# *Color Right Utility*

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## Hardware Calibration

The Chroma Calibrator from Sequel Imaging

# *File Menu*

The File Menu allows the user to load previously saved monitor information, save the current monitor information, and exit the application.

## NEW

NEW provides access to the Manufacturer Data files or MDMs. Clicking on NEW displays the available list of monitor files. Selecting a file and clicking OK loads the data and displays the descriptive information from the file in the status bar of the Selections Screen

## OPEN

OPEN loads a setup previosly saved in a named MDB file. Selecting a filename and clicking on OK loads the file and immediately effects the setup conditions saved in the file. The name of the currently open MDB file is shown in the title (topmost) line of the Selections Screen.

## SAVE

SAVE saves the current setup conditions in the current MDB file.

## SAVE AS

SAVE AS saves the current setup conditions in a named MDB file. This file becomes the current MDB and may be loaded at a later time through use of OPEN.

## EXIT

EXIT quits the Color Right application. If changes to the setup have been made, you are warned and given a chance to save the settings.

# *Options Menu*

## Show Current Settings

This option toggles the display of the current monitor settings. The current settings consist of combo boxes for Lighting Conditions, System Gamma, and Color Temperature. They also include the base monitor and phosphor and the description of the current MDB file.

## Show DAC Curves

This option toggles the display of the graphic card's DAC (Digital Analog Converter) curves in a separate window. The curves shown represent the Gamma selected.

The curves are displayed in the Selections Screen and the RGB Trim Screen. If the red, green, and blue curves are all the same, they are shown as black; otherwise they are displayed in their color. The dialog allows you to select display of the curves combined in one graph or to display the curves as separate graphs.

See also Preferences

## Preferences (OPTIONS Menu)

The Preferences Dialog is chosen from the OPTIONS Menu and allows you to control certain aspects of the display of Color Right information and fields.

- **Separate Gamma Curves** - displays the DAC curves as three curves in one graph or as one curve in each of three graphs.
- **AutoSave Abobe CCSD** (grayed-out) - saves the calibration data from a Chroma measurement in the Photoshop Current ColorSpace Description (CCSD) file. On startup of Photoshop, settings from the current setup will be used. Photoshop 2.5 or later is required.
- **Port** - identifies the serial port to which a Chroma calibrator is connected.

# *What Color Right Does*

As the name implies, **Color Right** provides you with the ability to properly setup the display system for best imaging results. **Color Right** provides the following control of the color display system:

- **Adjust Brightness and Contrast**
- **Set Gamma**
- **Set Color Temperature**
- **Correct for Lighting Conditions**

Individual color intensities may be controlled by using the RGB Trim screen to facilitate improvement in screen-to-print matching.

Different setups may be saved for use under different conditions.

For more exacting results, **Color Right** supports use of the Chroma Color Calibrator to measure the color parameters of the display and set the system automatically to the desired values.

See also Selections Screen
How to Use Color Right
RGB Trim Screen

# *How to Use Color Right - Quickly*

This section of HELP is designed to get you a valid monitor setup with a minimum of fuss. Click on the adjustment you would like to make and you will be linked to cookbook procedures on how to do it.

NOTE: Accurate setting of the brightness and contrast controls is critical to an optimum display.

- **Load the proper Manufacturer Data File**
- **Adjust Brightness and Contrast**
- **Set Gamma**
- **Set Color Temperature**
- **Correct for Lighting Conditions**

After setting up the display system the way you want, you may save the settings in a named file via the FILE menu/SAVE AS option. Otherwise, just click EXIT and Color Right will ask you if you want to save your changes in a default file before quitting.

See also Selections Screen

# *To Load a Manufacturer Data File*

1. Select NEW from the FILE menu
2. Select the .MDM file for your monitor. MDM files are supplied for each of two monitor phosphor types, a P22 phosphor and an EBU phosphor. Check your monitor User's Guide for the type of phosphor in your monitor. If no phosphor type is given, use the TYPE_P22.MDM, it is most common.
3. "Monitor Type", "Phosphor", and "Description" in the status bar will be updated with data from the MDM

## *To Set Brightness and Contrast*

1. Identify the brightness and contrast controls on the monitor. Insure they are correctly labelled.
2. Use the Discernability Target to adjust brightness and contrast. Turn down brightness until the rightmost dark box-within-a-box disappears. Turn it back up until the inner box is just barely visible.
3. Turn down contrast until the rightmost bright box-within-a-box becomes just visible.
4. If adjusting the controls does not produce the results in 2. and 3. above, leave the control(s) at full intensity.

## *To Set Gamma*

1. Click on the Gamma pulldown in the selections bar.
2. From the list of preset Gamma values, select the one that best fits the image you will use.
3. If you wish to use a value not presented in the pulldown, click "User Defined". A dialog box will appear and you may enter any number between .20 and 4.00. Two decimal places are accepted.

# *To Set Color Temperature*

1. Click on the Color Temperature pulldown in the selections bar.
2. From the list of preset values for Color Temperature, select the one that best matches the white of the paper you will use for output. Select "Native" for the brightest color temperature achievable by the monitor.
3. If you wish to use a value not presented in the pulldown, click "User Defined". A dialog box will appear and you may enter any integer number between 4000 and 12000.
4. If you have used RGB Trim, the Color Temperature pulldown shows the color temperature value from which the trim was made.

## *Correct for Room Lighting*

1. Click on the Lighting pulldown in the selections bar.
2. Select the room lighting description that best fits the current lighting. Choices presented are:
   - Bright: a Bright room is lit with overhead light and sunlight.
   - Light: a Light room is lit with overhead lighting only.
   - Normal: a Normal room is one which has lighting adjusted so that there is no apparent glare from overhead lighting, but there is enough light to easily read a piece of paper.
   - Subdued: a Subdued room is one which has indirect lighting and the light level in the workspace is too low to comfortably read.
   - Dark: a Dark room has no lighting other than the light generated by the monitor.

# *The Selections Screen*

The Selections Screen is the main screen of Color Right; all functions are performed or activated from this screen. The Selections Screen presents the following menus, fields, and information (starting from the top if the screen):

1. **Title line** - the top line of the screen identifies the screen as the Selections Screen. The name of the currently open MDB is displayed in this line.
2. **Menu Bar** - pulldown menus for FILE, OPTIONS, and HELP
3. **Pulldown Bar** - Color Right pulldowns for Lighting, Gamma, and Color Temperature are presented.
4. **Status Bar** - information about themonitor and the current MDM is displayed.
5. **Discernability Target** - A set of box-within-box targets is displayed for setting brightness and contrast.
6. **DAC Curves** - if selected in the Preferences section of the OPTIONS menu, small graphs of the DAC settings will be shown next to the Discernability Target and above the Next Action buttons.

In addition, there is a grouping of Next Action buttons in the right-hand, bottom corner of the screen. These buttons provide the following actions:

1. **HELP** - the context-sensitive HELP file may be accessed without crossing to the Menu Bar.
2. **Exit** - you may quit Color Right directly from the Selections Screen without crossing to the Menu Bar.
3. **Instrument Calibrate** - this button is "grayed-out" unless a Chroma calibrator is attached to one of the serial ports. This button would be used to activate instrument measurement and calibration.
4. **RGB Trim** - leaves the Selections Screen and accesses the RGB Trim Screen to enable individual adjustment of colors.

See also How to Use Color Right

# *RGB Trim*

The Trim screen is accessed from the Selections Screen via the RGB Trim button in the Next Actions group. The Trim screen provides sliders for manual adjustment of Gamma and Color Temperature.

To continue, click on either:

- **About RGB Trimming, or**
- **Using RGB Trim**

# *About RGB Trimming*

RGB Trim provides control over the display of the primary colors red, green, and blue. RGB Trim enables adjustment of these colors in five regions - black, shadow, midtone, highlight, and white. Thus, RGB Trim provides a tool for matching the display to printed output - **with the following caveats:**

1. Adjusting a color or colors via RGB Trim changes the intensity of the color or colors for the entire screen. As an example, suppose the printer output of a certain image produces a purple sky when the monitor displays the sky as blue. Editing the image via an imaging program such as PhotoshopTM or PhotostylerTM, is very difficult since the image on the screen is not the one produced by the printer. This screen-to-print mismatch is easily corrected via RGB Trim.

   Changing the display to make the blue sky match the purple produced by the printer is achieved by decreasing blue and/or increasing red in the midtone and/or highlight via RGB Trim. The sky on the display screen will now match the purple of the printed output.

   Blue and red in the midtone and highlight, however, are now changed across the entire screen. Thus, blue water, blue eyes, and blue clothing will also appear more red and less blue. These may match the printed output or it may not. The effects on areas other those matched are unpredictable.

2. Changing the display to match the output does not make any color changes in the data. When the image is printed again, it will look identical to the time before - **RGB TRIM EFFECTS CHANGES TO THE SCREEN DISPLAY ONLY.** But this is exactly the purpose of RGB Trim - to take the output from the imaging program and make the screen look like the print. With the display and the print images similar in color tones, changes to the image via an imaging program will result in similar changes in the output.

3. The best application of RGB Trim is for matching gray tones from the output to the display. This is called "tonal balancing". Since gray is a blend of equal parts of red, green, and blue, matching the gray levels of the screen to equivalent gray levels from the printer will result in the best balance of the display/print loop. In order to balance gray levels, see Using RGB Trim.

Thus, RGB Trim is powerful tool when used to correct for tonal imbalances. Other uses are possible but effects on output must be determined by the user for the specific instance.

# *Using RGB Trim*

The five color trim sliders provide adjustment for Red, Green, or Blue in each of the following five regions of the image:

**Black**
**Shadow**
**Midtone**
**Highlight**
**White**

Moving the slider changes the shape of the curve in the DAC for that color. The change is shown in the DAC curves at the top of the slider box. Moving the slider up intensifies the color and moving it down reduces the color.

Any changes made in the screen appearance by RGB Trim are made to the screen display only - NO LINK OF COLOR CHANGES TO OUTPUT OR IMAGE DATA IS MADE.

A slider for matching overall screen Gamma to the printed image is also provided in RGB Trim. All slider settings are saved via the SAVE/SAVE AS function in the FILE menu.

To access RGB Trim, click on the RGB TRIM button from the Selections Screen. To adjust the screen to match your own image, do the following:

1. Launch your imaging program. If you are in Color Right, press ALT-TAB to get to Program Manager, then launch your program
2. Once in your imaging application, open the image you wish to match.
3. Print the image using your imaging program
4. Use ALT-TAB to return to Color Right, or launch Color Right from Program Manager.
5. Access the RGB Trim screen. The imaging program should be displayed with the image just printed.
6. Hold the printed output next to the screen. Select one color to trim by clicking on the appropriate button R, G, or B.
7. Adjust the sliders in the Black, Shadow, Midtone, Highlight, or White regions as necessary. Since most displayed colors are combinations of red, green, and blue, you may have to make many attempts at mixing before a close enough match is achieved.
8. RESET resets the sliders to the settings on entry to RGB Trim. DEFAULT sets the sliders to a "linear" mode. CANCEL executes RESET, then exits RGB Trim
9. When a match is achieved, press OK. RGB Trim exits back to the Selections Screen. You may now use all the facilities of the Selections screen to save or exit. The Color Temperature pulldown window displays "5000*K - TRIM" , for instance, if 5000*K were the starting color temperature prior to trimming.
10. Setting color temperature from the Selections screen after moving sliders in RGB Trim overrides the RGB Trim results. This results in a reset of the DACs and setting to the new color temperature preset.

## *About Gamma*

GAMMA is the value in an equation defining the contrast to be applied to the display screen. For a value of 1.0, the contrast curve is flat and applies no emphasis to the screen. For values greater than 1.0, however, the curve has a positive slope and screen contrast is increased. Values below 1.0 demphasize contrast.

# *About Brightness and Contrast*

Proper adjustment of brightness and contrast is critical to the accuracy of the color display. Brightness affects the detail in the dark regions (black and shadow) while contrast affects display of detail in the near-white. Color Right provides visual t

# *About Color Temperature*

Color Temperature is a value describing the color of white produced by the monitor; it is stated in degrees Kelvin (*K). Low color temperatures, like 4100*K, are very dim and magenta, while high color temperatures, like 9300*K, are very bright and blue.

The eye best perceives color matches when color temperatures are close. Thus, set the color temperature of your screen so that the white of the display is close to the white of your printer paper. Most users work at settings of 5000*K or 6500*K.

## *About Native Color Temperature*

The Native color temperature of the monitor is the value achieved with full intensity applied to Red, Green, and Blue. Color Right reads this value from the .MDM file.

## *About Room Lighting*

Room lighting greatly affects the ability to perceive color on the display. Incorrect room lighting also contributes to eye strain. Thus, it is important that the screen be properly adjusted to correct for the ambient lighting conditons of the room.

# *About *.MDM Files*

MDM files supply information to Color Right about the monitor and its phosphors. Descriptive information from the currently active MDM file includes Monitor Name, Phosphor type, and Description of monitor and is displayed in the status bar on the Select

# *About Saving Setups*

The data describing the current state of Color Right selections is saved in a file with a ".MDB" extension. A default MDB is shipped with the system for startup. The currently open MDB is updated and saved automatically on selecting YES after EXIT or fr

# *About DACs*

Digital-to-analog converters (DACs) are part of your graphics card electronics. The color data stored in your imaging file as 8-bit-per-color digital data is converted to analog voltage levels by the DAC.

Associated with the DAC is a 256-entry table (8-bits). The 8-bit color value is first looked-up in this table and the value found is used as the output to the corresponding color gun of the monitor. The data in the look-up table is the curve shown in the "DAC Curve" presentation on all screens of Imaging Setup. Varying the curve changes the Gamma (contrast ratio) of the display.

# *About the Discernability Target*

The Discernability Target is used to judge and set the dynamic range of the monitor via the brightness and contrast controls.

There are four box-within-box patches in the target. The difference in brightness between the inside box and the outside box of any patch will be just barely noticeable when brightness and contrast are optimally adjusted. This target effectively allows you to see the entire dynamic range (darkest discernible black to brightest visible white) of your monitor.

# *About RGB Trim*

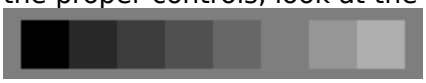
RGB Trim is a function available from the Selections Screen via a radio button. RGB Trim presents sliders for the individual setting of red, green, and/or blue intensities.

RGB Trim should be used to match the screen to imbalances in the grays of the output. In applications like word processing or spreadsheets, RGB Trim may be used to achieve a more pleasant presentation of colors.

RGB Trim should be usd with caution, however, since it has unpredictable effects on the color temperature set in the Selections Screen.

# *Identifying the Brightness and Contrast Controls*

Monitor manufacturers sometimes mislabel the Contrast and Brightness controls. To identify the proper controls, look at the Gray Ramp target below and do the following:



1. Adjust both controls to their maximum settings.
2. One at a time, turn down each control while observing the darkest sections of the Gray Ramp Target. Reducing brightness will make the dark sections indistinguishable while reducing contrast will not.
3. Check the controls and mark them accordingly.

# *The Chroma Calibrator*

The Chroma calibrator is a small device that is used to measure the color characteristics of your monitor. Based on these measurements, accurate calibration of the display is performed.

If you are doing serious imaging work but doing display calibration visually, you are working with only an approximation of true color.

To achieve the accurate color your display is capable of, call Sequel Imaging at **603-425-2170** to find out about Chroma, the only monitor calibration instrument with 24-bit resolution available to the Windows user.