CxF3 files, identified by the ***.cxf** file extension, as well as from several other CxF3-compliant file types used by X-Rite's i1Profiler (i1Publish). PatchTool 4.5 now adds options to **export** opened color lists to the generic CxF3 file format as well as to these four CxF3-compliant file types dedicated to i1Profiler:

File Extension	File Type
*.cmxf	Chart Measurements
*.pxf	Patch Sets
*.txf	Test Charts
*.mxf	Measurements

As its name suggests, the CxF3 file format is the third revision of the CxF format developed by X-Rite for storage and exchange of color data. Short illustrated descriptions of the CxF2 and CxF3 formats are presented as **Appendix C** and **Appendix D** of the PatchTool Help manual which is freely available on the BabelColor Web site:

http://www.babelcolor.com

For more technical documentation on the CxF3 format, please consult the official CxF3 Web site:

http://www.colorexchangeformat.com

The CxF3 format is less structurally rigid than the CxF2 format and has the potential for more uses. For example, in CxF2, there is a specific file structure to save a single list of colors to be used as reference, called a *Standard*, and one or more lists of *Measurements* based on this list. Such a structure is perfect for Quality-Control (QC) type applications where multiple measurements sets are compared to a single standard. Any program which detects this file structure should only presume that it contains Standard and Measurements data to be used for QC purposes. A program should not use this file structure to save an RGB or CMYK color list, as the Standard, as well as corresponding measurements, with the intent of using this data to compute a profile (unless one wants to make the file incompatible with other applications!). In short, in CxF2, the file structure is intimately linked to the final application.

In a CxF3 file, the Standard and Measurements are not stored in a dedicated structure for QC purposes; they are stored, like any other color data, as **Objects** (i.e. a color Object) within the same, unique, **Object Collection**. All objects are identified by an **Object Type**, an attribute similar to the patch name or patch ID, whose purpose is to link all Objects with the same Object Type. For instance, you could identify a group of RGB colors with a "Target" Object Type, and another with a "Measurements" Object Type. The differences with the CxF2 format are that you are not limited to two Object Types (there can be as many as you want), that the number of Objects of each type can vary, and that the name of an Object type is not a prescribed CxF3 keyword.

The CxF3 loosely defined structure, with various data sets identified only by a non-standard Object type, makes the format a more universal color data container, but with one major drawback: the link between the data sets is not defined! It is not possible to identify a CxF3 file's purpose just by looking at its structure. Some meaning can be inferred by the words used in the various Object Types, but this is not standardized. Yet, because the structure is simple, a program like PatchTool can parse (i.e. analyze) a CxF3 file content, show a user what it contains, and the user can then select to import one or more set of data identified by a common Object Type.

The absence of structure dedicated to specific applications is likely the reason why X-Rite uses different file extensions to identify a file's usage. For example, a *.cmxf file contains only L*a*b* or spectral data representing chart measurements, with no RGB or CMYK data, while a *.mxf file, used to generate a profile, contains RGB or CMYK target data as well as L*a*b* or spectral data measurements of the target. By associating a purpose to a file format, there is less ambiguity in how its data should be used.

Of course, nothing is as simple as it looks, and any application developer is free to add Custom Resources to a CxF3 file. Custom Resources are by definition non-standard, although they could become "de-facto" standards if used consistently by many application developers. These resources provide information not covered by the CxF3 file format, for example the number of rows and columns in a test chart, the number of pages on which the chart is printed, or specific information on how a profile should be generated from the file data. Fortunately, i1Profiler is designed in such a way that this additional information can easily be added–regenerated in fact–if it is missing in the imported file.

The purpose of this application note is twofold: It presents PatchTool's CxF3 export features while highlighting the differences of the various i1Profiler file types.

Compatibility with i1Profiler: CxF3-compliant files exported by PatchTool have been successfully imported in the following versions of i1Profiler; exceptions are noted:

- i1Profiler 1.3.2 for Mac (Note: *.cmxf files do not open)
- i1Profiler 1.4.1 for Windows
- i1Profiler 1.5.0 for Mac and Windows

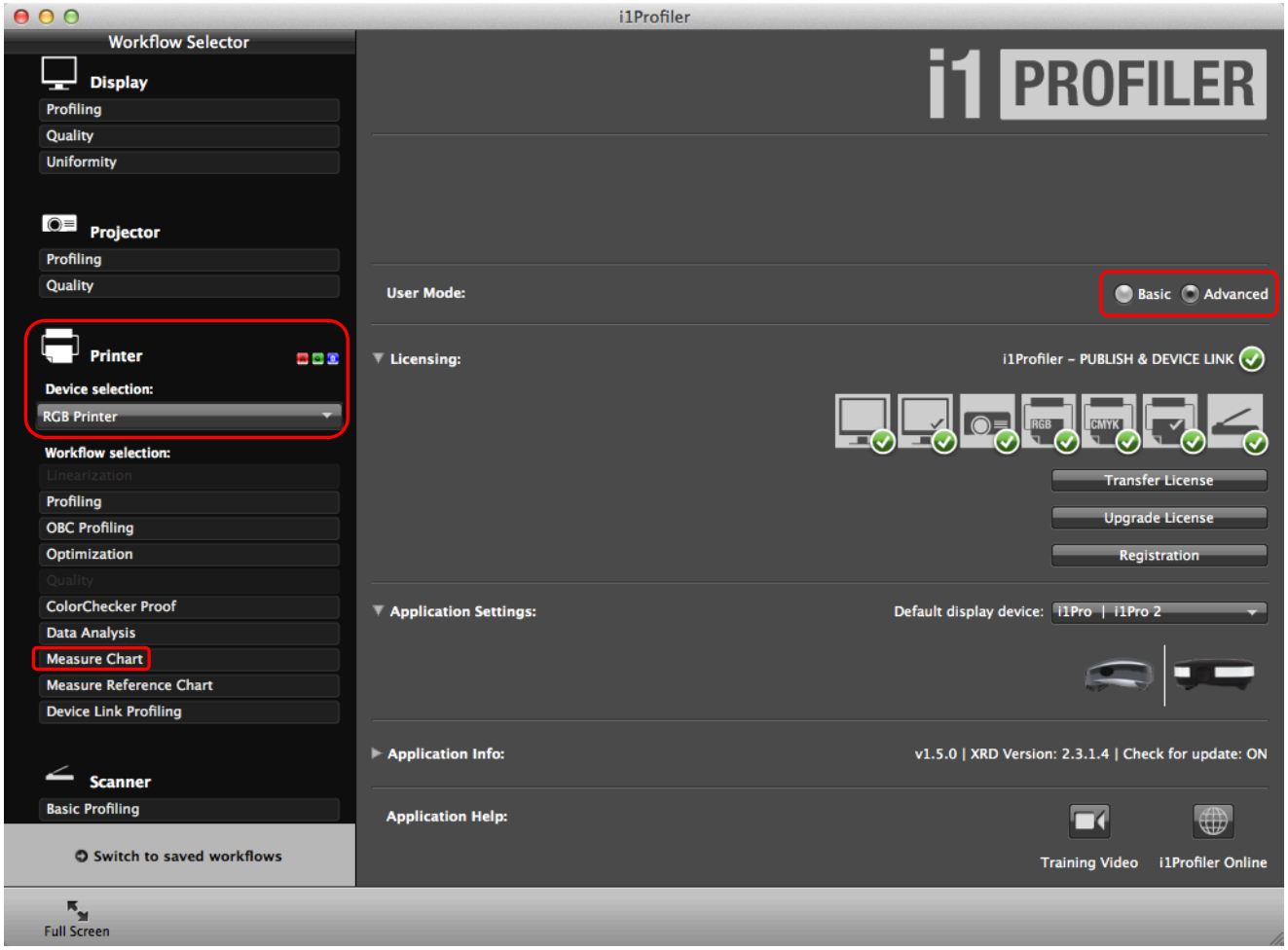
i1Profiler export limitation: i1Profiler support is limited to the file types listed in the beginning of this introduction and to RGB and CMYK reflectance workflows (For instance, CMYK+n workflows and display measurements are not supported). In addition, except for a small option with *.cmxf files described in the following section, there is no support for Custom Resources. Additional features may be added in future versions as knowledge is gained and need is expressed by user feedback.

Note: The structure of CxF3 files is freely available in the official CxF3 Web site whose link is provided above. We have used this information in combination with what we learned by observation while using i1Profiler in order to develop this tool. We currently have no access to, and have not used proprietary information relative to i1Profiler file formats and have not used any decompiling code to gain that knowledge.

2. i1Profiler's "Measure Chart" workflow

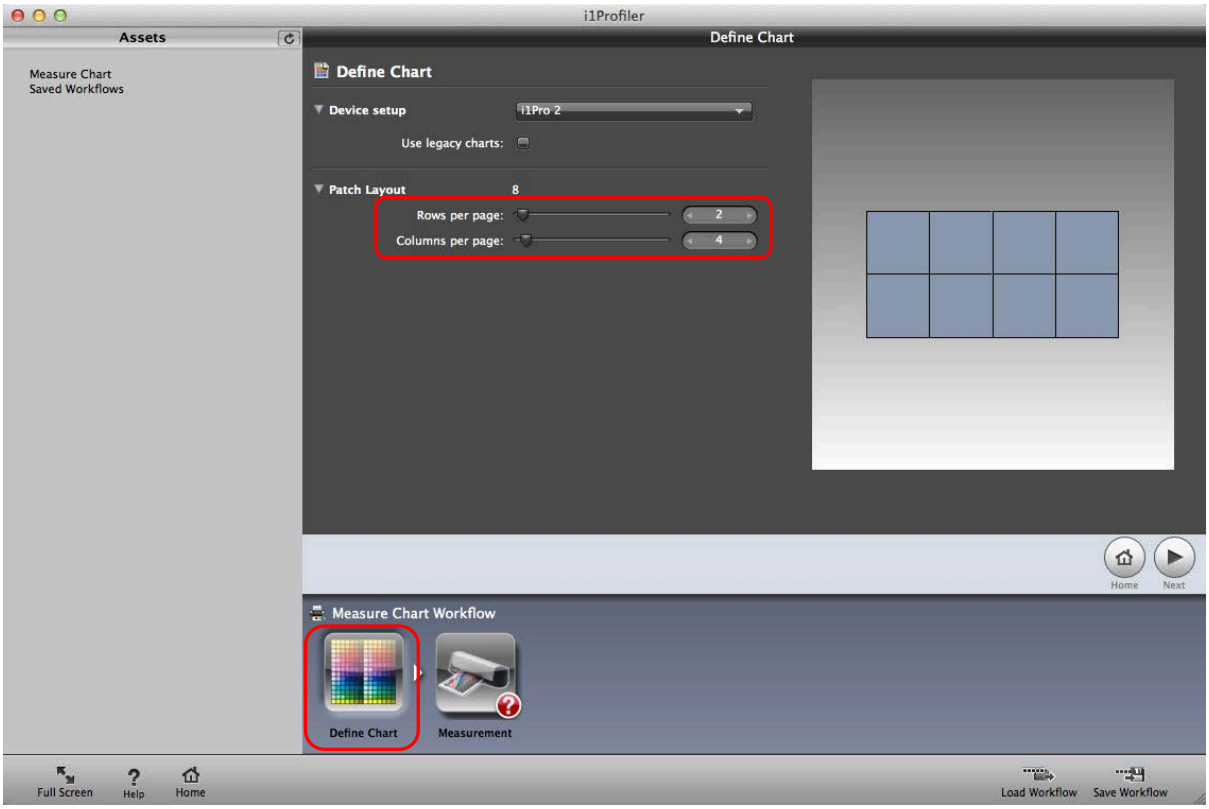
The **Measure Chart** workflow may seem trivial at first sight but it can illustrate many of the particularities of working with i1Profiler and how we deal with them in PatchTool, so we recommend that you do not skip this section!

Before measuring a chart, the first action you must do in i1Profiler's main screen, shown below in "Advanced" mode, is to select a device type: RGB, CMYK, CMYK+1 to CMYK+4, or a connected printer, which can be either RGB or CMYK. PatchTool CxF3 export supports RGB and CMYK devices. In this screenshot we have selected an "RGB Printer" device.

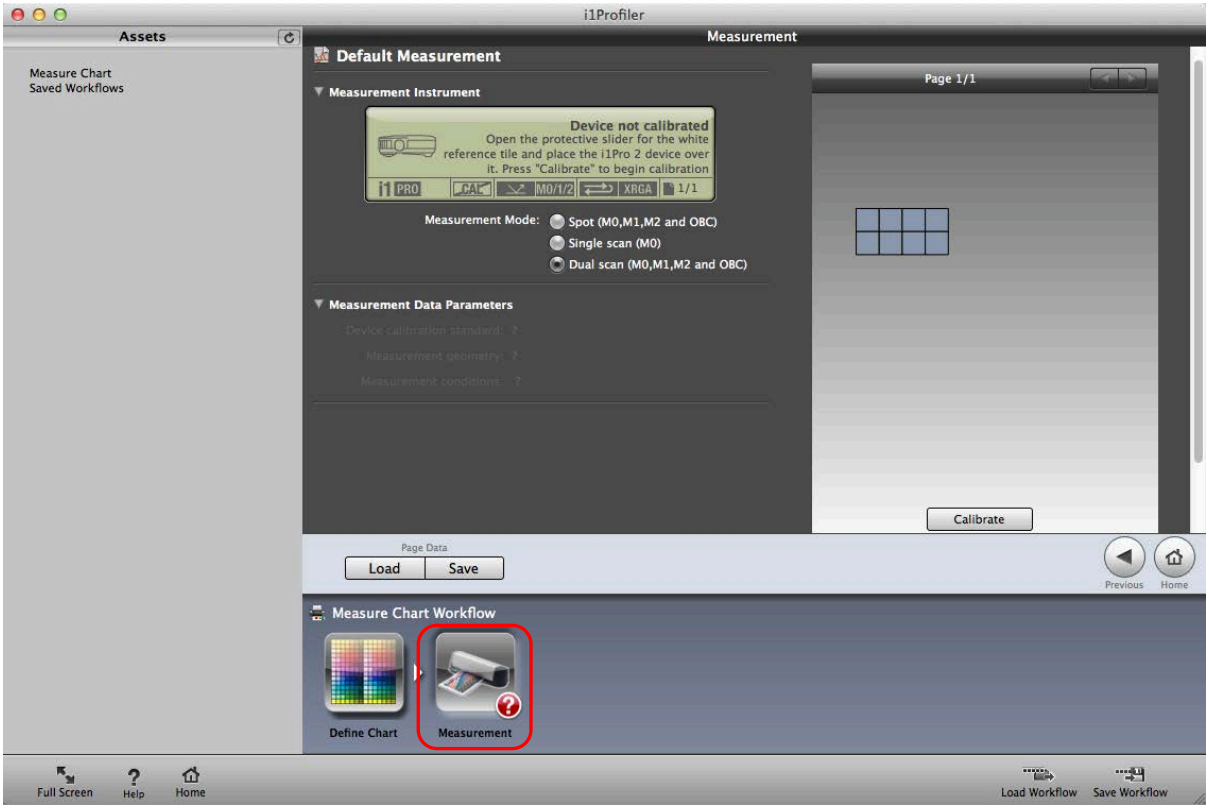


Note: In this Application Note, all i1Profiler screenshots were taken on a Mac and all PatchTool screenshots were taken on a Windows PC.

Once you click on the "Measure Chart" selection you see the corresponding workflow, where we selected the "Define Chart" step and we defined a simple 2 rows by 4 columns chart:



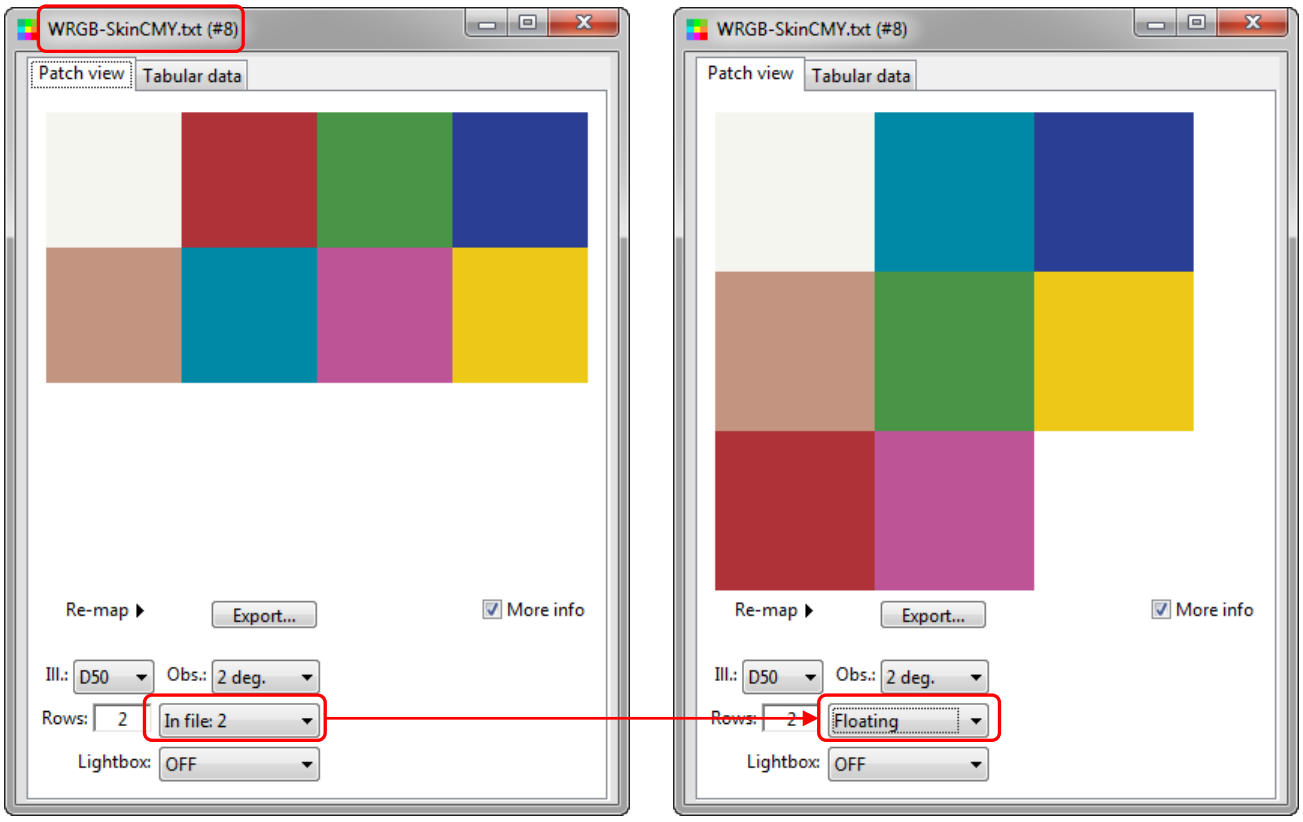
If you then click on the large "Measurement" workflow icon you see the following display, where the connected instrument status is shown and where you can select the measurement mode:



At this point you could well do the measurements in i1Profiler, but we will instead make a small diversion in PatchTool.

Note: While it is not recommended to use PatchTool and i1Profiler at the same time, because the programs may compete for controlling any connected instrument, you can leave both PatchTool and i1Profiler opened while doing the operations described herein. The reason is that we do not actually use any instrument to perform measurements. However, an instrument can be connected to enable i1Profiler features.

Below is a PatchTool screenshot where we opened a measurement file with eight patches:



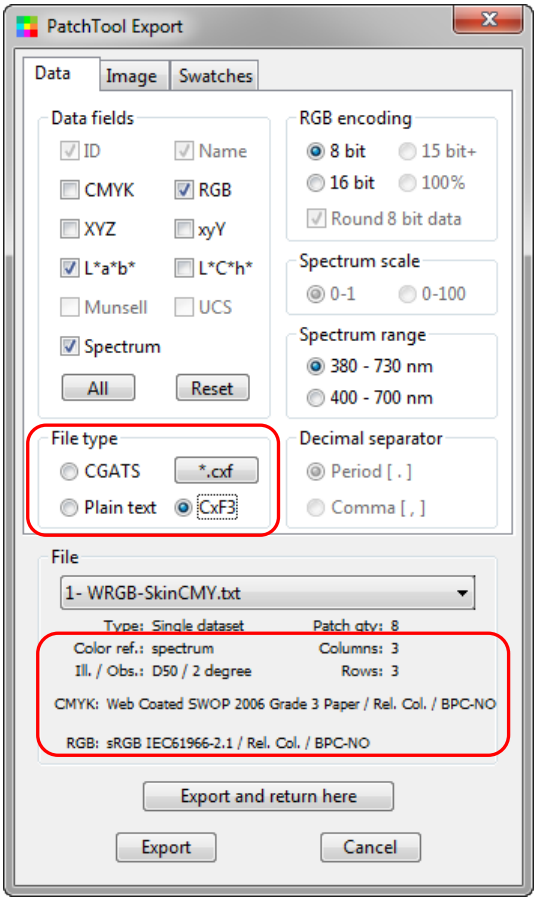
This file, named "**WRGB-SkinCMY.txt**", can be found in the PatchTool 4.5 installation folder, within the

"**…\Patchtool\sample_files\Misc_files\AN-10**"

folder. You can use PatchTool's "File/Open Sample Files/Misc. Sample Files…" menu to go directly to the "sample_files" folder. The measurements in the file represent averages of 30 ColorChecker charts for 8 of the 24 patches. The measurements were all taken with the M0 Measurement Condition (i.e. no filter and Illuminant-A) and the measurement standard was GMDI-GretagMacbeth although this information is not specifically indicated in the file. While the file specifies two rows, we deliberately selected "Floating" in the "Rows" menu to better illustrate what happens when we export this layout to i1Profiler.

Note: The "**WRGB-SkinCMY.txt**" file can be opened in PatchTool's "demo" mode, i.e. in a non-registered version; however, you will not be able to export without a license. For this reason we have provided the exported files used in this example in the same folder whose path is shown above. The exported files can be used in i1Profiler.

When we click on the "Export" button of the PatchTool file we see the export dialog shown on the right, where we have selected the CxF3 "File type".



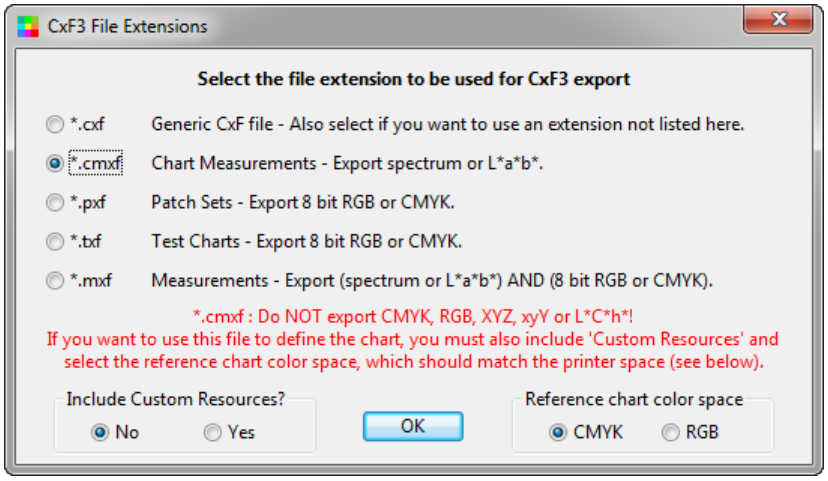
When the CxF3 "File type" is selected, a button appears which shows the currently selected CxF3 file extension, in this case "*.cxf", the default extension for CxF files of all versions.

Note: Even if all CxF versions use the same generic file extension (*.cxf), the files exported by PatchTool are compliant only with the CxF3 format.

You will notice that for CxF3 files the "ID" and "Name" data fields are selected and disabled, that the "Munsell" and "UCS" data fields are unselected and disabled, that RGB encoding is limited to 8 bit and 16 bit, that 8 bit rounding is selected and disabled, that the spectrum scale is fixed to "0-1", and that the decimal separator can only be a "Period".

You should also take a habit of looking at the information appearing under the file name. In particular, the "Color ref." information and the CMYK and RGB origin/profile information can have a significant impact on whether or not your file will be compatible with i1Profiler. Specific examples will be discussed in this document.

If you click on the button with the "*.cxf" caption, the following dialog appears, where we have selected the radio button corresponding to the "*.cmxf" extension:



When the "*.cmxf" extension is selected, two other sets of selection buttons appear. The first set is used to include or not Custom Resources in the file, and the second set is used to define the chart color space within the Custom Resources; we will leave them as shown above for the moment (i.e. we do not include Custom Resources in the exported file). Before closing this dialog, please take time to read the text besides the "*.cmxf" selection as well as the text in red; it provides important information on the data fields that you should select and unselect when exporting a Chart Measurements file.

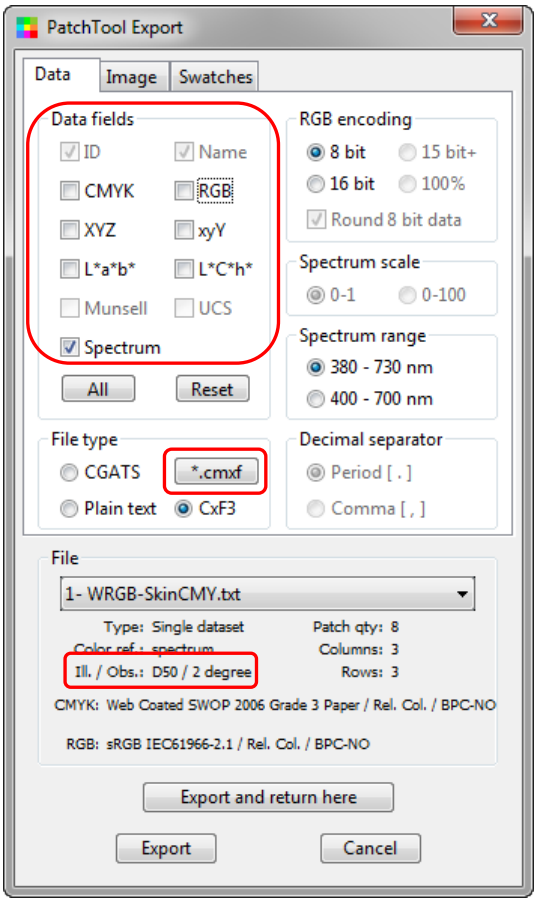
Once the "CxF3 File Extensions" dialog is closed, we go back to the export dialog. This dialog is shown again on the right where we now see "*.cmfx" in the button over the CxF3 selection. Compared with the export dialog shown on the previous page, we have also unselected the L*a*b* and RGB data fields, in accordance with the recommendations for *.cmxf files given in the file extensions dialog.

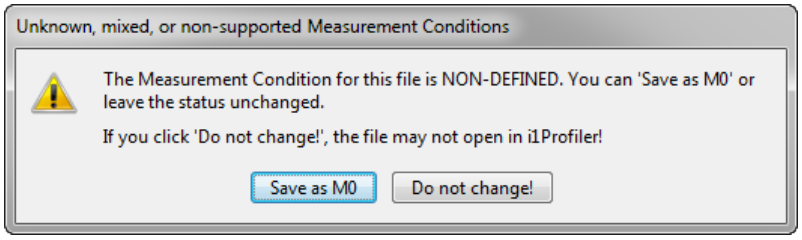
We have just kept "Spectrum" but we could as well have just kept "L*a*b*".

Warning: When exporting L*a*b*, make sure the Illuminant is D50! The i1Profiler program, like MeasureTool in the past, always assumes that L*a*b* data is in D50. So if another Illuminant was selected in the PatchTool file, you better close the export dialog and change the Illuminant in the PatchTool file. While you do that, also check that the Observer is 2 degree!

Note: There are no particular data field restrictions when exporting to a file with a *.cxf extension, unless of course if the program to which it is intended has specific requirements.

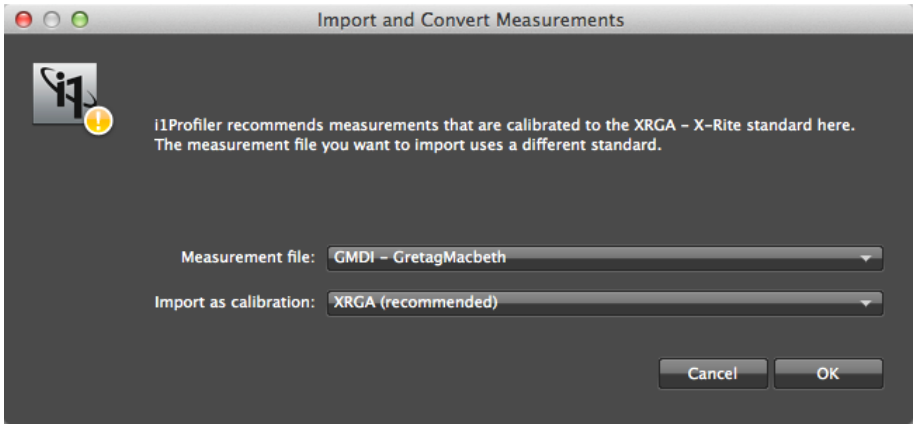
Once the proper data fields are selected for a given CxF3 file extension, you can click on one of the export buttons. For the file used in this example, you will see the following message dialog.



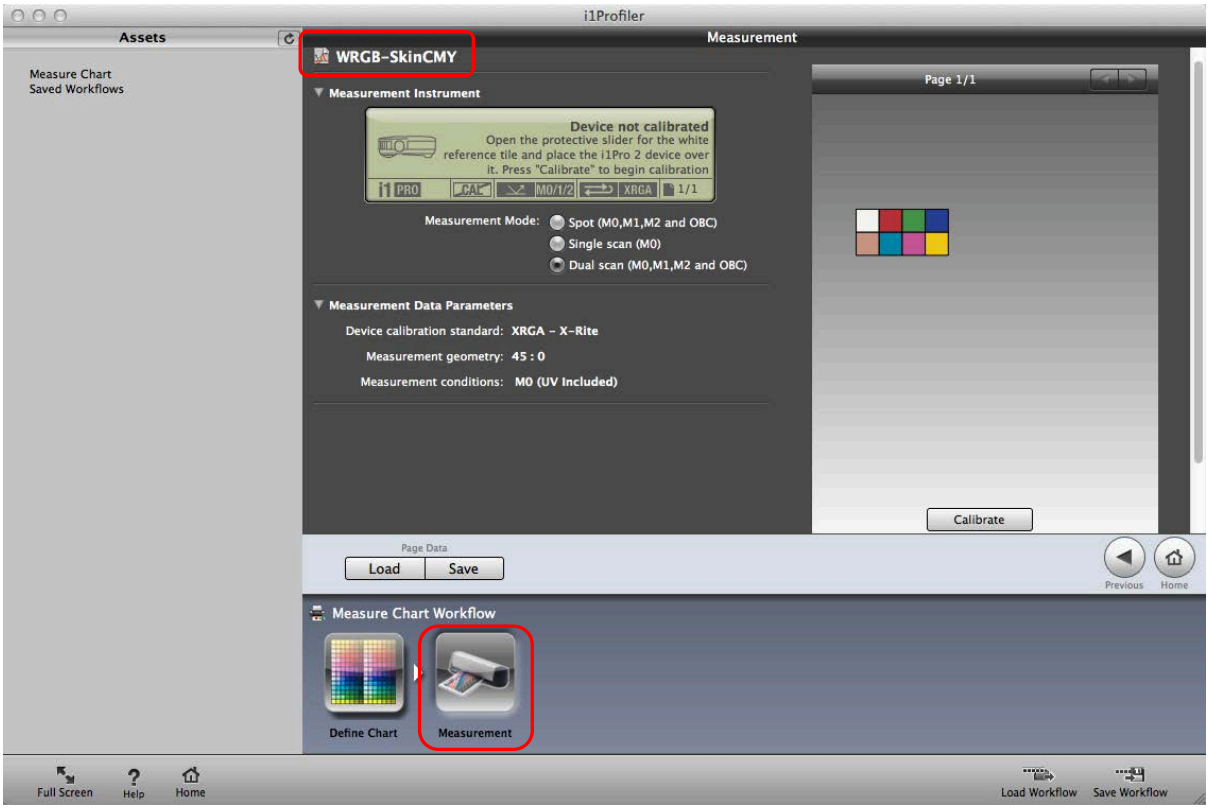


We previously mentioned that the M0 Measurement Condition was used for the file measurements but that this information did not appear in the file. Import in i1Profiler will likely fail if the data is not properly associated to a standard Measurement Condition, so we recommend that you accept the change. However, as in all warning dialogs associated with CxF3 export, you can refuse the proposed change, and see what happens…

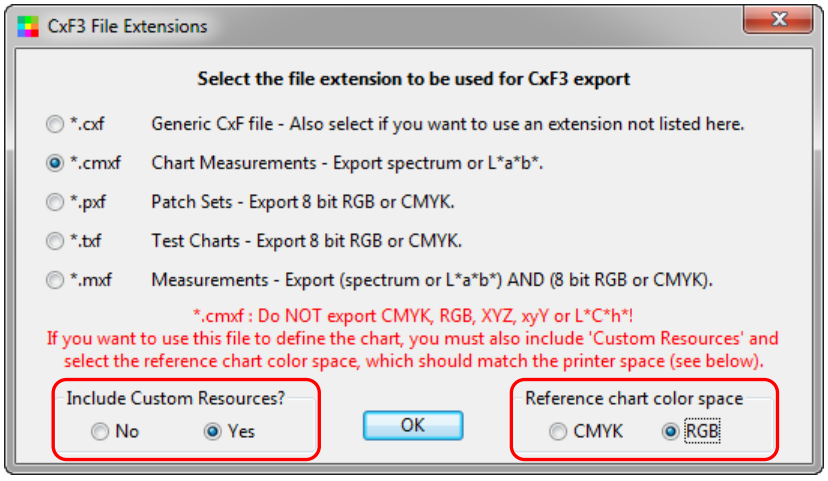
The default name for the exported file is "**WRGB-SkinCMY.cmxf**". We can now take this file and import it in i1Profiler. The i1Profiler interface should be as defined in the beginning of this section. In i1Profiler, first click on the large "Measurement" workflow icon and simply drag and drop the *.cmxf file onto the icon. You should then see this dialog on the right asking if you want to convert the GMDI-GretagMacbeth data to XRGA; in this case just click "OK" but you may select otherwise for your own data.



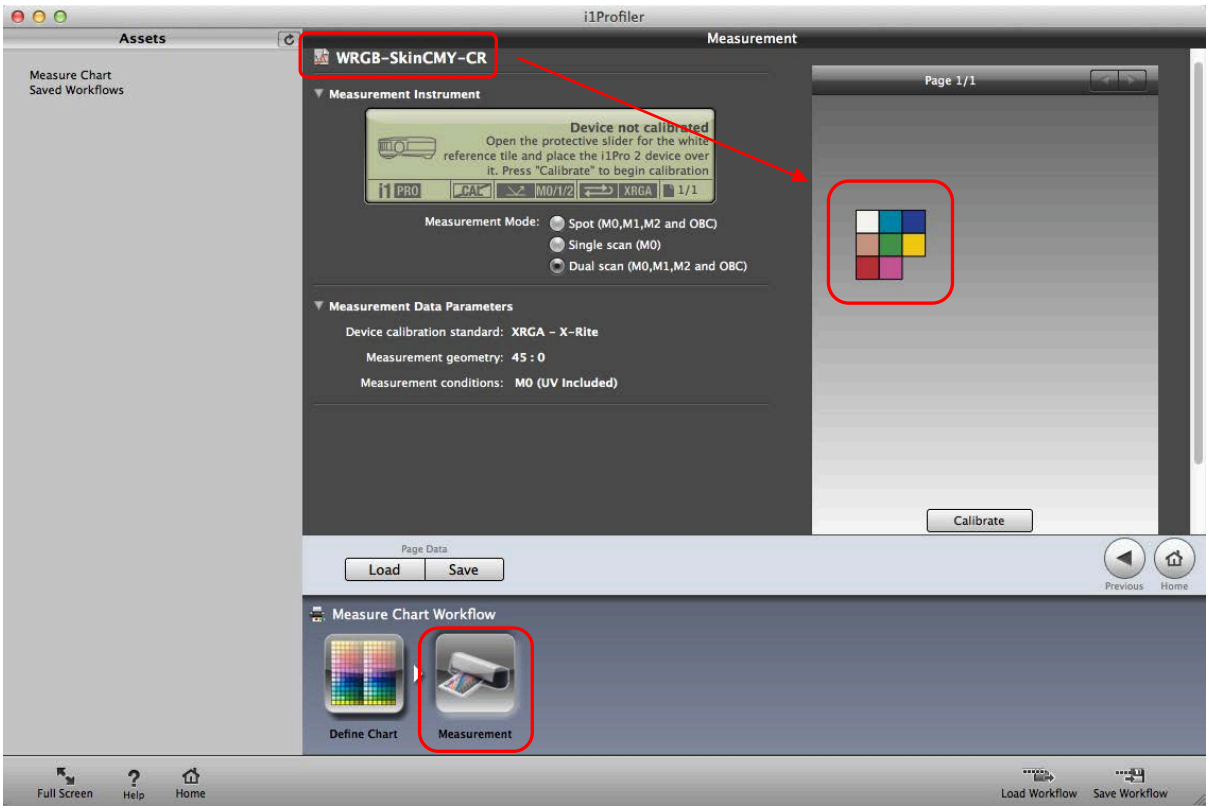
The measurements should fill the layout and appear as in the screenshot below. You will notice that the patches fill the layout from top to bottom and from left to right. Also, the patches are positioned according to the 2 by 4 layout we defined in the i1Profiler chart definition interface, and not the "floating" 3x3 layout of the PatchTool file.



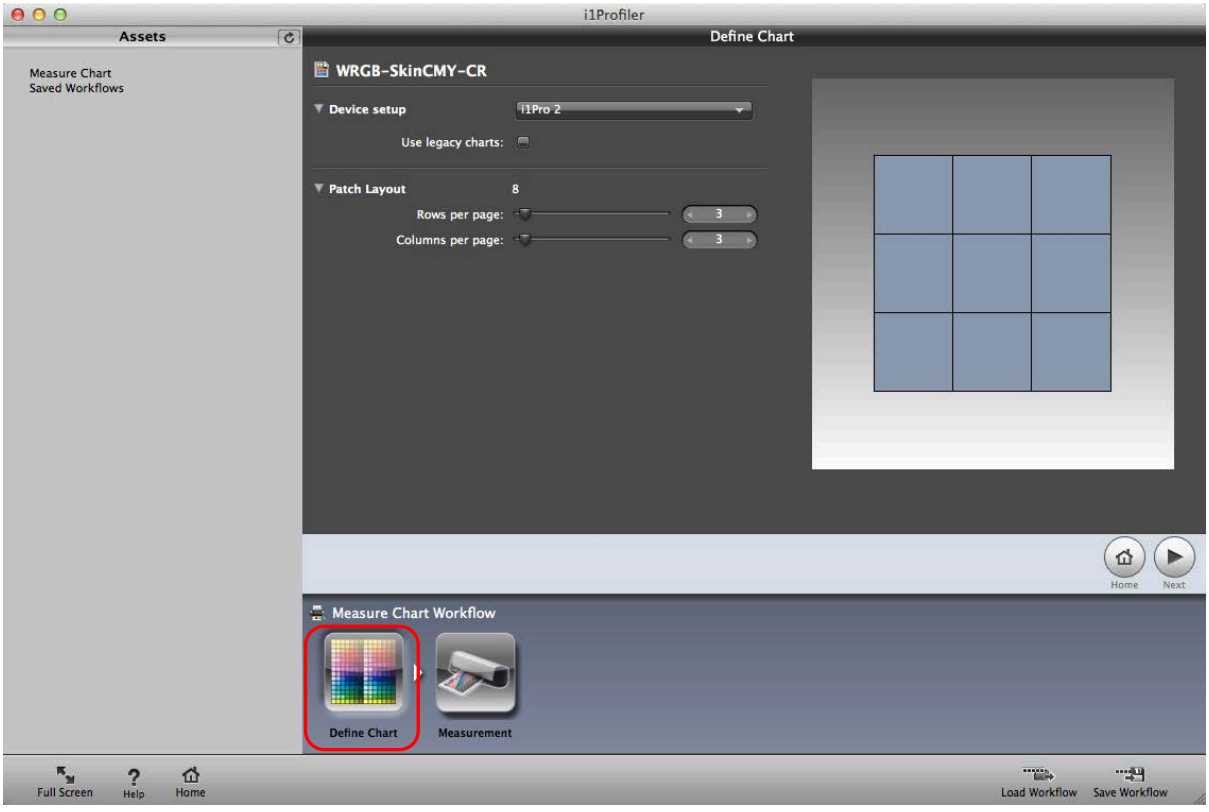
Now, let's go back in PatchTool. With the "**WRGB-SkinCMY.cmxf**" file still opened, click on the "Export" button and then on the "*.cmxf" button of the export dialog. In the "CxF3 File Extensions" dialog, click on "Yes" to include Custom Resources and on "RGB" for the chart color space, as shown below. Click "OK" when done to go back to the export dialog.



Export the file again, using the same data fields as defined previously. You can keep the same file name or change it to your liking; we have added "-CR" to our file name (i.e. "**WRGB-SkinCMY-CR.cmxf**") to indicate we added Custom Resources to the file. Now drag and drop this file on i1Profiler "Measurement" workflow icon, and you will see the following layout:



Notice how the layout changed to a 3x3 grid, with eight of the nine positions filled with the measured data. Compared to the first file we exported without Custom Resources, the new file has additional information on the layout rows and columns as well as the color space of the chart. If you select the "Define Chart" workflow step in i1Profiler, you will now see a 3x3 grid.



You can also drag and drop a *.cmxf file on the "Define Chart" workflow icon to define a layout, but the file MUST contain Custom Resources. Without Custom Resources, i1Profiler will show a 1x1, 0 patch layout; just drag and drop the "WRGB-SkinCMY.cmxf" and "WRGB-SkinCMY-CR.cmxf" files alternately on the chart definition icon to see the effect.

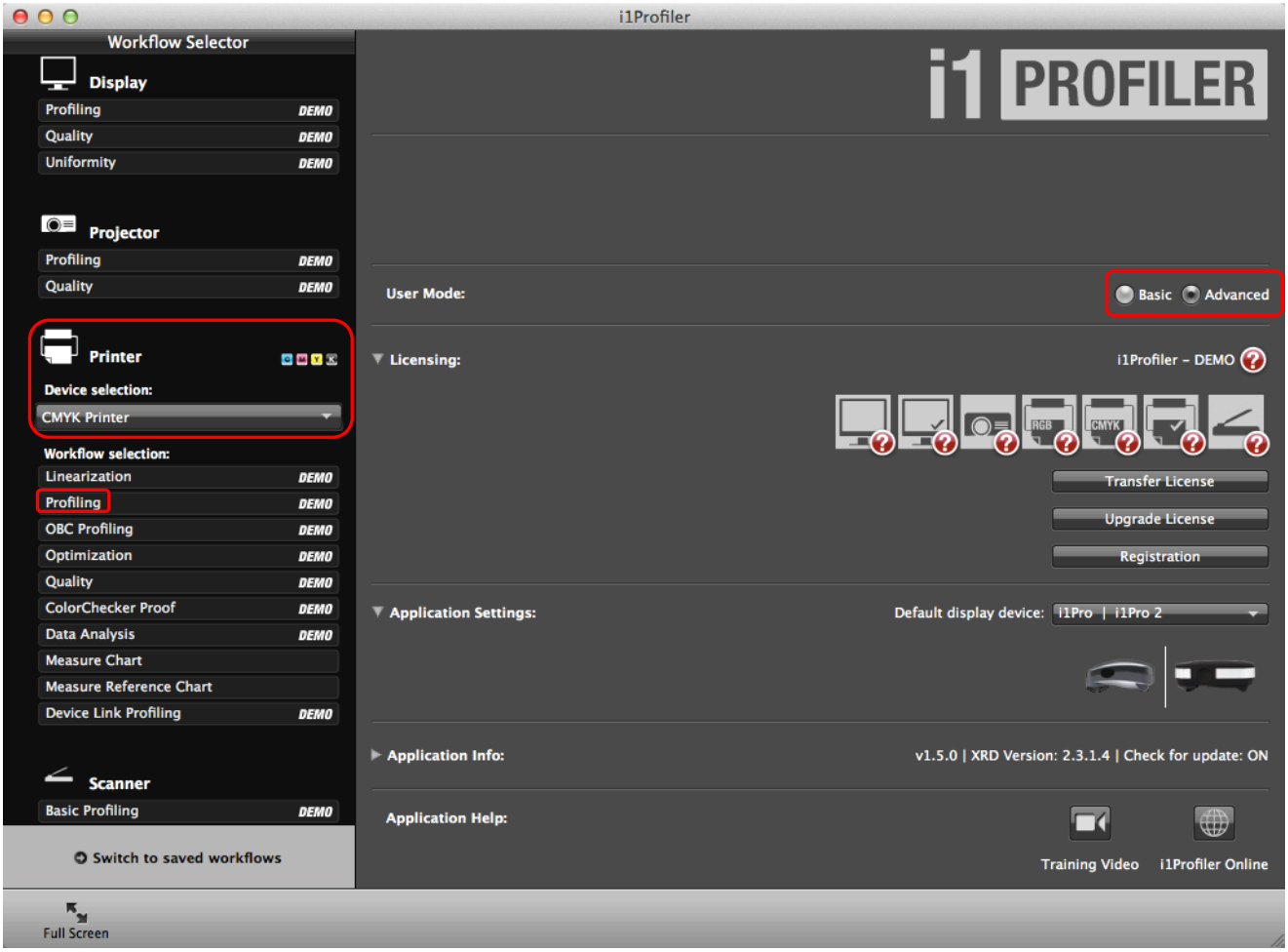
Additional info: You can also try to export a file with Custom Resources but with the wrong color space, selecting "CMYK" for an "RGB" workflow for example, and you will see that your file, while accepted for chart definition, will not be accepted for measurements and that even a measurement file with no Custom Resources will be rejected afterwards. Please note that when a Custom Resource identifies a color space in a Chart Measurements file, the file does not actually contain RGB or CMYK data.

In this section we have seen how to export measurements from PatchTool to i1Profiler Chart Measurements file format, a CxF3 compliant format with the *.cmxf file extension. With PatchTool CxF3 import capabilities, you can now extract measurement data from essentially any i1Profiler file, process the data out of i1Profiler if required, and re-export it in a CxF format i1Profiler can understand. Of course, you can also define a chart and measure it entirely with PatchTool's Patch-Reader and then export the measurements to i1Profiler.

The next section shows how we can export data from PatchTool to i1Profiler's **Profiling** workflow.

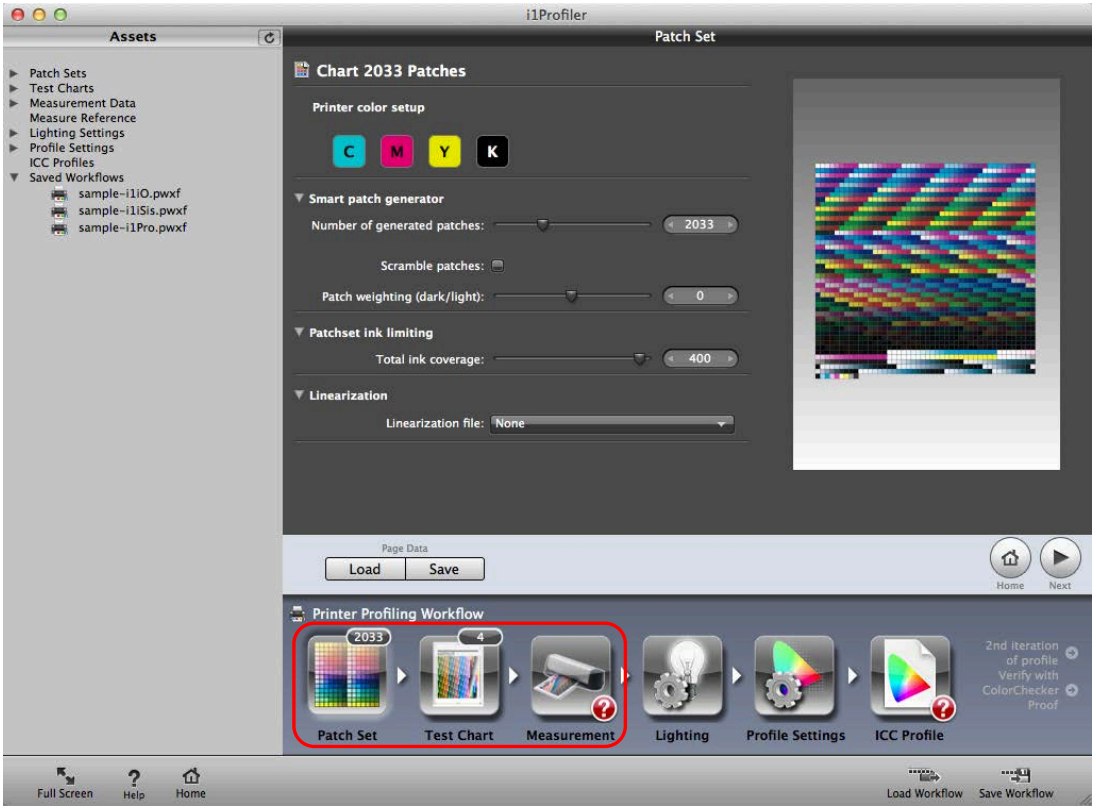
3. i1Profiler's "Profiling" workflow

For this section we select a CMYK device and a **Profiling** workflow, as shown below on i1Profiler's Main screen. You will notice that i1Profiler is in demo mode. We have disconnected our instrument on purpose to show that the steps of this tutorial can still be done. Of course, completing a workflow, for example by generating a profile, requires that an instrument be connected and that the instrument contains the appropriate i1Profiler licensing codes.



When we click on the "Profiling" selection, the Profiling workflow appears; this is shown on the next page. The first three steps of the Profiling workflow are to define a patch set, select a patch layout, and to obtain measurements from the printed layout. Each step corresponds to a file type, as shown in this table:

Step	File Type	File Extension
1	Patch Sets	*.pxf
2	Test Charts	*.txf
3	Measurements	*.mxf



The **Patch Sets** and **Test Charts** files contain the same device data, RGB or CMYK for instance. These files may sometimes be nearly identical, with only one minor difference in a Custom Resource. In other instances, they may be quite different; for example, a Test Charts may also contain standard CxF3 tags dedicated to patch "Location", with specific information on the column, row, and page where each patch is located. However, one of the nice things about i1Profiler is that you can easily regenerate the location information by selecting an instrument and changing the printed patch layout, and then resaving the file.

The **Measurements** file contains the device data plus the measurement data associated with these patches.

Important: Because a Measurements file also contains the reference target color data, you can drag and drop this file onto the Patch Sets and Test Charts workflow icons and i1Profiler will update the workflow accordingly.

For this example, we start with a measurement file of an IT8.7/4 target (random layout) taken with "Color Tool", a software from Heidelberger Druckmaschinen AG. The file's purpose if to profile Pacesetter Gloss paper on a Heidelberg Speedmaster SM 102 sheetfed offset press. As you see, the workflow is not a full i1Profiler workflow, since we did not need the Patch Set and Test Chart steps, but a hybrid one where we start with the measurements file, a workflow often seen in practice.

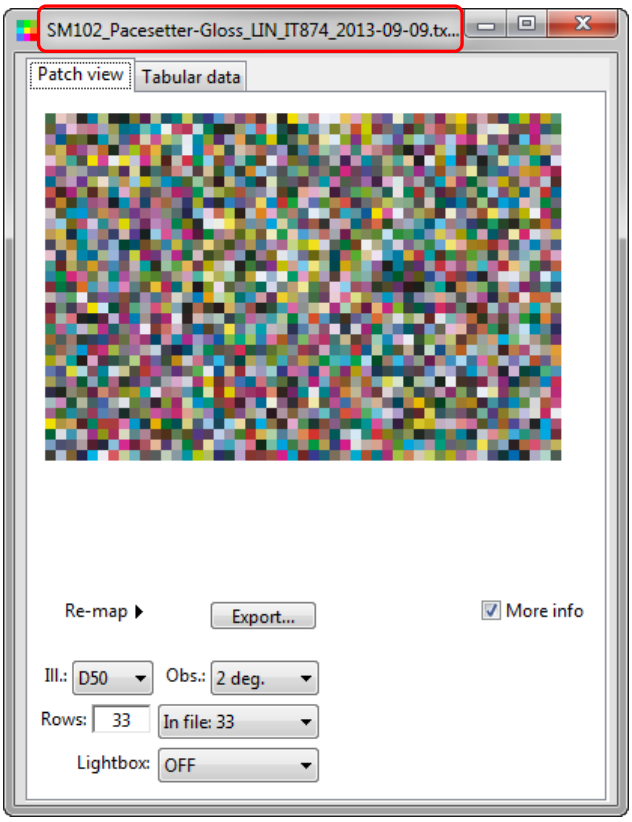
This file, named "**SM102_Pacesetter-Gloss_LIN_IT874_2013-09-09.txt**", can be found in the PatchTool 4.5 installation folder, within the

"**…\Patchtool\sample_files\Misc_files\AN-10**"

folder. You can use PatchTool's "File/Open Sample Files/Misc. Sample Files…" menu to go directly to the "sample_files" folder. The measurements were taken with an X-Rite iSis with the M0 Measurement Condition (i.e. no filter and Illuminant-A) and the measurement standard was GMDI-GretagMacbeth although this information is not specifically indicated in the file.

Note: The "**SM102_Pacesetter-Gloss_LIN_IT874_2013-09-09.txt**" file can be opened in PatchTool's "demo" mode, i.e. in a non-registered version; however, you will not be able to export without a license. For this reason we have provided the exported files used in this example in the same folder whose path is shown above. The exported files can be used in i1Profiler.

The measurements file is shown below as it appears when first opened in PatchTool. In the header of this CGATS text file, which can be opened with any text editor, it is indicated that the target layout is random. If you are familiar with the appearance of the random layout of an IT8.7/4 target, you will realize that the layout shown in PatchTool when the file is first opened is different. There are a few reasons why this can happen and we will see how to correct it, if we need to!



One reason could be that the number of rows in which the target should be visualized is not indicated in the file; this is the case for the file of our example. Another reason could be that the number of rows is present in the file, but it is wrong! We really should not be surprised by the absence of this information since this parameter is not defined in the GCATS standard. The "LGOROWLENGTH" tag was defined many years ago for this purpose (likely by the Logo Company, part of the GretagMacbeth Group, now X-Rite); it is used by many companies and can "almost" be considered a standard.

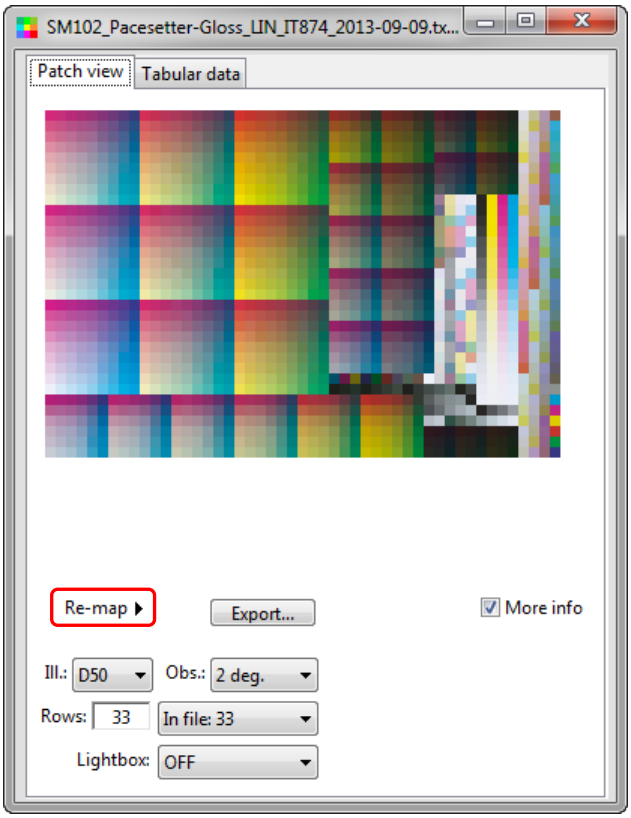
When a CGATS file is opened, PatchTool looks for the LGOROWLENGTH tag and, if not found, leaves the value non-defined, which corresponds to "Floating" appearing in the menu besides the "Rows" value in the Patch view tab of an opened file. However, because the file has a number of patches which correspond to an IT8.7/4 target, PatchTool assigns 33 "Rows" by default, which corresponds to a "landscape" view of the target, either in its "Visual" or "Random" layouts (Note: The same number of rows is assigned when the quantity of patches corresponds to an ECI2002 target).

Important: The fact that you cannot see the opened file in the expected layout usually has no consequence on how this file will be exported to i1Profiler thereafter. However, if it is important for you to see the patches in one of the standard layouts, please read the following section. If you do not need to change or visualize the layout, you can go directly to Section 3.2, where we explain how to export the file.

3.1 Changing and reassigning the layout of an opened file

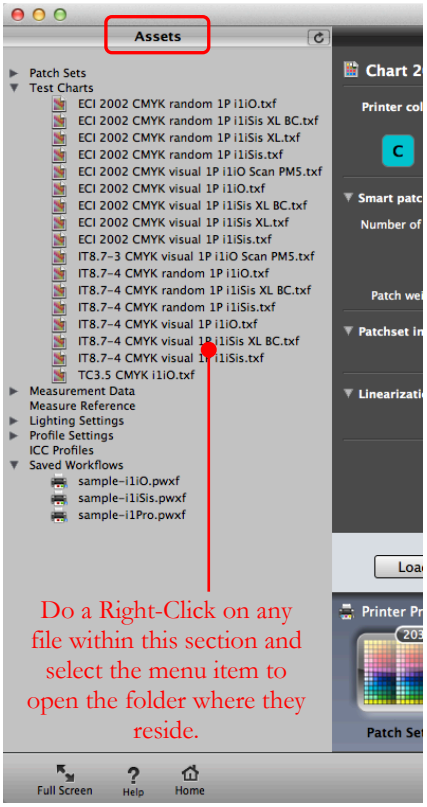
In this section we see how we can change the layout of the file we just opened to match one of the standard layouts of our target file. This can be useful if we want to check the values of specific target patches.

First use the "**Re-map/Change layout to IT8.7/4 Visual**" popup menu to see if the layout changes to the familiar IT8.7/4 Visual layout. This command will work if the IDs of the patches correspond to the IDs defined for the standard IT8.7/4 target. In this case, for the file we just opened, we are "lucky" and we obtain the layout shown on the right.



Of course, if the IDs are not properly assigned, you will not see the correct layout. Fortunately, there is still hope to synchronize the data with the corresponding IDs defined in the target standard. The following paragraphs should help you in this task. To get a better feel of the procedure, we will use one of the Test Charts provided by i1Profiler.

Before we select a file, let's just look at how files are handled in i1Profiler. In i1Profiler, all working files, either provided with the program or generated by the user, are available in the "Assets" pane. The specific files appearing under a section, "Test Charts" for example, as we see in the screenshot below, will only be those corresponding to the selected device. Here we see the files for a CMYK device.



The assets files are usually dragged and dropped onto the corresponding workflow icons of the i1Profiler interface. You can also open or save a file in a workflow step by first clicking on the workflow icon and then clicking on the "Load" or "Save" button.

Hint: What is less obvious in the i1Profiler interface is that you can open the folder in which these files reside by doing a Right-Click on any file within the "Assets" section. This is what you should do in the "Test Charts" section to open i1Profiler's **"…\ColorSpaceCMYK\TestCharts**" folder.

With the **TestCharts** folder opened, we suggest you drag and drop the

"**IT8.7-4 CMYK random 1P i1iSis.txf**"

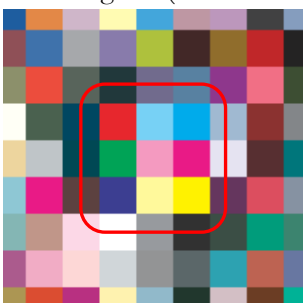
file onto the "Open file / Drag&Drop" button in PatchTool's main window (Do not drag the file from the i1Profiler interface but from the folder!). PatchTool's "Import CxF3" dialog should open. In the import dialog, select the CMYK data and click on the "Proceed" button; you can assign ANY profile in the "Missing Info" dialog which will appear since this is not important for the demonstration.

When the file opens, you get a message that the IDs "may" be incorrect. This is not always the case but it is true for this file. We will see how we can correct the situation in the procedure shown on the next page.

ID reassignment procedure in PatchTool:

1- Make sure the patches are displayed in the order of the original file by selecting the "**Re-map/Reset ALL changes**" popup menu (just in case layout changes were applied since the file was opened!).

2- In the menu besides the "Rows" value, select the "**49 (IT8.7/4 Vert.)**" menu item (Note: This is a new menu item of PatchTool 4.5). 49 rows correspond to the IT8.7/4 target turned 90 degrees (i.e. Vertically). If you had opened an ECI2002 target file, you would select instead the "**45 (ECI2002 Vert.)**" menu item. If required, extend the file window to see the bottom patches. After this step, you should be able to recognize the "Random" layout turned 90 degrees. More specifically, the "Random" IT8.7/4 layout is recognized here by a pattern of CMY, light-CMY, and RGB patches turned 90° clockwise in the target center, as shown on the right screenshot. Since we can see the nine patches of the pattern for this file, we can jump to Step-4; however, if, for another file, you do not recognize the layout, either "Random" or "Visual", then you should go to Step-3.



3- If you do not recognize the layout after Step-2, you should select the "Floating" menu item in the "Rows" menu and then enlarge the file window slowly in the vertical direction while looking for a familiar pattern as the patches rearrange themselves. Stop extending the window when you see the pattern. If no familiar pattern is seen, the patches in the file may be ordered in a non-standard pattern and you will not be able to do the next steps.

4- Turn the layout counter-clockwise with the "**Re-map/Turn 90° CCW**" popup menu. Please note that you can turn a layout only when all columns and rows are filled, i.e. the last column shall not be partially filled.

5- (Optional) Depending on how the target data was saved you may need to flip the target vertically using the "**Re-map/Flip Vertical**" popup menu. This does not need to be done for the "**IT8.7-4 CMYK random 1P i1iSis.txf**"file.

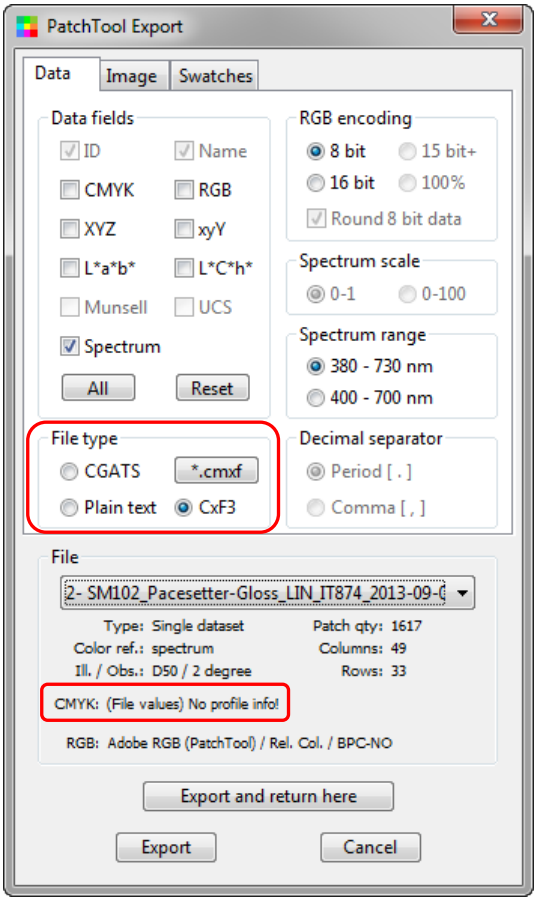
6- You finally reassign the IDs corresponding to the layout using the "**Re-map/Assign IDs for the IT8.7/4 Random layout**". You can test that the IDs are now properly assigned by selecting the "**Re-map/Change layout to IT8.7/4 Visual**" menu item.

If the above procedure fails on a given file and you really need to associate the proper IDs with your measurements, here is one last thing you can try.

Last chance to sync the IDs: Try to locate any file which has the IDs in the same order as seen in your measurements file, even if this file does not include measurements. You may need to add "dummy" data to this file, using a spreadsheet application for instance, in order to be able to open it in PatchTool; the extra data can be of any kind, with any value (RGB data all set to zero for example). Open the file with the correct IDs in PatchTool as well as the file with the measurements; the files should have the same number of patches of course. You can then use the "**Tools/File-to-File Transfer…**" tool to copy the patch IDs into the measurement file.

3.2 Exporting a measurements file to i1Profiler

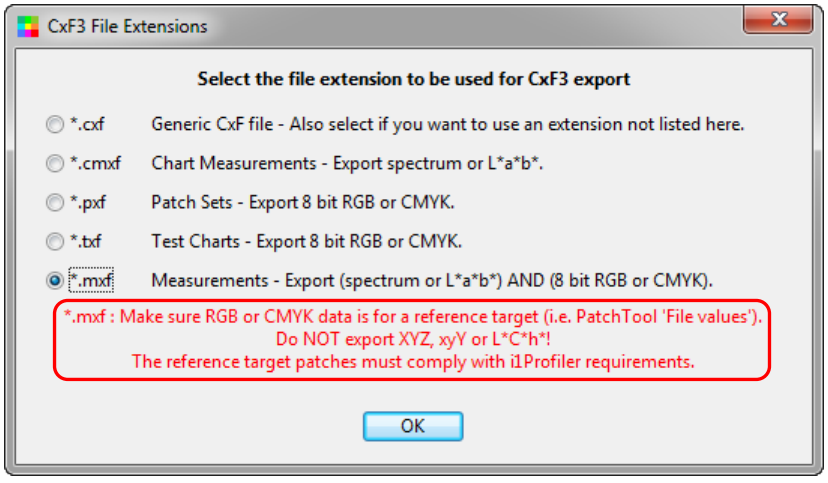
In this section we assume that the file is opened in PatchTool and that we are satisfied with the layout (Note: As mentioned before, there is no specific requirement for the IDs to be properly assigned). We can click on the "Export" button of the PatchTool file to see the export dialog shown on the right. If you have followed this Application Note from the start, the CxF3 "File type" should still be selected and the "*.cmxf" extension should be seen in the button.



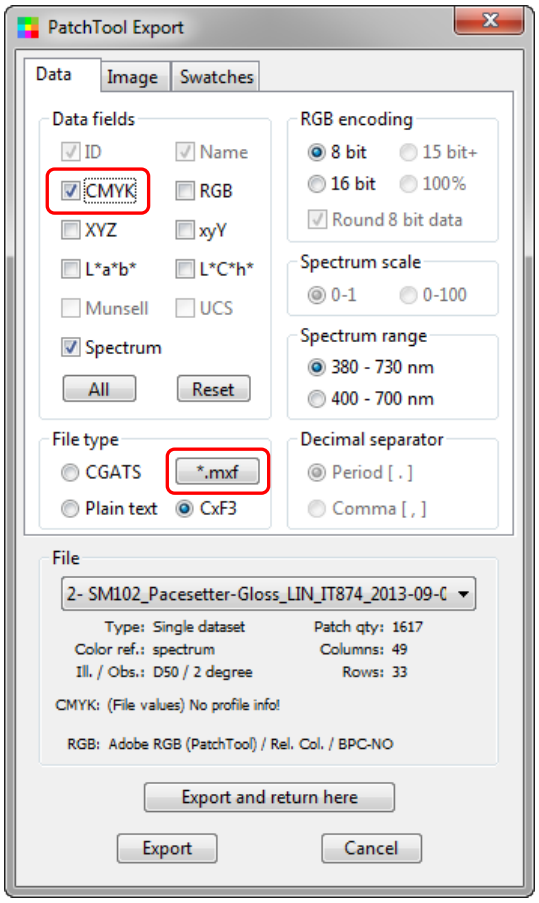
With the CxF3 "File type" selected, click on the button with the "*.cmfx" caption (or whatever caption is displayed). The "CxF3 File Extensions" dialog shown below will appear.

Select the radio button corresponding to the "*.mxf" extension. Make sure to read the description as well as the red text which appears over the "OK" button. It is particularly important, in fact essential, that the device data, RGB or CMYK, represents **target reference data**. In other words, the device data should not come from converted measurements obtained through a profile. This can be checked by looking at the profile information associated to the exported file in the export dialog (shown on the right).

In addition, the reference patches must comply with i1Profiler's requirements. While these requirements are not publicly available, we know, from experience (!), that i1Profiler specifically expects a white patch with CMYK coordinates equal to (0,0,0,0); you will receive an error message if such a patch is not found. In reference with the previous paragraph, you will readily understand that such pure white CMYK coordinates, where ALL values are zero, are seldom seen for CMYK data obtained from a profile, and thus the importance of using **target reference data**.

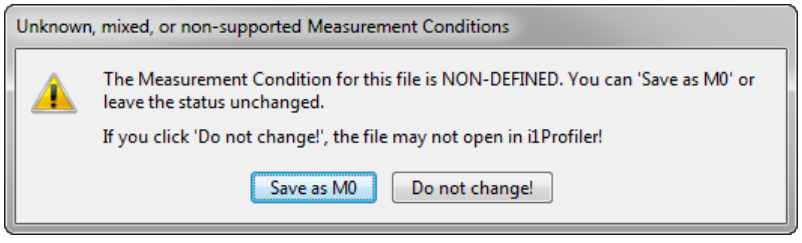


Once the "CxF3 File Extensions" dialog is closed, we go back to PatchTool's export dialog. This dialog is shown again on the next page where we now see "*.mfx" in the button over the CxF3 selection. Compared with the export dialog shown above, we have also selected the CMYK data field, in accordance with the recommendations for *.mxf files given in the file extensions dialog. We have selected "Spectrum" but we could as well have just selected "L*a*b*" instead.



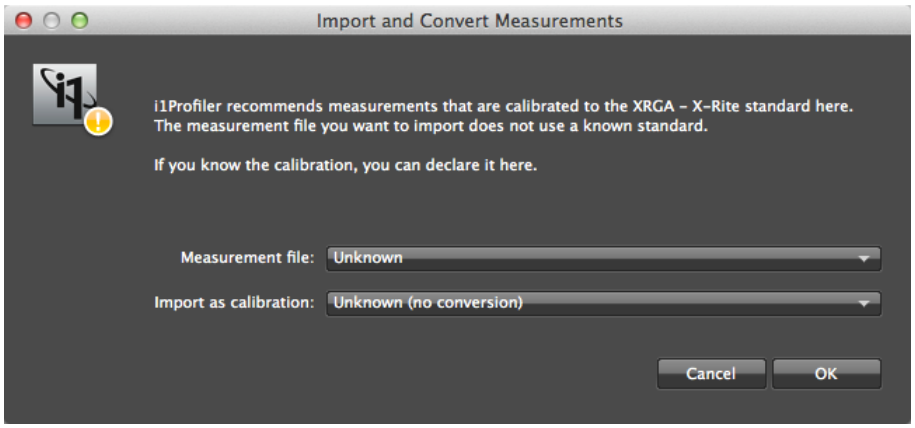
Warning: When exporting L*a*b*, make sure the Illuminant is D50! The i1Profiler program, like MeasureTool in the past, always assumes that L*a*b* data is in D50. So if another Illuminant was selected in the PatchTool file, you better close the export dialog and change the Illuminant in the PatchTool file. While you do that, also check that the Observer is 2 degree!

Once the proper data fields are selected for a given CxF3 file extension, you can click on one of the export buttons. For the file used in this example, you will see the following message dialog.

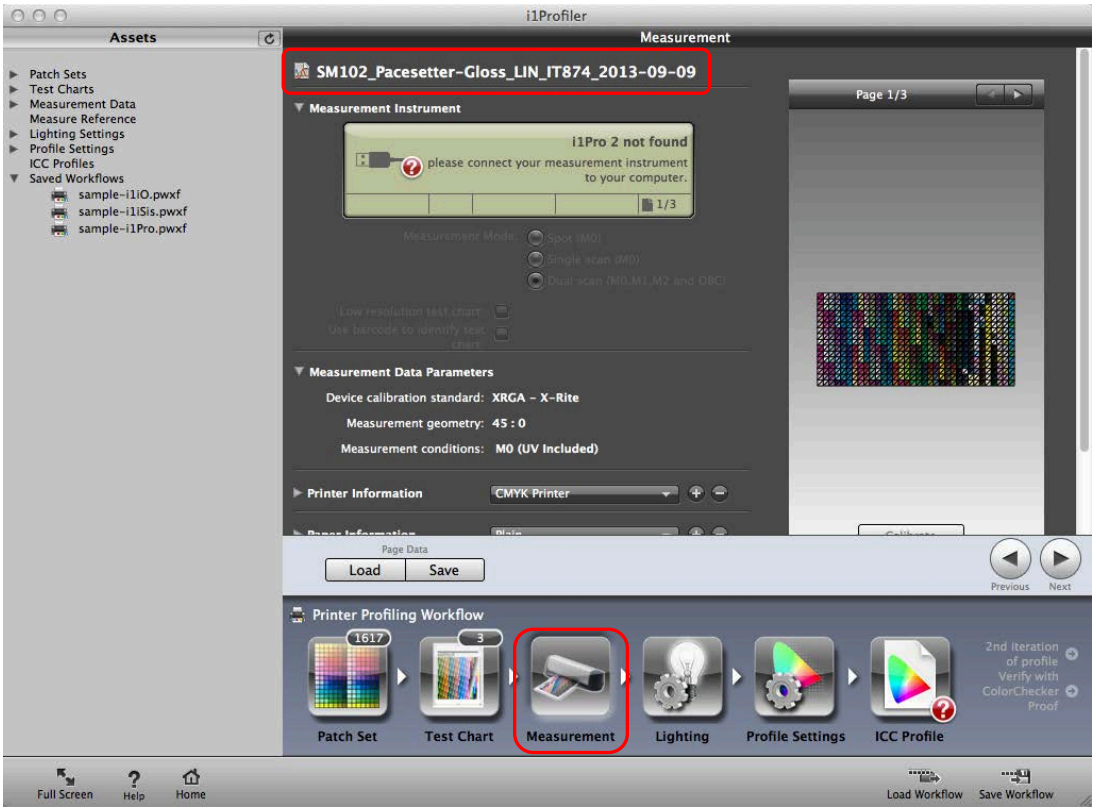


We previously mentioned that the M0 Measurement Condition was used for the file measurements but that this information did not appear in the file. Import in i1Profiler will likely fail if the data is not properly associated to a standard Measurement Condition, so we recommend that you accept the change. However, as in all warning dialogs associated with CxF3 export, you can refuse the proposed change, and see what happens…

The default name for the exported file is "**SM102_Pacesetter-Gloss_LIN_IT874_2013-09-09.mxf**". We can now take this file and import it in i1Profiler. The i1Profiler interface should be as defined in the beginning of this section. In i1Profiler, first click on the large "Measurement" workflow icon and simply drag and drop the *.mxf file onto the icon. You should then see the following dialog asking if you want to keep the data, with an unknown calibration standard, as is. In this case we could select to convert from GMDI-GretagMacbeth data to XRGA but you may select otherwise for your own data.



The measurements should fill the layout and appear as in the screenshot below. You will notice that the layout is not readily associated with the random or visual layouts of a standard IT8.7/4 target and that it may be separated in multiple pages, depending on the instrument and chart size defined in the "Test Chart" workflow interface.



We suggest that you drag and drop the measurement file one more time on the Measurement icon while keeping an eye on the "Test Chart" and "Patch Set" icons. You will see that these workflow steps are updated at the same time as the Measurement data is processed. As we mentioned before, the "Patch Set" and "Test Chart" interface are automatically updated for the device patches found in the measurements file. You should save the updated Patch Set and Test Chart files for future use.

From this point you can generate a profile with i1Profiler.

Additional info: You can also use PatchTool to export a chart directly in the "Patch Set" or "Test Chart" file format. Simply select the proper CxF3 extension and the data fields recommended for these formats. It is important to make sure that the RGB or CMYK data you are exporting is NOT derived from other data types imported in the file. To be valid, the device data must, **at least**, be either:

- Imported in addition to the data type used for import. This is the case when you see "(File values)" in the corresponding CMYK or RGB descriptions of the export dialog.
- Used as the "Color ref." for the given file (i.e. the color reference is shown as either CMYK or RGB in the export dialog).

While these conditions are checked by PatchTool when exporting to these files types, meeting one of them is not an absolute insurance that your data is acceptable to i1Profiler since it is always possible to manipulate file data. You should import your data in i1Profiler and complete the i1Profiler workflow for further validation.

4. Conclusion

We have seen two examples where CxF3-compliant files exported from PatchTool were used within an i1Profiler workflow. We hope that these examples have helped you understand the various i1Profiler file types and how the specific file content for each type can be defined within PatchTool.

With PatchTool's ability to open and export CxF3 files, we are confident that you will find many other uses to maximize the benefit of data exchange between products from different vendors.

SPECIAL THANKS

I would like to thank Mr. Roger Breton for providing me with some of his measurements taken while calibrating large commercial presses.

The BabelColor Company

Founded in 2003, *The BabelColor Company* is dedicated to the development and sale of specialized color translation software and color tools. It also provides color consulting services for the professional and industrial markets.

info@BabelColor.com

http://www.BabelColor.com