

APPENDIX D:

SCANNER CALIBRATION

The purpose of these instructions is to offer tips and techniques for calibrating a desktop scanner with Photoshop. This will make the scanning process more productive. These instructions are not meant to be a substitute for experience, but rather one of many methods about how to use Photoshop with a scanner to get good results.

Technically, this method adjusts image contrast by changing the tone reproduction characteristic when scanning.

LIMITATIONS OF SCANNERS

1. If you are trying this technique on an older desktop scanner, the scanner might have a technical limitation that may prevent you from achieving the suggested target values. The main limitation is usually in the scanner's sensor system. Scanners with sensors that are not refined will not be capable of detecting darker tones of the target image. In technical terms, the scanner has poor dynamic range. This will cause the darker shadow tones to potentially have the same measurements in the target image steps #16 (3/4 tone) and #22 (the shadow). This will make it difficult, if not impossible, to achieve good shadow details.
2. Measuring Images is important: Photoshop allows you to measure halftone density (percent dot values) for this calibration method. To refine this technique, optical density of reflection or transparent originals can be measured with a densitometer.

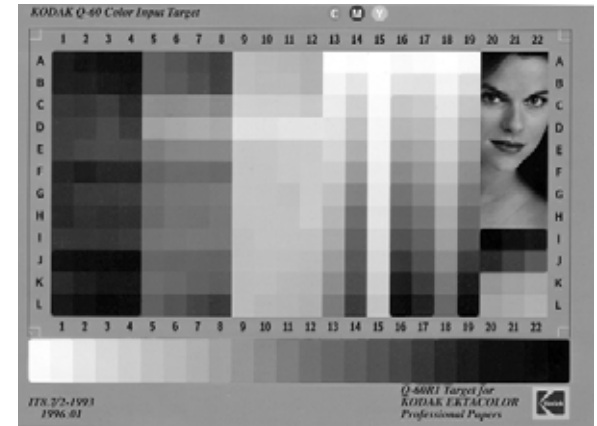
- Read the previous sections in this book.
- Have basic knowledge of Photoshop and, specifically, the black and white imaging tools.
- Be familiar with most aspects of the Curves tool.
- Know the mechanics of your scanner's hardware and software.
- Have an IT8, Q60, or grayscale target. These quality control target images are used for scanning and imaging work. They are available in transparent and reflection versions depending on the type of scanner.

Ordinary Grayscales Will Work But...

The techniques outlined in this book will work with transparent and reflection gray scales that you might already own or that you can buy from a graphic arts supplier.

The difference between an ordinary grayscale and the IT8 target are the number of steps and the density values in each of the steps. The steps on a non IT8 grayscale are usually different than the ones outlined in this book. In case you're not going to use the IT8 target, the density values have been supplied for transparent and reflection grayscales. Be aware that using another target image besides an IT8 increases the number of variables. Therefore, risk of failure increases.

Using an alternative grayscale would entail measuring the grayscale target with a densitometer until the target densities are found. In many instances, finding the same exact densities is not possible. What happens in this situation is the end-user begins to estimate as close as possible to the target densities. This is a satisfactory method for experienced professionals, but if you are just getting started with scanning and Photoshop you will probably get confused. Hence, using a grayscale will work, but we suggest getting an IT8 target. The IT8 is a good quality-control tool that imaging professionals should own.



Reflection IT8 Target

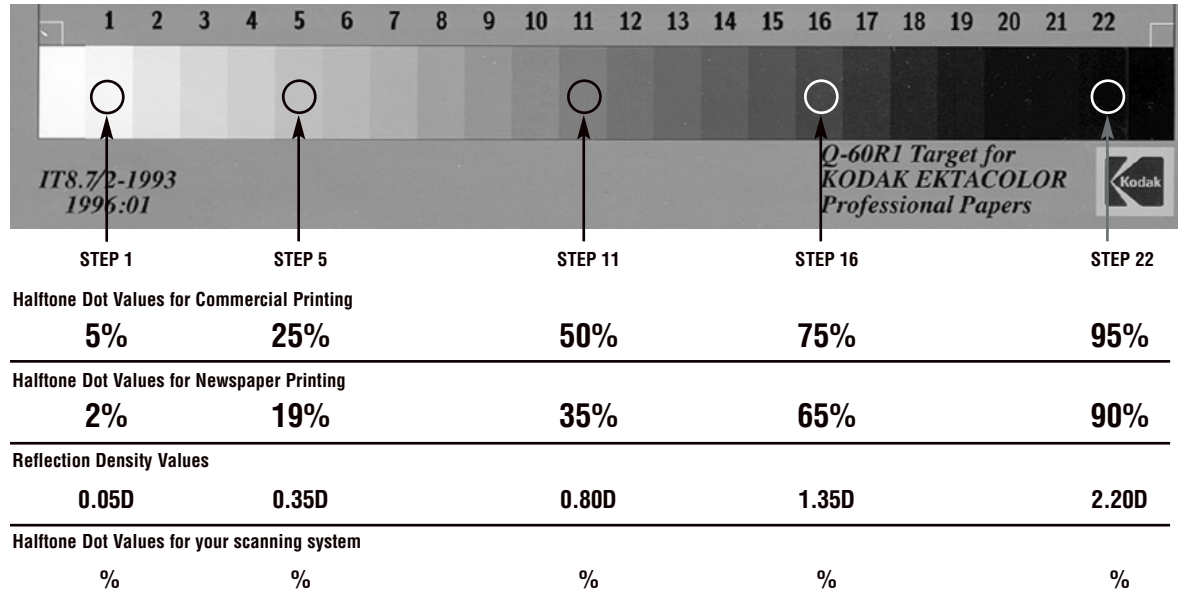


Transparent IT8 Target

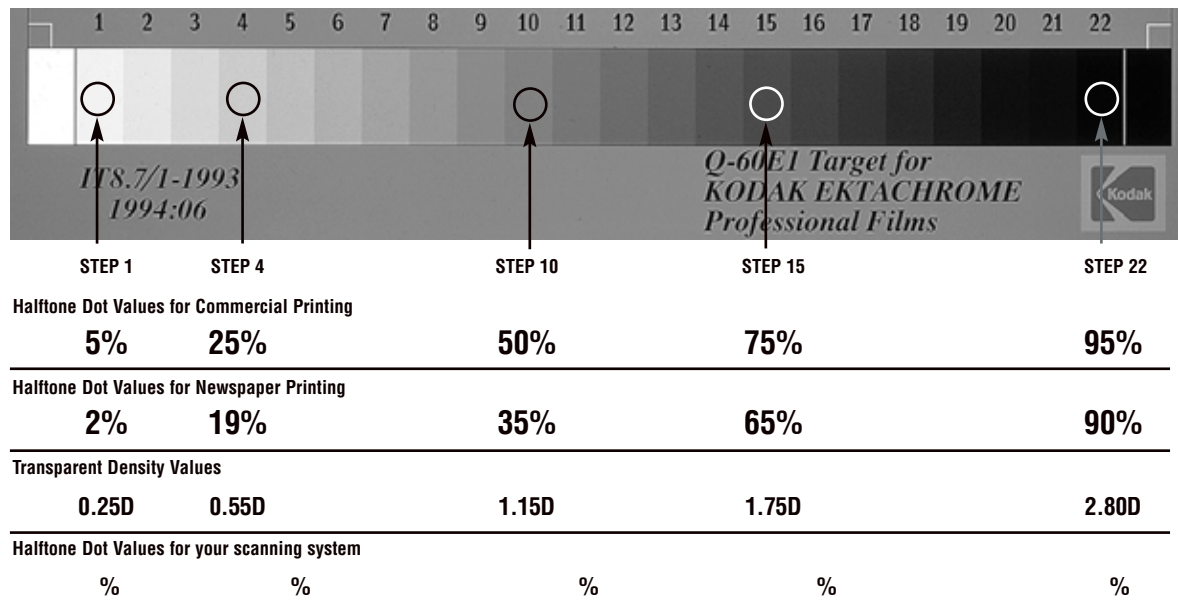
PLACES TO PURCHASE IT8 TARGETS

- **Eastman Kodak Company**
Phone: 800-234-0426
Item Q60E1 Q60 Color Target - 4" x 5" Ektachrome - Catalog # 8294738
Item Q60 R1 Color Target - 5"x 7" Ektacolor Paper - Catalog # 1907914
- **AGFA Dealers**
- **Fuji Dealers**

IT8 Reflection Target Areas & Values:



IT8 Transparency Target Areas & Values:



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COPY THIS PAGE

After you copy this page, record the Scanner Calibration Half-tone Values of your scanner in the blank areas of the chart we have provided.

USE THE SAMPLER POINTS IN THE FIRST FOUR STEPS.

To make measuring these target points easier, use the Sampler points. Typically we place them on the first four points and use the Eyedropper to measure the fifth point.

THESE VALUES ARE NOT ABSOLUTE:

1. We use a systems approach to scanner and system calibration. The half-tone target values are guidelines for optimizing a scanner. They have proven to be a good beginning point for both commercial and newspaper printing. These supplied values will change and most likely need refinement for different types of imaging conditions such as different Photoshop Preference parameters, changes in dot gain characteristics, half-tone resolution, papers, printing press types (web or sheet-fed), and customer requirements.
2. The density values that have been described will vary depending on the manufacturer of the target image and the calibration of your densitometer.

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WHEN ADJUSTING CURVES, BE AWARE!

- Do not bend the final Curve too dramatically.
- Multiple points are usually required to adjust the Curve (between 2 and 5 points are typical).
- Poorly adjusted Curves will introduce posterization. (Posterization will degrade the image reproduction.)
- Each scanner will have its own characteristics at the default settings.
- Each Curve adjustment will be different for each scanner.

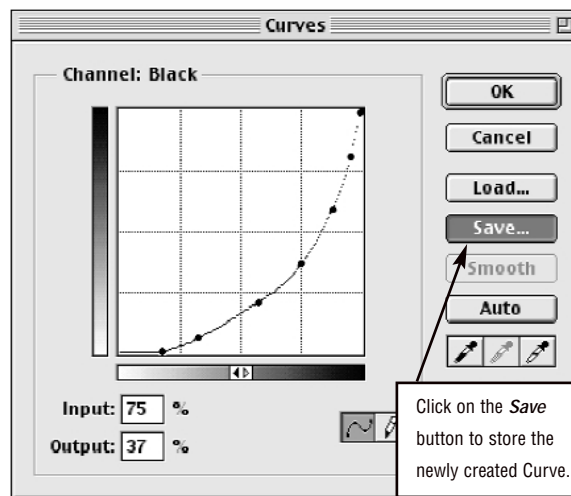
SAVE ALL OF THE CALIBRATION FILES

Create a folder and make a back up of all the files that are created in this process. Title the folder Calibration Images/Files and place it in the Photoshop Goodies folder.

In the Calibration Images/Files folder are the default scans of Reflection and Transparent IT8 Targets and the Curve parameter files that were created. Use numbers and descriptive name titles to make the Curve parameters become available at the top a list. It makes them easy to find. Here is an example:

- 1- Ref B&W Average Curve
- 2- Trans B&W Average Curve
- 3 - Ref B&W Low Key Curve
- 4- Trans B&W Average Curve
- 5 - Ref B&W High Key Curve
- 6 - Trans B&W High Curve

EXAMPLE OF A PROPERLY ADJUSTED CURVE:



This curve produces smooth transitions between tones when applied to an image.

1. Scan the image into Photoshop using the scanner's default settings.

- To save time during this process, use a low resolution setting. Work on the low resolution file and then apply the final Curve to a high resolution scan. Remember to save the image that was scanned at the default settings before doing any image processing.

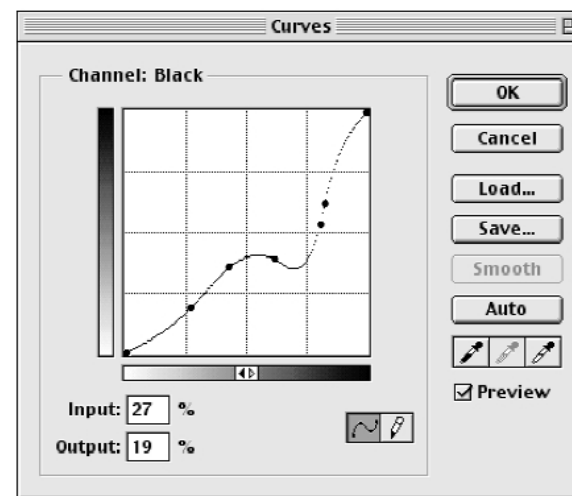
2. Use Photoshop Curves to adjust key areas on the target image.

- There are five areas on the target image to adjust. Use Curves in Photoshop (Cmd/Cntrl M). Adjust the Curve until the target values are achieved on the image that was scanned at the default settings.

This adjustment is usually done by first setting the white and black points with Curves and then dragging the midtone points on the Curve.

The Info Palette is used with the Sampler Points to verify the target values during these adjustments.

EXAMPLE OF A POORLY ADJUSTED CURVE:



This type of curve might produce the correct values on the IT8 Target, but transitions between tones are not smooth. The results of applying this kind of curve to an image will make it have a posterized or banded effect.

To fix the bumps in the curve, add points, and place the points so the curve has smooth transitions between the tones.

3. Save the parameter file of the new Curve in Photoshop.

After the Curve is adjusted to the target values at all five points, save it as a parameter file in Photoshop. Use the Save button in the Curves dialog.

4. Load the saved Curve into the scanner.

Load the saved Curve through the scanner's software. In some scanners, an import command is used.



The example above shows the results of scanning without any type of calibration. This image was scanned at the scanner's default values



The example above shows the effects of a properly prepared curve that produces smooth transitions between an image's tones and creates visually good results.



The example above shows the effects of a poorly prepared curve that produces bad transitions between an image's tones. The effect is called Posterization or banding.

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STEPS FOR OPTIMIZING A SCANNER WITH PHOTOSHOP CURVES:

1. Scan the IT8 image into Photoshop using the scanner's default settings.
2. Use Photoshop Curves to adjust 5 key points on the target image.
3. Save the parameter file of the new Curve in Photoshop.
4. Load the saved Curve through the scanner's software.
5. Verify the Curve works by scanning the target.
6. Fine tune the images contrast.
7. Scan a few average images with the new Curve.
8. Option: Use the existing scanner controls to optimize scans.
9. Finesse or enhance the final image in Photoshop.

5. Verify that the Curve works, rescanning the target.

- Scan the target image with the imported Curve to verify that the newly scanned image file will create the listed values in the five steps.

6. Fine tune images with this technique.

- Refining this technique requires making a few test Curves and outputting the scanned image to a proofing system. The proof can be digital or pre-press proof or even conventional film and printing.

7. Scan a few average images with the newly established Curve.

- Use the newly established Curve to scan average-looking images. Most likely, the images will come out not quite perfect but, probably better than at the default setting of the scanner.
- A practical approach to test the Curve is to scan a few images that represent your typical scanning needs. You will find the Curve does not work 100% in all situations because each image's lightness and darkness is different. To handle this you will have to create a few Curves, perhaps 3 to 8, that covers most of the scanning situations. Identify these Curves with easy to understand names.
- This means the halftone target values recommended in this book will have to be altered to handle different types of images.

8. Option: Use the existing scanner controls to optimize scans.

- If your scanner doesn't have features to load pre-established Photoshop Curves, there are two alternative methods.
- One is to use the scanner controls. The techniques are the same except you have to use the scanner's specific image processing features with the target image.
- The second method is to set the scanner's controls to a standard adjustment, like the defaults settings, and create a scan of the IT8 target. Then create and save the Photoshop Curve that achieves the target values. Apply the newly saved Curve(s) to each scanned image.

9. Finesse or enhance the final image in Photoshop.

- Once the image is scanned and optimized by the customized Curve, begin work, setting and fine tuning the highlight, midtones, and shadow points on each image.