QuadToneProfiler-K3 for macOS Instructions

The new QuickCurve for inkjet prints using the Epson K3 printers, allows for easier profile creation, toning variations, and linearization without the need to go through the traditional QuadTone RIP profiling process. All you need to do is define you toning recipe and then print and measure a simple linearization target.

Getting Started with QuadToneRIP

Make sure QuadToneRIP is installed and you have a basic familiarity of the user interface. Please read the tutorial that comes with the QuadToneRIP to get a basic understanding of how to install printers and the basic print dialog interface.

I realize there is usually a rather steep learning curve for people just getting started, and some of the QuadToneRIP specific terms can be early stumbling blocks. Before diving into the actual workflow you will use for my software, I think it would be best to clarify some of the often confused terms that are used in the profiling process.

This first and most important is the word "profile" itself.

QuadTone RIP Profiles and ICC Profiles

A QTR profile is not an ICC profile.

One of the largest sources of confusion is the multiple usages of *profile*, especially for people accustomed to using a standard color managed workflow with the OEM printer driver. Thankfully, Color Management is not as intimidating or confusing as it was when ink jet printers and digital photography was starting to gain in popularity.Now most photographers using inkjet printers have a good handle on using a color managed workflow by defining an ICC Profile for their paper and printer when printing through Photoshop, Lightroom, or their other favorite image editors. Unfortunately, that can lead to problems when they start using QuadToneRIP.

Many problems and points of confusion are introduced when people are not clear about how they use the word *profile*. It is a good habit to specify if you are referring to

an ICC Profile or a QTR Profile—especially since you can use a custom ICC Profile when printing with a custom QTR Profile for a black and white color-managed workflow… (see confusing!). It can be helpful to think about QTR Profiles as containers for the information needed to construct *amedia settings* for a paper, printer, and ink combination. So then you color manage right? Well, yes, but you shouldn't. Color Management with QTR and black and white ICC profiles is a sticky subject that is best to just ignore for now. My particular view is that the whole point of the QTR calibration process is to make custom media settings so there is less need for ICC profiles to correct for problems with the printer. Matching it to the display is a whole other can of sardines.

Basic QTR Terminology

Now that "profile" has been cleared up there are a few terms that need to be understood before diving into profiling. This is not meant to make you a QTR expert, but here is a short crash course. If you have been using QTR and making your own custom profiles you can skip to the step by step instructions and just refer back to this if needed.

.qidf and .txt Ink Descriptor Files – QTR Profiles

This version of QuadToneProfiler–DN is designed to work independently of the QIDF text file, but I include information about it here for clarity. There is an option to export an initial QIDF file with the ink limits and relative gray values for use with the standard QuadToneRIP curve creation system. The resulting curves are very different and you will not be able to use the QTR-created curves with the remaining sections of the QuadToneProfiler–DN.

The files ending in either .qidf or .txt are plain text files that hold the instructions the QTR Curve Creation Algorithms uses to create the overlapping gray inks and toner partitions.

On Windows, the .qidf files are created by typing text inputs into the boxes in the QTRgui curve creation module, but they can just as easily be created and edited in a basic plain text editor. There is no QTRgui for the macOS and the only option is using the plain text version. The QuadToneProfiler spreadsheet tools will generate these files for you and all you will need to do is "install" it. More on that later.

The .qidf files generated from QuadToneProfiler are fully compatible with the QTRgui curve creation tools, but they do not require the QTRgui to open, save, or create the quad curves.

.Quad files – QTR Curves

The Quad curves are the final result of installing the the .qidf/.txt file profiles when using the QTR-curve creation program or what are exported from the QuadToneProfiler apps.

The Quad curves can also be thought of as the media settings you select in the QuadToneRIP driver in the curves menu. Behind the scenes, the .quad files are simply unsigned 16-bit integers that signify the ink level for each of the 256 steps in the grayscale. These files are not directly edible with the standard QTR curve creation tools, but there are a few different methods of editing the ink levels. That is beyond the scope of this document, but the tools included in the QuadToneProfiler Deluxe edition can be used to load, edit, and export .quad files.

Print Tool.app

Print Tool for Mac OS X allows you to layout multiple images or multiples copies of one image on a single page. This is not exclusive to printing with QuadToneRIP and can be used for any installed printer on the system. PrintTool is integral to the profiling process because it allows the user to bypass OS X's and Photoshop's color management settings for printing the Ink Calibration Image files and the grayscale targets used in the profile creation process. Adobe Color Printer Utility has this ability to bypass the system's color management, but does not have the ability to control the layout of multiple images on one page. Print Tool also allows for easy color managed printing and soft-proofing with any installed ICC Profile.

Curve Creation

Curve creation is one of those confusing terms and it can mean "create a correction curve" to match the native output to a defined target. This is more often used by with people making digital negatives, but is a case where further clarification is needed. Curve Creation can also be a reference to the behind the scenes functions that partition each ink channel into the smooth overlapping segments seen in the final .quad file. This second usage of curve creation is generally how I use the term, and I will specify "create a correction curve" for the linearization steps.

Linearization

Linearization will be covered in more detail in the step by step instructions, but basically it means: measure the native output from the printer and generate a correction curve to produce a standardized evenly distributed output densities. The problem with "linearization" is that different measurement formats represent density differently and linear Density might not be linear L*a*b* L* . In general QuadToneRIP terms, Linearization means make the L*a*b* L* measurements evenly spaced from the paper white to the darkest printable tone. When it is graphed it looks like a straight line. There is a lot of debate on whether this is the ideal way of doing things, but it is a good reliable standard and an easy one correct to.

QuadTone RIP Profiles and QuadTone RIP Curves

QTR Profiles and ***QTR Curves*** are often used interchangeably when discussing QuadToneRip, which leads to some of the natural confusion for those first diving into creating custom settings for their printers and papers. That confusion can also lead to problems when trying to trouble-shoot problems or participate in online discussions about the profile creation process.

A QTR Profile is often used as generic term for a file that contains all the settings for each paper, printer, and ink set, and toner settings. The problem is that *profile* can have different meanings depending on the context in which it is used. When used generically like this it can mean both to the text file that contains the user inputs used to generate .quad file, as well as the .quad file itself. I will attempt to dispel some of that ambiguity by redefining how those terms are used throughout the calibrating and profiling process—don't worry if you find yourself confused at this point; the next few sections should shed some light on this

.qidf and .txt files — QTR Profiles or Ink Descriptor Files

The **Quad Ink Descriptor File** is simply a plain text file with a special extension that allows it to work with the Windows QTRgui. You can open these in Notepad on Windows by right clicking and choosing to "Open with" note pad. These .qidf files can be used on OS X, but you will need to define an application to open them. If you are working on OS X then simply save them as .txt files, and carry on.

These *ink descriptor files* can be thought of ink recipes, and hold the instructions that a series of functions in the *QTR Profile Installation Script* will use to create the overlapping gray ink and toner partitions. *Profile* might not be the best word for these ink descriptor files, but they are located within the *Profiles* folder in the QuadToneRip application folder. In thinking about the definition of profile—information about the characteristics of something (in this case, how the inks are partitioned in the .quad file) —it is fitting, but it can lead to confusion when not Preceded with *QTR*.

QTR Profile Installation Script

I've referenced the QTR Profile Installation Script or Curve Creation Program several time already. It is ok to not care *how* it works, but it is a good idea to have a basic understanding of what it is, how to use it.

Installing the Profile/Curves

You have to options for loading a new profile or a new set of curves on macOS. The first is to rerun the InstallPrinter.command in the profile folder that you ran to create the QUADxxxx printer and print queue (if connected by USB)).

When you double click the install.command file you will see the profile install script run (quickly) in a Terminal window. This installation script is a command line tool that automatically processes all of the plain text quad ink descriptor files located in that profiles folder (if there are any). The end result of running the install script is a text file with a .quad extension that contains the 16-bit values for each of the 256 steps of the grayscale for each different ink channel.

The install script doesn't change or save anything in ink descriptor file. It looks to see if there is an existing quad file in the library/printers/qtr/profile/quadxxxx folder (or the equivalent on a PC). If a quad file with that name does not exist, it builds a new quad file and creates a set of curves based on the instructions in the qdif file. If there is an existing quad file of the same name, it rewrites the set of ink curves based on the instructions in the qdif file. Those inputs in the qdif files might be exactly the same every time, but since the script doesn't "know" if anything is different in the .quad or ink descriptor file it recreates the ink curves overtime it is run.

If you are on macOS and have installed final version of the linearized qdif file you can remove it from the profiles folder in the QuadToneRip applications folder. If you remove the qidf file from the profiles folder it won't rebuild the quad file every time the install script is run, but you will still be able to print with that set of quad curves. It isn't important, but it might save a few seconds each time you run it. You can remove all the profiles for papers that you are not going to use (and remove the .quad files from their respective folders too). That just helps keep the print dialog boxes a little less cluttered and less searching for the curves you really want to use.

The .QUAD File

If you were too look at the .quad file in a plain text editor, you will see something link this: Numbers ranging from 0-65535 on hundreds (or thousands) of separate lines, depending on the number of inks used in that model printer.

```
## QuadToneRIP K,C,M,Y,LC,LM
# QuadProfile Version 2.7.5.0
# K curve
0
0
0
0
```

What these numbers actually represent are the 16-bit (unsigned—neither positive or negative) integers that control the amount of ink at each of the 256 steps that make up an 8-bit tonal scale. These 16-bit numbers are the percentage of the total ink the printer is capable of spraying onto the paper at any given point. 0 is 0% ink, and 65565 is 100%. Fortunately, these values are created by the QTR installer script, and we do not need to make the calculations ourselves to create the quad value for each ink for each of the 256 steps. Our job in the profile creation process is to give accurate instructions that the QTR installer will use to do this work for us.

Accessing to Your QTR Profiles and Quad Curves

Now that you know some of the terminology, we can start to dive into where to find these different kinds of files.

There are two folders associated with each printer. One for the Ink Descriptor Files (QTR Profiles) and one for the .quad files (QTR Curves). You can put your .quad curves that are exported from QuadToneProfiler directly into the curves folder or the profiles folder. The .quad curves in the profiles folder will be copied to the curves folder when you run the install command. These are in different locations on Macs and PCs, but the folders are similarly named. PC users can access the Ink Descriptor Files through the QTRgui curve creation module.

QTR Profiles (ink descriptor files) are not used with my QuadToneProfiler apps, but are located in folders organized by printer model and ink set in the QuadToneRIP/Profiles folder. These are directly related to how the QTR curve (.quad file) folders are named and organized, but in reality, you can have the ink descriptor files located anywhere on your hard drive.

Viewing the Quad Curves

macOS X users access these files directly through the finder, and then can view the Quad curves in QTR CurveView. In macOS these .quad files are stored buried in the system library folder, so I recommend people create an alias to the QUAD printer folders on the desktop or as a favorite folder I the finder sidebar.

Here is an example file path to find the .quad files:

```
StartUpDisk/Library/Printers/QTR/quadtone/quadxxxx   (ex:
quad1430-K6 or quad3800-UC)
```

Installing and Setting up QuadToneRIP

If not already done, install the latest version of QuadToneRIP, DataTool, and Print Tool from:

www.QuadToneRIP.com/downloads

Setting up QuadToneRIP

After installing QuadToneRIP from the main installer package, you might ask, now what? Where did it go?

The great thing about using QTR on the Mac is that once you set up your printer and install the curves, QTR is just part of the printing system on the Mac. You can print with it anywhere you can press command+p to print. Ok, but WHERE is QuadToneRIP? Unfortunately, this is where people get tripped up right from the start.

QuadToneRIP needs to have components installed in two different places on your computer. The actual QuadToneRIP folder with all the stuff you would usually expect to work with will be installed in the usual Applications folder and is easily accessed. The QTR folders and files used for the actual printing are buried deep within the file system in the `MacintoshHD/Library` folder. The good news is that you'll use very little of any in the QuadToneRIP folder and will really only need to find or make shortcuts to two folders.

The next several steps detail precisely how it should be done. Just note, I **highly** recommend setting the Finder to show everything in List view (command+2). I also recommend double-clicking (or press command+o) to open each folder in its own window and **not** use the little disclosure arrow to drill down into each folder. Using the disclosure arrow will open long lists of files that will make it harder to navigate to where you need to go.

The Applications/QuadToneRIP folder

As I said, you will need very little of what is in the QuadToneRIP folder. The one place you will go to the most is the Profiles folder with all the QTR-supported printers.

Each of these Profiles folders will have an Installxxxx.command file (generally known as the install command) and several text files. The text files are generally referred to as "profiles" (or less confusingly, "ink descriptor files"), and they will have either a .qidf or .txt extension. The text files contain the recipes for the printer/ink/paper combination that the QTR curve creation program needs to make the .quad files used for printing. Don't worry. If you are using my software, you will NOT need to use these text files or know what any of their settings mean. Just ignore them. Better yet, I recommend duplicating the folder for your printer, and deleting all the text files in it.

Folder for your printer? Which one is that?

When you open the Applications/QuadToneRIP/Profiles folder, you will see an extensive list of printer models. You will need to find the folder that has the same name as your printer model. There are some folders that apply to multiple printer models in the same family, like the 4900, 7900, and 9900 or the P6000 and P8000. In these cases, it is best to create a new folder for your printer model and add "-QTP" or some way to indicate the installed ink set. For example, my P800 is called P800-QTP, my K5+CMY printer is called 3880-K5CMY, or my 9880 with PiezoPro inks is called 9880-PZP. You would then change the name of the install command to reflect that printer model name.

Follow the detailed steps below and refer to the illustrations as needed.

Installing the Quad Printer Step-by-Step

Create a new QuadToneRIP profiles folder for the QuadToneProfiler curves

- Open the QuadToneRIP application folder
- Open the Profiles folder and find the folder for your printer model and duplicate it.
- Change the name to (printer model)-QTP (ex: if you have the P800, find the P800-UC folder and duplicate and then rename it P800-QTP) and then add it as a shortcut to your Finder sidebar (drag the folder to the sidebar)
- Open the duplicated and renamed folder and delete all .txt quad ink descriptor files, so only the install.command file is in the folder.
- Change name of the install.command file to install(name of renamed folder).command (ex: P800-QTP.command)
- Double click the install command to run the program that will create a new Quad printer with the name of folder or name of install command (ex: QuadP800-QTP).
    - Running the install command will always open a new macOS Terminal window and display some output that should look like the screenshot below.
- Navigate to the Quad printers folder by clicking he **Go** menu the Finder menu bar and choose **Go to folder** (or simply activate the Finder and press shift+command+G) and copy and paste **MacintoshHD/Library/Printers/qtr/Quadtone/**. Locate the newly-created Quadxxxx folder and add it as a shortcut to the Finder sidebar. This folder is where you will be save the .quad files that you will use when printing.

The install.command file

Theoretically, the install.command file can be anywhere on your computer, but in practice and for ease of use, I recommend people put it with all the other QuadToneRIP related files in the QuadToneRIP/Profiles/YourPrinter folder.

When you first run the install command, it looks into the `MacintoshHD/Library/Printers/qtr/Quadtone/` folder to see if there is already a folder called Quadxxxx (or whatever the install.command file is named). If the folder doesn't exist, it will create the new folder, attempt to create the new virtual Quadxxxx printer, install any .quad files, compile any .txt quad ink descriptor files in the Profiles folder, and then add it to the list of connected printers in the macOS printing system.

If the Quadxxxx folder already exists, it looks at the list of available printers to see if there is already a virtual printer named the same as the Quadxxxx folder. If there is, it

will install or update any .quad media settings files within the Quad printer folder, making them available to print with later.

While not used when working with the QuadToneProfiler software, another essential aspect of the install command needs to be understood. The install command is also responsible for compiling any ink descriptor text files within the same folder into a new .quad file into the Quad printer folder. It will also COPY any existing .quad file in the same folder as the install command to the Quad printer folder. Compiling and copying the quad files is something that always trips people up, and is why I recommend duplicating the folder and deleting all the .txt files first. It is also why I recommend adding any .quad files saved from QuadToneProfiler directly to the Quadxxxx folder for your printer and only running the install command to make them available to print with (rather than allowing the install command to copy them from the Profiles folder to the Quad folder).

Deleting unused quad files

The install command will also update the printing system so that any deleted quad files will be removed from the list of available media settings to choose from the curve menu options in the QuadToneRIP print dialog screen. If you want to delete any used .quad files, simply go to the quad folder for that printer and put them in the trash, and re-run the install command to update the printing system. This is also why I recommend putting the .quad files only in the Quad folder. If the .quad file is in the Profiles folder and the Quad folder, it will need to be deleted from both folders.

Printing with QuadToneRIP

QuadToneRIP will be available system-wide after installing your printer and any media settings, so you can print from whatever application that supports printing.

Getting to the QuadToneRIP print dialog options can be tricky the first time you do it because of the default state of the macOS print dialog window. If a small window like this appears, press the “Details” or “More options” button to expand the window to show the QTR options.

Press the button that says “Layout” to open the pop-up menu to reveal the other available settings in the print dialog window. Choose QuadToneRIP from the list to get to the mQTR-specific settings. There are three printing modes to choose from: 8-bit, 16-bit, and Calibration. I always use 16-bit printing because QTR allows for printing 16-bit images and will interpolate the 8-bit ink levels in the .quad file to 16-bits if the image is also 16-bits. Calibration mode requires specific 8-bit RGB images used to print each ink in the printer as a separate channel without any blending from the other inks. Calibration mode will be covered in the Custom Curve Creation section.

Normal 8 or 16-bit printing modes will allow you to choose media settings for Curve 1, and optionally for Curve 2, and Curve 3 for split toning. These settings in the print dialog window are where the name “QTR Curves” comes from when referring to

the .quad media settings files (not to be confused with correction curves for inkjet negatives). Just remember Curves == .quad files == printer media settings.

QuadToneRIP Media Settings

The media settings you choose for normal color printing with the Epson driver (and the fine-tuned with ICC profiles) are essentially what you are creating when making a linearized QuadToneRIP .quad file. The printer manufacturers create internal driver-specific settings containing the ink levels for the black and color inks for a few papers. These internal media settings tell the printer how to translate the RGB values in the file to the percentage of CMYK ink dots on the paper. QuadToneRIP bypasses the standard Epson driver and is why we need to make our own grayscale media settings. The nice thing is that my tools allow you to do what Epson does to create their media settings but is dedicated to printing grayscale images and allows for unlimited customization of the ink sets and not being locked into the predefined Epson inks and settings. It also means that we can tailor the media settings for YOUR printer, paper, and sensibilities and not rely on ICC profiles and color inks to control the overall density and gray balance or color toning in the print for our selected paper. It might require a few additional steps at the beginning, but the results in the final prints are well worth it.

QuadToneProfiler-K3 Basic User Interface

Starter Curve Setup Screen

The starter curve setup screen has matte and glossy curves and toner settings for most standard K3-style printers. Choose the printer model, black ink setting, and toner setting and save the starter curves to your Quad printer folder and run the curve install command for that printer.

There are options for creating custom split tones by adjusting the C, M, and Y component sliders based on the color you want to achieve. The blended curves will be very good and linear for getting started, but for best results, you should consider a final linearization due to differences in your printer and paper from what I used to build the initial starter curves.

Approach to Toning and Blending Components

The toning recipes are based on preset ratios of Cyan, Magenta, and Yellow inks. You can customize your ratios by adjusting the sliders for the individual color channels in the three tonal ranges. The overlaps of the Lc/C and Lm/M channels are preset and corrected based on the luminance and saturation, and then blended with the K3 inks

and linearized so that any blending of the separate color/gray combinations will produce a linear print.

The Black Ink Limit

The black ink limit is set for each paper type and ink set to get the best results based on my experience with different papers and printers. If the default setting does not work well for your printer, you can manually adjust the black ink limit or curve shapes after adjusting any of the toner settings.

The adjustments in the curve editor are only temporary and do not alter any of the built in curves or settings, and the edited curves will be reset when any setting in the starter curve setup screen is changed.

Saving and installing the starter curves

Save any of the toning curves you want use to the QuadToneRIP/Profiles/YourPrinterFolder and run the install command to make them available in the QuadToneRIP print dialog window. You are now ready to print the targets for the linearization steps.

Linearization

Linearization is the process of using measurements from a print and corresponding quad curve to match some desired output. It essentially defines what the output should be—either a straight line from the paper white to the Dmax or some custom set of values you choose—and creates a look-up table to determine what set of ink values will produce that final output in the print.

QuadToneProfiler Linearization Interface

The linearization window is divided into two main sections.

The left side has a table for the measurements in a list from light to dark. You will see 21-step placeholder values when the screen first launches, and the list will update with the values from the opened measurement file. The chart on the left side of the screen will display graphs for the measured, smoothed, and output values. The buttons below the chart open additional panels to preview the original and corrected color patches, preview the original and corrected output with an actual image, and adjust a custom output curve.

The right side of the screen has a graph of the output quad ink levels, a field to add notes to the final quad file, and different export options in addition to the standard .quad file used with QTR.

Basic Linearization Workflow

- Print and measure a step wedge image with the initial quad curve
  - Open the measurement file and corresponding .quad used for the print
  - Apply any smoothing or error correction to the original measurement data
  - Apply any custom output curve if needed
  - Save and install the new corrected quad curve
  - Make a new test print to check results

Printing the linearization target

The initial quad curve created in the custom curve creation screen had an initial correction applied when you created it, but you need to create a final linearized curve based on measurements from a printed step target.

Target Sizes

The grayscale linearization can accommodate target sizes from 11 to 256 patches from a wide range of measurement devices and file formats. I generally recommend a 128-step target if using an i1 pro device in strip mode, but linearization will work fine with a 21-step target if using a flatbed scanner or manual measurement device to read the target.

- Open PrintTool and open the image.
- Make sure there is no color management, and then select Run Print.
- Open the QuadToneRIP print dialog options (remember to press the Layout button to open the menu to access the QuadToneRIP settings).
- Set the mode to 16-bit to enable the Curves 1, 2, and 3 menus
- Select the menu for Curve 1 and choose the newly created base gray curve.
- Set the printer settings to highest resolution (2880x2880) Unidirectional and Installed Black.
- Leave the advanced options unchecked.
- Then run the print.
- **note** there is a bug in QuadToneRIP v2.8.0 that will duplicate the print job and have a filter failed error. The print will print fine; just delete the duplicated job in the printer queue.

Measuring the target

There are too many devices and software to detail in these instructions, but the general rule is to measure from light to dark and save the lab values as a plain .txt file.

Please see the measurement workflows on my site for detailed instructions and videos for the most popular devices.

Loading the Measurement Data

Press the button to load the measurement data from the target you printed a measured. The software will automatically detect the data format, and if there are multiple samples per patch, average them into a single set of values and show a graph of the measured values in the measurements chart and list on the left side of the Linearization screen.

Measurement Data Graph

There are four sets of data graphed when loading the measurement data.

- The black dots are the original interpolated measurement data.
    - The software interpolates the original measurements into 256 steps, but there are only 129 steps graphed in the chart. These dots will not change when adjusting the smoothing sliders. However, they will change if you edit the values in the table on the left
- The red line represents the 256-smoothed values and will change when adjusting the two smoothing sliders or when updating any of the values in the original measurement data list. These are the values used in the linearization calculations
- The straight black line is the linear L*a*b* values from Dmin (top left of the graph) to Dmax (bottom right). The black line is a reference for the linear output, but those values **are not used** in the actual correction calculations.
- The Green line shows the target L*a*b* L* values and **are the actual values used** in the linearization calculations. You can adjust the output values to be something other than perfectly linear output with the manual curve control panel.

Smoothing the Measurement Data

Proper smoothing of the measurement data is one of the more critical adjustments you will need to make. Thankfully, it is all visual and you don't need to do any calculations on your part. There are two sliders that control the number of points used in the smoothing algorithm. The main smoothing value adjusts for any large bumps in the measurement data but can distort it at the extreme highlight and shadow ends of the tonal scale. Use the second smoothing slider to adjust the values from the main smoothing slider back to the general trend in the original measurement data while also smoothing out any remaining bumps in the curve. The goal is to use enough smoothing to remove any bumps or flat spots that will result in banding in the final print and remain true to the general trend of the original data.

Main Smoothing Window Size:

The number of points to use will depend on the size of the measurement target. 21-step targets will require less smoothing than 128 or 256 step targets. A larger value will result in a larger moving-average window and a smoother curve. Very high values will distort the shadow values because the window will include and average values from the 3/4 tones. A good starting point is a setting of 11-35. (Note: the window size will always be rounded up to an odd number to ensure that there is an equal number of input points around the point being smoothed.

Fine Smoothing Percentage:

A value of 0 will turn off the smoothing, and start to apply the smoothing as soon as you begin to adjust it to the right. A higher value will result in a smoother curve but will distort the highlight and shadow values if it is set too high.

For those interested, here is what is happening in the smoothing steps: The main smoothing slider is a simple moving average. It creates a window of the specified number of points, averages them into a new value, then moves down one step and repeats until it creates a new set of 256 smoothed values. Those values are input into the second smoothing calculation, where the fine smoothing slider value determines the percentage of points to use in a smooth-step interpolation to recreate the final 256 smoothed values. Those final values are graphed as the red line and used in the actual linearization calculations.

Manual Curve Control

The manual curve control allows you to adjust the output densities to something other than a perfectly linear L*a*b* L*. The purpose of this control is to adjust for how matte papers with a relatively low Dmax will appear too light or have shadow values that appear much lighter than the image on the display. It adjusts the output values in the .quad curves so that the final print appears more perceptually correct and removes the need to use a 2nd adjustment curve to the digital image prior to printing.

I would not recommend starting to adjust these until you see what a linear L*a*b* L* print looks like.

Standard Manual Curve Setting

You can also choose the standard compression button to apply a curve that is similar to the kind of compression you get with an ICC profile.

The software will automatically determine which curve to apply based on the dMax. If the dMax is lighter than a Lab L value of 10, it will apply a shadow correction curve. If the dMax is darker than a Lab L value of 10, it will apply a slight curve to lighten the quarter and mid tones and keep linear shadows.

Saving the linearized .quad curves

When you are happy with the smoothing and manual output curve (if used) and have added any notes, you will need to save the linearized .quad file to the Quadxxxx folder for your printer.

Naming the Linearized Curve

I always suggest using the same name as the non-linearized curve and adding -LIN before the .quad extension. If I use the manual output curve controls, I add -LIN-MC or -LIN-CS (for “manual curve” or “compressed shadows”).

You will also need to rerun the install command for the printer (found in Applications/QuadToneRIP/Profiles/YourPrinter) so that it is available in the QTR print dialog options.

Confirming Linearization

To ensure the new linearized curve is printing correctly and make the .qtp file, you need to make a test print of your standard test image and include a bullseye gradient that will show any obvious reversals or problems with the linearization. Include a simple 21-step grayscale target with your test print to measure and confirm linearity.

The other important factor to check is the smoothness of the mid-tones. The grayscale torture test image in the resources folder includes two bullseye gradients as well as linear gradients broken up into 11, 21, 51, 101, and 256 steps. Use this image along with your standard test image to make sure there is no posterization or banding in the final linearized curves.

Open the PrintTool and arrange your test image, the torture test, and a 21-step target so that they print together and that there is enough space around the 21-step target for easily reading the patch values. Also, be sure to check that color management is still turned off in the main Print Tool window.

Open the QTR print dialog windows by choosing the Print and Paper Settings, going straight to the Print button, and choosing the new linearized gray curve in the Curve 1 drop-down menu.