QuadToneRIP 2.7 & Eye-One Spectrophotometer

Setup the Basics

The X-Rite Eye-One can be used to calibrate the final linearization of QuadToneRIP curves. Single read-outs can be done but scanning an entire 21 or 51 gray stepwedge is the most convenient. The **MeasureTool** program is a part of ProfileMaker 5 and can be downloaded from:

http://www.xrite.com/product_overview.aspx?ID=757&Action=support&SoftwareID=931

If you have difficulty with the long link, simply start at the beginning and search down through Support, Downloads > ProfileMaker 5. You must download the whole product and then just use MeasureTool. Only a demo version of the software is needed for use with QuadToneRIP -- you do not need a "dongle" to run the parts needed.

Eye-One Reference Files and Target Images

There are five Reference Files to tell MeasureTool the patches layout.

Steps	Order	Reference-File	Target-File
21x4	random	QTR-21x4-random	Step-21x4-random.tif
21	sorted	QTR-21-gray	Step-21-gray.tif
21	random	QTR-21-random	Step-21-random.tif
51	sorted	QTR-51-gray	Step-51-gray.tif
51	random	QTR-51-random	Step-51-random.tif

For Mac OS X, drag the reference files into:

/Applications/ProfileMaker Pro 5.0.10/Reference Files/Printer/EyeOne/

For Windows, drag the reference files into:

\Program Files\X-Rite\ProfileMaker Professional 5.0.10\Reference Files\Printer\EyeOne

If the version number is different find the correct folder by searching down the hierarchy. For other OS versions you may need to search for these folders.

The 21x4 target is recommended for the best accuracy. I has 4 patches for each step value and the QTR software will automatically average the 4 measurements which gives a more accurate result.

Printing the Target Stepwedge Image

Print targets with QTR and all the selections you want to profile or linearize. The intended resolution is very important. The targets are **Untagged** and should **NOT be color managed** in any way. Do not **Convert** an image. Always print with **No Color Management**.

Scanning using MeasureTool

1) Run **MeasureTool**, only demo mode is needed, there is no need for a dongle.

2) Click on the **Configuring** box and select **Eye-One** and **Reflection**, not **Spectral.** Below is should say **OK** in small letters. Close the Configure box.

3) Click on the **Measuring -- Chart** box.

4) Select a reference file such as **QTR-21x4-random** under **Test Chart**.

5) Click **Start**, put the instrument on the white reference and click **OK**.
It will also go through it's own calibration step.

6) A **Measurement** window will open, select:
Mode: Strip without gaps for the random stepwedges
Mode: Strip with gaps for the sorted stepwedges
Mode: Patches where scanning reports too many errors, this allows you to read one value at a time

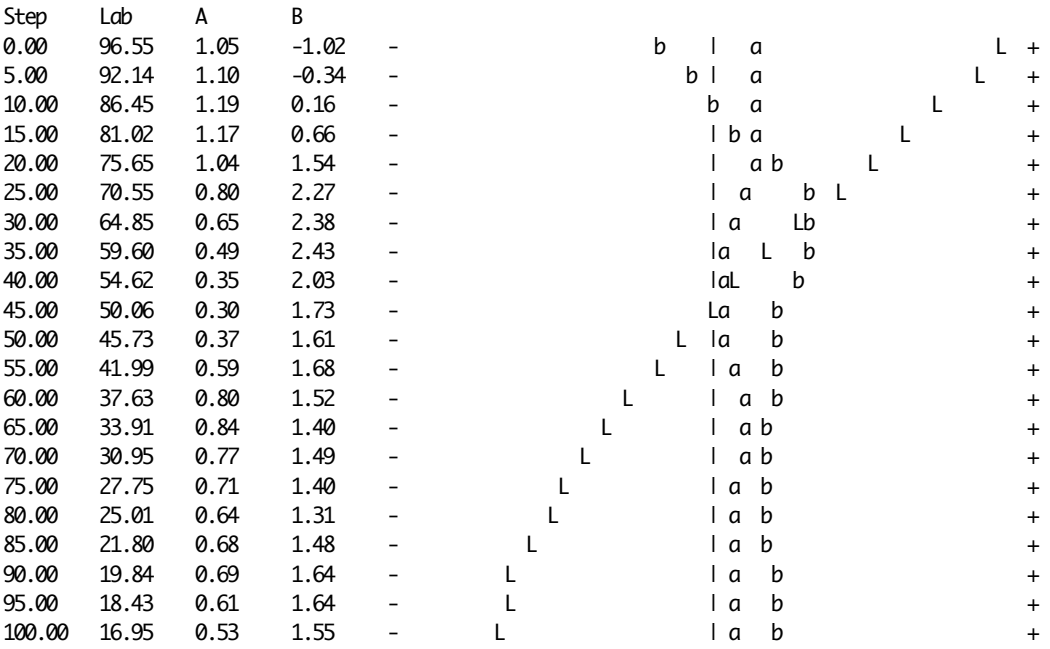
MeasureTool does better error checking on the random order wedges, so unless you want wedges where you can visually see and compare the steps, the random stepwedges are recommended.

6) Now scan the stepwedge from **BEG** to **END**.

7) A new window will pop-up with the scanned grayscale.
Save the scan by using **Save As --Text Document**

Analyzing the Data from the Scanned Grayscale

Drag the saved grayscale scan file onto **QTR-Linearize-Data** . A TextEdit window with the 21 readings and a graph like this will open:



Step	Lab	A	B
0.00	96.55	1.05	-1.02
5.00	92.14	1.10	-0.34
10.00	86.45	1.19	0.16
15.00	81.02	1.17	0.66
20.00	75.65	1.04	1.54
25.00	70.55	0.80	2.27
30.00	64.85	0.65	2.38
35.00	59.60	0.49	2.43
40.00	54.62	0.35	2.03
45.00	50.06	0.30	1.73
50.00	45.73	0.37	1.61
55.00	41.99	0.59	1.68
60.00	37.63	0.80	1.52
65.00	33.91	0.84	1.40
70.00	30.95	0.77	1.49
75.00	27.75	0.71	1.40
80.00	25.01	0.64	1.31
85.00	21.80	0.68	1.48
90.00	19.84	0.69	1.64
95.00	18.43	0.61	1.64
100.00	16.95	0.53	1.55

LINEARIZE="96.55 92.14 86.45 81.02 75.65 70.55 64.85 59.60 54.62 50.06 45.73 41.99 37.63 33.91 30.95 27.75 25.01 21.80 19.84 18.43 16.95"

The data read by the Eye-One and displayed here is in Lab which is a 3 channel representation of each step.
L is Luminosity -- basically just how dark or light it is.
A is the red/green axis, + is red, - is green.
B is the yellow/blue axis, + is yellow, - is blue.
-- the color axes are magnified so the color variations are smaller.
-- the L data ideally will be a straight line. it matches human perception.

Linearize a QuadToneRIP Curve

The **Linearization** process is simply creating a correction curve using the above data to straighten the L data graph. To use this feature, simply create the ink description file, doing the partitioning. The GRAY_HIGHLIGHT and GRAY_SHADOW fields can be approximated at 6 and 8 respectively. Make the quad curve and print out the **Step-21-gray** stepwedge, and measure as above. The last line has the linearization info. Triple-click on it, **Copy** the whole line and **Paste** it to the bottom of the ink description file. Re-process the ink file with **Drop-Quad-Profile**. Print out the stepwedge again and you should have results similar to this:

```
Step     Lab      A       B
0.00     96.62    1.07    -0.94    -                        b   |   a                    L  +
5.00     92.18    1.04    -0.31    -                          b |   a                 L    +
10.00    87.83    1.18    0.07     -                            b   a              L       +
15.00    84.13    1.24    0.32     -                            |b  a            L         +
20.00    79.92    1.21    0.85     -                            |  ba          L           +
25.00    76.61    1.07    1.34     -                            |   ab        L            +
30.00    72.19    0.92    2.07     -                            |  a    b    L             +
35.00    68.10    0.72    2.41     -                            | a      bL               +
40.00    64.32    0.63    2.45     -                            | a     Lb                +
45.00    60.34    0.53    2.55     -                            | a   L   b               +
50.00    56.92    0.43    2.28     -                            |a  L    b                +
55.00    52.56    0.33    2.00     -                            |a      b                +
60.00    47.91    0.36    1.71     -                          L |a    b                  +
65.00    43.88    0.43    1.62     -                        L   |a    b                  +
70.00    40.25    0.67    1.63     -                      L     | a   b                  +
75.00    36.41    0.79    1.34     -                    L       |  a b                   +
80.00    32.27    0.84    1.50     -                  L         |  a  b                  +
85.00    28.32    0.80    1.55     -                L           |  a  b                  +
90.00    24.24    0.68    1.34     -              L             | a  b                   +
95.00    21.24    0.60    1.20     -            L               | a b                    +
100.00   16.91    0.53    1.50     -          L                 | a   b                  +

LINEARIZE="96.62 92.18 87.83 84.13 79.92 76.61 72.19 68.10 64.32 60.34 56.92 52.56 47.91 43.88 40.25 36.41 32.27
28.32 24.24 21.24 16.91"
```

There is also a 51 step gray reference and image file for 2% steps.
Use the 21 steps for the linearization, but use the 51 steps to check the final result.

Creating an ICC Profile for Printing & Soft-Proofing

The same data file from above can also be used to create a grayscale ICC profile that can be used for printing and soft-proofing in color. In general it's recommended that you linearize the QuadToneRIP curves first. Then create ICC profiles built on top of linearized QTR curves.

Print a stepwedge like the second one above, scan the step wedge and drag the file of data readings on to **QTR-Create-ICC.** This a simple droplet program that will create an icc file with the same name as the data file. The created icc file is used during printing to achieve a Perceptual Intent mapping from any input embedded profile to the output. This scheme can be used with any type of black and white printing such as Black-Only from the Epson driver or the new Advanced B&W mode of the latest printers. This achieves the final step of a completely color managed workflow to match the screen and the print.

Printing in Photoshop with Profiles

Printing is done like using any other ICC profile. In the **Print with Preview** screen under **Color Management** select the created profile for **Print Space.** In Photoshop CS2 select **Let Photoshop Determine Colors** and the created profile for **Printer Profile**. Also select **Rendering Intent: Perceptual** and **Black Point Compensation ON.**

Soft-Proofing in Photoshop with Profiles

For Soft-Proofing in Photoshop select View > Proof Setup > Custom...
Select the Profile, turn off Preserve Numbers, Rendering Intent: Perceptual, Black Point Compensation ON. Simulate Paper White and Ink Black are optional -- preview the results and decide what you like. If you plan on using this soft-proof often you may Save it.