Bracketing of Gamma, Contrast, and TCR

Overview

Bracketing™ provides a simple method of calibrating printer color by producing one or more pages of output that demonstrate the effects of gamma, contrast, and TCR (TrueColor-Rendering) on an image sent by the user. The user's image is printed multiple times as "thumb-nail" size images with different gamma, contrast, and TCR settings displayed with each image. If the image is an 8-bit monochrome (grayscale) image, then a single gamma-contrast bracketing page is printed. If the image has color data in it, then two pages of output are created. The first is gamma-contrast bracketing, and the second is gamma-TCR bracketing.

Assumptions

Bracketing is currently available for use with computers running FTP or LPR. Bracketing does not currently work with EtherTalk.

Description

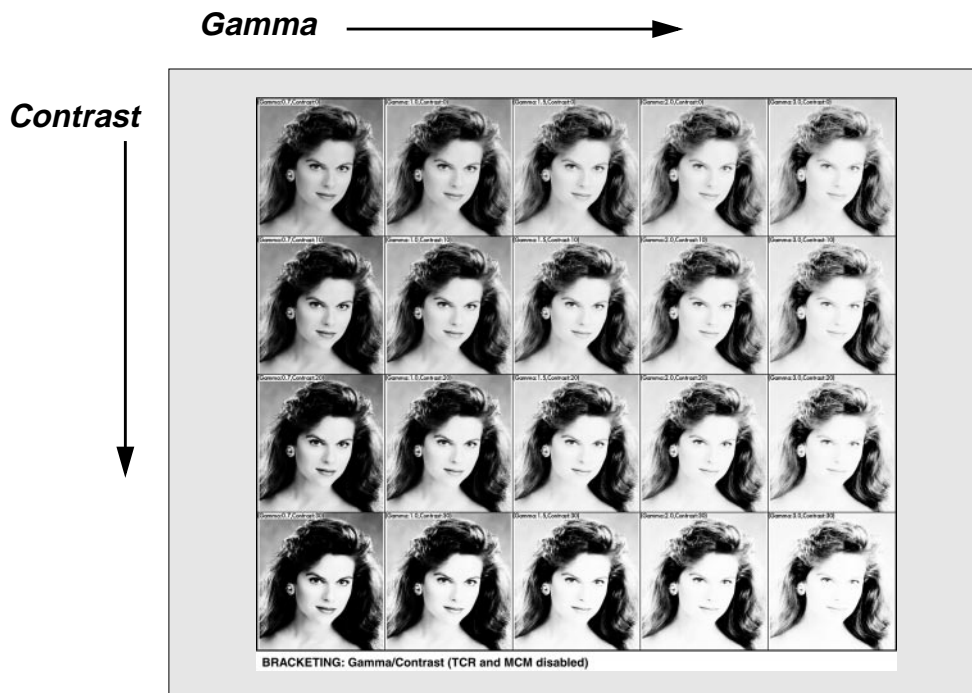Support for Bracketing is assigned to printer Logical Device 9. A file transferred to this Logical Device, using either FTP or LPR standard protocols, will cause the printer to generate a bracketed image page.
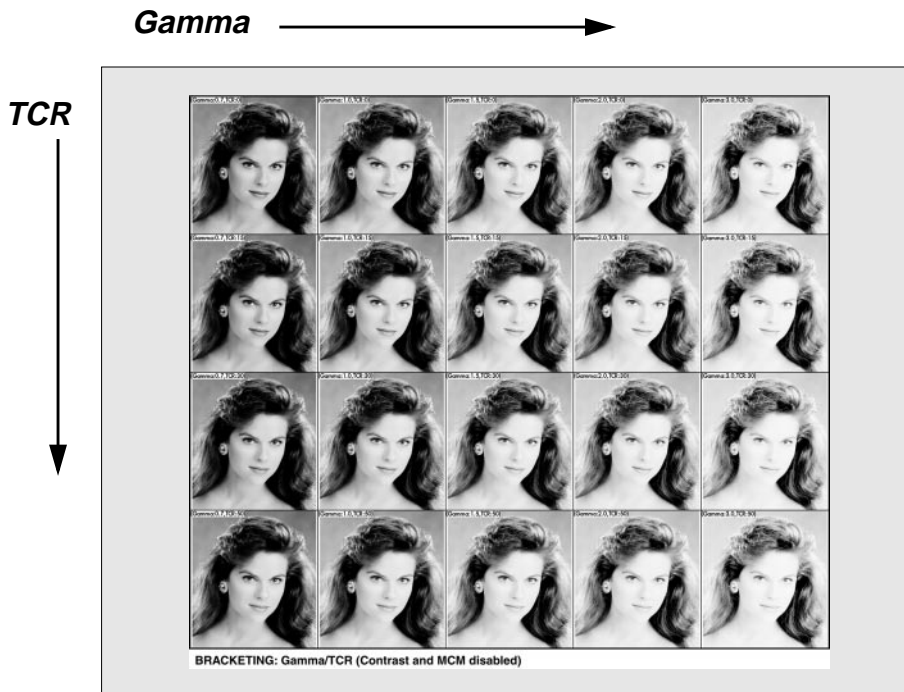
Bracketing Page Format

The output format of Bracketing is best described as a matrix printed on a page in landscape format. The matrix has five columns and four rows. The gamma value increases from right to left on both pages, and contrast and TCR increase from top to bottom on pages one and two, respectively. This is illustrated by the gamma-contrast graphic below and the gamma-TCR graphic on the next page.

Gamma and TCR Ranges

The gamma, contrast, and TCR values used in Bracketing are chosen to represent the most commonly used values. Additionally, if none of the images appear as the user wants, the user can use the matrix as a guide to determine a starting point for choosing the desired values. The values used for gamma are 1.0, 2.0, 3.0, 4.0, and 5.0. The values used for contrast are 0, 15, 30, and 50. The values used for TCR are 0, 15, 30, and 50.

BRACKETING: Gamma/Contrast (TCR and MCM disabled)

CODONICS

Gamma →

TCR ↓

BRACKETING: Gamma/TCR (Contrast and MCM disabled)

Effect of Currently Set Gamma, TCR, and MCM

It is important for the user to know how the printer handles the current image processing settings (gamma, contrast, TCR, and MCM) when making a bracketing print.

Bracketing varies two parameters at a time, such as gamma and contrast or gamma and TCR. When rendering a bracketing image, the printer ignores the current default settings of the variables being bracketed. However, the printer applies **all non-bracketed** color corrections as usual. This way, a user can turn on MCM, for instance, and see the effect this has on the gamma-contrast bracketing print, or he/she can turn on contrast and see the effect this has on the gamma-TCR bracketing print. Because of this, it is recommended that the user turn off all color corrections when making the initial bracketing prints so that it is clear what the effect of each individual correction is. Then the user can enable the non-bracketed color corrections as desired to fine-tune the output.

To help ease any confusion, the bracketing prints carry a banner at the bottom of each page that states what the bracketing print is and whether or not any of the non-bracketed color corrections is being applied.

Gamma, Contrast, and TCR Explained

Although gamma, contrast, and TCR are explained in their own Technical Briefs, an explanation here might be helpful.

Gamma is usually represented as a curve that is used to correct the intensity of each component of the color (in this case RGB). The curve correlates to a weighted factor that corrects for the eye's non-linear behavior. The printer supports gamma settings ranging from 0.1 to 10.0. Settings less than 1.0 darken the image. Settings greater than 1.0 lighten the image, and a setting of 1.0 results in no change in the image.

Contrast enhancement is used to adjust the difference between light and dark portions of images. The printer supports contrast values from -100 to 100. Negative values reduce contrast, positive values increase contrast, and a contrast setting of 0 produces no change.

TCR decreases the color saturation of an image. For instance, a bright red color is made more pink with the application of TCR due to the desaturation effect (removal of color). The printer supports TCR settings ranging from 0 to 100. A setting of 0 produces no change. A setting of 50 results in 50% desaturation, and a TCR setting of 100 results in complete desaturation, removing all color from the image and making it print as a grayscale.

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