

# MonacoEZcolor User Guide



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# Congratulations

Congratulations on your purchase of MonacoEZcolor—an application for producing custom ICC (International Color Consortium) profiles for monitors, scanners, digital cameras, and printers.

MonacoEZcolor is an entry level program for users who work with photographic images on a desktop computer and desire to color manage their workflow.

This guide assumes you are familiar with the hardware and software functions of all your devices. It takes into consideration that you may be new to color management.

## **MonacoEZcolor Package Components**

Your MonacoEZcolor package includes the following:

- MonacoEZcolor CD
- MonacoEZcolor User Guide
- IT8 Reflective 5x7 target
- Registration card

## Product Registration and Support

So that we can provide you with technical support and keep you updated with the latest product information, be sure to complete registration on-line or return the enclosed registration card.

For more information on support options, the latest software updates, and other helpful information, visit Monaco Systems at [www.monacosys.com](http://www.monacosys.com).

## Using the Documentation

This guide contains information on the installation and use of MonacoEZcolor software. It provides general instructions for using your monitor, scanner, digital camera, and printer to create profiles, and explains the basics of editing printer profiles.

<i>Read...</i>	<i>To learn about...</i>
<b>Preface</b>	package components, product registration and support, and using the documentation
<b>Chapter 1</b>	system requirements installation
<b>Chapter 2</b>	quick start to using the software
<b>Chapter 3</b>	understanding color management
<b>Chapters 4-6</b>	building monitor profiles
<b>Chapter 7</b>	building scanner profiles
<b>Chapter 8</b>	building digital camera profiles
<b>Chapter 9</b>	building printer profiles
<b>Chapter 10</b>	editing printer profiles
<b>Chapter 11</b>	using profiles
<b>Online Help</b>	using the software

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# I Installation

This chapter provides a list of minimum system requirements and installation instructions.

## Minimum System Requirements

### Macintosh

Power PC® Processor or Intel  
Mac OS X version 10.3 (Panther), 10.4 (Tiger)  
-128 MB of available RAM  
-64 MB of hard-disk space  
24-bit display  
USB port

### Windows

Pentium® PC or faster processor  
Microsoft® Windows 2000, XP Pro (32 bit), Vista (32 bit)  
-128 MB of available RAM  
-50 MB of available hard-disk space  
24-bit display card with LUT support\*  
USB port

\* Some Windows video cards do not allow system level support of color management.

If calibrating multiple displays attached to a single CPU, a separate video card is required for each display.

## Software Installation

For the most up-to-date installation instructions, refer to the *Release Notes* on the CD.

## Colorimeter Installation

To install the optional MonacoOPTIX<sup>XR</sup> colorimeter:

1. Shut down the system.

Connect the colorimeter to any available USB port. If your computer has one USB port, and it is being used, connect the colorimeter using a powered USB hub (not included).

2. Restart the system and launch your Monaco Systems software. The application automatically detects the colorimeter.

## 2 Quick Start

This quick start is intended for the experienced user. If you are new to color management, start with *Chapter 3: Understanding Color Management*.

MonacoEZcolor is an application that creates device profiles for monitors, scanners, digital cameras, and printers. Using the application is a simple matter of choosing the devices you wish to profile and following the onscreen instructions.

We know you're anxious to get started, but spend a few moments reading the requirements outlined in this quick start section and the process will be smoother.

### **What You Need To Get Started**

MonacoEZcolor won't run off the CD; you need to install it. Insert the CD into your disc drive, double-click on the installer and follow the prompts.

Make sure all of your devices are properly connected and working. Set your monitor to 24 or 32-bit (True Color or Millions of Colors). If you've purchased the optional MonacoOPTIX colorimeter, be sure it is connected.

Scan and print some images. You should be comfortable with the software options and operation of both your scanner and printer. If you are profiling a digital camera, you should have a working knowledge of creating and using digital images. Digital camera workflows vary depending on your device. It is beyond the scope of this guide to provide instructions for using a digital camera.

If you are profiling a reflective scanner, digital camera, or printer, have the supplied IT8 target ready. If you are profiling a transparency scanner, obtain the appropriate transparency IT8 target before beginning.

## Quick Start to Using MonacoEZcolor

Launch the application. When the main application window appears, select the device you wish to profile and follow the displayed prompts.

### Create Monitor Profile



This option creates an LCD or CRT monitor profile based on certain information you supply. You should be familiar with adjusting your display's brightness, contrast, and white point controls. When you have supplied the required information, the software will automatically generate a monitor profile.

### Create Input Profile



This option creates a profile for a reflective scanner, transparency scanner, or digital camera.

MonacoEZcolor will prompt you to supply information and perform a series of tasks using your device and the appropriate IT8 target. If you are creating a profile for a transparency scanner, contact Monaco Systems to purchase a transparency target.

If available, be sure your scanner's Twain driver is installed. You should also be familiar with specifying resolution settings using your scanner software. If you are creating a digital camera profile, you should have a working knowledge of using your camera in a studio setting under controlled lighting.

When you have completed the required tasks, the software will automatically generate the appropriate profile.

## Create Printer Profile



This option uses a reflective scanner as the measurement device in the printer profiling process, and results in both a scanner profile and a printer profile.

### Creating a printer profile requires:

- using a reflective IT8 target to profile your scanner
- using your profiled scanner as a measurement device to accurately read your printer's output
- pre-installing your scanner's Twain driver
- familiarity with setting the resolution option using your scanner software
- familiarity with setting the print dialog box options for your printer
- loading the paper stock into the printer you are profiling (Printer profiles are created for specific paper stocks and output resolution settings. This means you create a different profile for each combination of paper and printer resolution you use.)

MonacoEZcolor will prompt you to supply device information and perform a series of tasks with your scanner and printer. Because building a printer profile requires generating a scanner profile and involves greater computation, the processing time will be longer than building either a monitor or a scanner profile alone. When you have completed the required tasks, you will have the option of saving both a scanner and a printer profile.

## Edit Printer Profile



This option allows you to edit any RGB or CMYK printer profile. Printer profiles are edited to create a better monitor-to-print match, original-to-print match, or to shift color balance or tonal values towards a desired result.



## 3 Understanding Color Management

Color-managing the desktop environment has come a long way in the past few years. However, it can still seem daunting to the new user. This chapter presents a simplified overview of color management and how it works to produce consistent color when you scan, view, and print images.

This discussion is intended for the beginner user. If you are an experienced user, feel free to skip this chapter and jump right into using the software.

Discussions of color management typically include technical topics such as spectral data, color space models, color matching modules, device calibration and characterization, colorimeters, and spectrophotometers. However, our purpose here is not to explain the complex technology behind color management, but rather to simplify the process into something that is readily understandable. We understand the typical user is not interested in what's happening "under the hood," they just want their color to match.

## What is a Color Management System?

A color management system is a system of hardware and software products that ensure accurate color reproduction across all the devices that you use.

The hardware components are obvious—your monitor, scanner, printer, and some optional measurement devices. The software components are not as obvious—*device profiles* (descriptions of how a specific device reproduces color), applications used to create profiles (MonacoEZcolor), and applications that use profiles (Adobe Photoshop, ColorWorks, MonacoCOLOR, etc.).

## How Does Color Management Work?

*RGB (red, green, and blue) and CMYK (cyan, magenta, yellow and black) refer to the color models used to describe color.*

*The RGB model is based on the additive properties of red, green, and blue light. The CMYK model is based on the subtractive properties of the four inks used in the printing process.*

Each device in your workflow reproduces color differently. Scanners, monitors, and printers use different color spaces. Most scanners and monitors are RGB devices—or use RGB color spaces—while output devices can be RGB or CMYK devices. To further complicate matters, some devices within the same family are able to reproduce a wider gamut of color than their peers. If you aren't familiar with some of these terms, don't worry. What's important is that you understand that similar devices differ in their ability to reproduce color accurately.

Color Management Systems (CMS) were developed to compensate for the variability in the way devices reproduce color. The main software components in a CMS are the device profiles and a Color Management Module (CMM).

Device profiles are software modules that provide a description of each device's color gamut—or range of reproducible color. The CMM is a software module that acts as a central interpreter between the color gamuts of the different devices. The color gamut for each device is stored in the corresponding profile. The CMM compares them and makes the necessary adjustments to ensure color is interpreted accurately across all devices in your workflow. The result is an accurate translation from one device to the next, giving you consistent, predictable color.

## Using Device Profiles

A complete color management system consists of:

- devices (monitor, scanner, digital camera, printer)
- device profiles (a description of each device's ability to reproduce color) and a CMM (software that uses profiles)
- software to create device profiles (MonacoEZcolor)
- software to apply device profiles (ColorWorks, Photoshop)

MonacoEZcolor is software that is used to create device profiles. It is not a color management system, and it does not apply profiles. Monaco ColorWorks is an example of software that can be used to apply profiles. It contains (or can access) the CMM that translates the color data between devices.

You *create* your device profiles using MonacoEZcolor and *apply* the profiles using a color-managed application.

Each color-managed application has its own method for applying or using profiles. For more information, refer to the documentation that came with the color-managed applications you use.

### **Adobe Photoshop LE/Elements Users:**

Adobe Photoshop versions 5.0 and greater support color management. Adobe Photoshop Limited Edition and Adobe Photoshop Elements do not support color management. If you are using Adobe Photoshop LE or Elements and desire to implement color management, you must upgrade to the full version of Photoshop or use another color-managed application such as Monaco ColorWorks.

## Creating Profiles Using MonacoEZcolor

This section provides an overview of creating monitor, scanner, digital camera, and printer profiles using MonacoEZcolor software.

Reading this section is not a prerequisite for using the software. It is included for those users who desire a greater understanding of the profiling process.

### Profiling a Monitor

Profiling a monitor is the process of calibrating your monitor, and describing or characterizing its ability to display color accurately. With MonacoEZcolor, this can be done in two ways: visually, using the software alone; or automatically, using the software and the optional MonacoOPTIX<sup>XR</sup> colorimeter.

Profiling using the visual method is a simple matter of entering information for your monitor type, adjusting the monitor's brightness and contrast controls, and using onscreen sliders to adjust the monitor's RGB guns. Once these tasks are completed, MonacoEZcolor automatically builds a profile. The profile can then be applied using a color-managed application, such as Adobe Photoshop, to adjust the monitor's display of color.

The optional MonacoOPTIX<sup>XR</sup> colorimeter performs most of the same tasks automatically. However, because using a colorimeter does not rely on your subjective visual judgement, the results are always more accurate. For this reason, we highly recommend purchasing the optional MonacoOPTIX<sup>XR</sup> colorimeter. For more information, or to order a MonacoOPTIX<sup>XR</sup>, visit [www.monacosys.com](http://www.monacosys.com).

## Profiling a Scanner

Profiling a scanner is the process of describing or characterizing your scanner's ability to scan color accurately. This is done by scanning an industry-standard IT8 target and using MonacoEZcolor to measure and compare the target's scanned color values to known color values for the target. The known color values are contained in a Reference file, which is supplied with the target.

MonacoEZcolor creates a profile by computing the difference between the measured values and the known reference values and saving the results. The final result, known as a scanner or input profile, is used in color-managed applications, such as Adobe Photoshop, to adjust the color captured by the scanner.

## Profiling a Digital Camera

Profiling a digital camera is the process of describing or characterizing your camera's ability to capture color accurately under controlled lighting conditions in a studio setting.

Digital camera profiles are created by shooting the IT8 target as part of a studio configured photo session. Using controlled lighting during the photo session is critical to the profiling process. The final scene is shot with and without the IT8 target. When the IT8 target is included, it is placed in a central location within the scene. Once captured, the digital photo that includes the IT8 target is opened into a graphics application, such as Photoshop, cropped to the edges of the IT8 target and saved as a TIFF. The cropped TIFF is then imported into MonacoEZcolor and treated as a scanned TIFF. The remainder of the process is identical to creating a scanner profile.

A single digital camera profile can be used for all photos shot during a single studio session, as long as the light source remains consistent.

## Profiling a Printer

Profiling a printer is the process of describing or characterizing your printer's ability to reproduce color accurately.

When you profile your printer, you are actually creating a description of how your printer will reproduce color using a particular output resolution, ink, and paper stock. Consequently, if you use more than one output resolution, ink, and paper stock, you will need to create additional profiles for each combination you use. In turn, when you print from a color-managed application—such as Adobe Photoshop—you will need to load the profile that matches the resolution and paper stock you are using.

To create a printer profile, a set of color patches is first printed. The value of each color patch is then measured using a reflective scanner as the measurement device. To do this, the printed set of color patches is scanned along with the supplied IT8 target. This accomplishes two tasks: scanning the IT8 target profiles the scanner, ensuring it performs accurately as a measurement device, and scanning the printed patches records the color data to be measured. The software then analyzes the measured printer patch values and creates a printer profile.

In actual practice, the reflective scanner and printer may be profiled—or characterized—during the same profiling session using the Create Printer Profile option.

## How Many Profiles Will I Need?

The answer to this question depends on the number of devices you use and the variables associated with each one.

In general, each device you use requires a profile. However, some devices may require several profiles.

For example, a scanner used to scan reflective copy requires a different profile than the same scanner using a transparency attachment to scan transparencies. Your printer requires a different profile for each output resolution/paper/ink/stock combination you use. A printer using high-quality glossy paper at 1400 dpi resolution uses a different profile than the same printer using inkjet paper and a resolution of 360 dpi. Profiles also require periodic replacement in the course of device maintenance.

Use the following as a general guide to determine when a new or replacement profile is needed.

Create a new profile for your scanner whenever:

- the scanner lamp is changed
- you use a new or replacement IT8 target
- you change IT8 targets (reflective vs. transparency)
- you notice inconsistent results
- you change scanner settings (gamma, brightness, contrast)

Create a new profile for your digital camera whenever:

- the lighting configuration in the studio has changed

Create a new profile for your monitor whenever:

- the brightness or contrast controls have been adjusted
- the hardware white point has been adjusted
- the viewing environment has changed

Create a new profile for your output device whenever:

- the device has been serviced
- you change inks or paper stock
- you change output resolution or settings



## 4 Creating CRT Profiles Using a Colorimeter

This chapter provides an overview of using MonacoEZcolor software along with a supported measurement device to create profiles for CRT (cathode ray tube) displays.

There are two methods of profiling a CRT display—visually, using your visual judgement and the software—or instrumentally, using a Monaco Systems colorimeter and the software. Using a colorimeter is optional, but results in a more accurate profile.

If you didn't purchase the optional MonacoOPTIX<sup>XR</sup> colorimeter, follow the procedure in “Chapter 6: Creating a Profile Using the Software” to create your profile. Or to order a MonacoOPTIX<sup>XR</sup> colorimeter, visit [www.monacosys.com](http://www.monacosys.com).

If you are profiling an LCD (flat panel or laptop) device, see “Chapter 5: Creating LCD Profiles Using a Colorimeter”.

You'll need the following to get started:

- MonacoEZcolor software
- a supported colorimeter
  - MonacoOPTIX<sup>XR</sup>
  - MonacoOPTIX
  - MonacoSENSOR

## CRT Profile Basics

CRT monitor profiles are created by using a measurement device to measure a series of color patches that are sent to the display by the software. The collected data is analyzed and used, along with other monitor attributes (gamma and white point), to calibrate and profile your monitor.

With MonacoEZcolor software, you can choose to create a profile using a full **Calibrate & Profile** procedure, or if you are confident the current calibration is good, you can choose an abbreviated **Profile Only** workflow.

Once a monitor is profiled, there are a few points to keep in mind.

- Monitor profiles are not interchangeable; they are monitor specific. You cannot use a profile created for one monitor with a different monitor.
- Profiles are based on phosphor measurements and certain information you supply about your monitor—white point, gamma, brightness, and contrast settings. If you adjust a monitor's brightness, contrast, and color controls after it has been profiled, the profile will no longer be accurate.
- Be aware of your environment.

The appearance of a displayed image is strongly influenced by the ambient lighting in the room. Any increase in ambient light decreases the effective monitor gamut. Profiles should be used under the same lighting conditions that were used when the profile was created.

Avoid using bright lights or intensely colored objects near your workstation. These variables can change your perception of color.

## Before you begin

Before you begin profiling your monitor, do the following.

1. Turn your monitor on, and allow it to stabilize by letting it warm up for at least one hour prior to calibrating your display. This will increase the accuracy of color readings.
2. Become familiar with your monitor's brightness, contrast, white point, and RGB color controls.
3. Set the monitor bit depth to maximum resolution, and set your desktop pattern to a light gray or as close to neutral as possible.
4. Connect your colorimeter and be sure the proper drivers are installed.
5. Set your room lighting to the level you typically use when evaluating images. Avoid bright lights; they may affect the profiling process. If you are creating a profile to use when evaluating images for press, turn the room lighting off with the exception of your viewing booth. In this manner you replicate the conditions used to evaluate proofs.
6. Clean the surface of your display following the manufacturers recommended procedures. Dust and fingerprints can foul readings. **DO NOT** use household glass cleaners. They can damage the display surface.
7. If applicable, clean the suction cup(s) on the colorimeter using a damp lint-free cloth. Dust on a cup can cause the colorimeter to lose suction during the measurement process.
8. Do not use other calibration or gamma correction software with MonacoEZcolor software, or functionality may be impaired. Remove any other monitor calibration or gamma correction software from your system.
  - Macintosh: If using a version of Adobe Photoshop that includes the Adobe Gamma Control Panel, disable it.
  - Windows: If you are using Adobe Photoshop, uninstall the Adobe Gamma Loader, from your system. **Do not remove the Adobe Gamma Control Panel.**

## Step 1: Launch MonacoEZcolor

1. Launch MonacoEZcolor software.

The *Welcome to MonacoEZcolor* window appears.



2. Click **Create Monitor Profile**. The *Before You Begin* window appears (not shown).
3. The *Before You Begin* window outlines some of the previously discussed prerequisites for creating a valid monitor profile. If you have not already completed these, do so now.

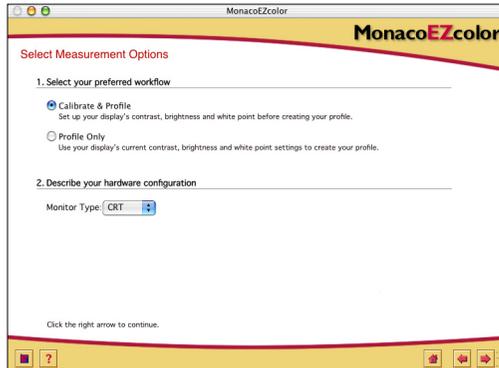
If your workstation has dual monitors, drag the application window onto the monitor to be profiled. The application must remain on this monitor throughout the profiling process

4. Click the next (>) arrow to continue.

The *Select Measurement Options* window appears.

## Step 2: Select Measurement Options

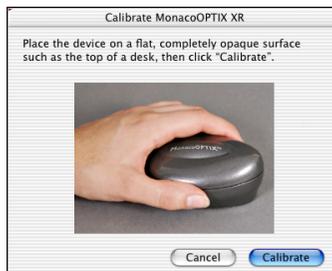
The *Select Measurement Options* window prompts you to define your workflow and monitor type.



1. Select a workflow:
  - To perform a complete calibration and profiling procedure, select the **Calibrate & Profile** radio button.
  - To create a profile using the current calibration, select the **Profile Only** radio button.
2. Select **CRT** from the **Monitor Type** list.
3. Click the next (>) arrow to continue.

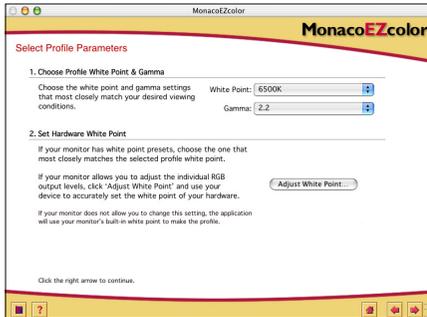
The application verifies the connection with your measurement device. You may be presented with device configuration or calibration windows. If this occurs, follow the screen prompts to calibrate your device.

Sample device calibration window ►

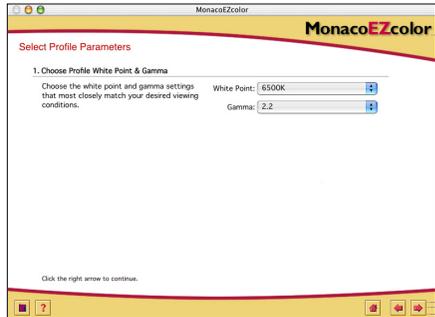


## Step 3: Select Profile Parameters

Before you can use MonacoEZcolor software to build your profile, you must input the target white point and gamma settings for the profile. The *Select Profile Parameters* window prompts you for this information. Options available in the



▲ **Calibrate & Profile** workflow



▲ **Profile Only** workflow

*Select Profile Parameters* window are dependent on the workflow selected in the previous step.

1. Identify a *target* white point for your profile by making a selection from the **White Point** list:
  - Select the white point preset with the correlated color temperature that matches or is closest to the temperature of your viewing environment:
 

5000 K	7500 K
5500 K	9300 K
6500 K	
  - Select **Monitor Native** to have the software determine the white point during the profiling process. This setting is used for monitors that have factory preset white points or for users who have already set the hardware white point and do not want to change it.
  - Select **Custom...** and enter the correlated color temperature (K) or the xy chromaticity coordinates of your target white point.

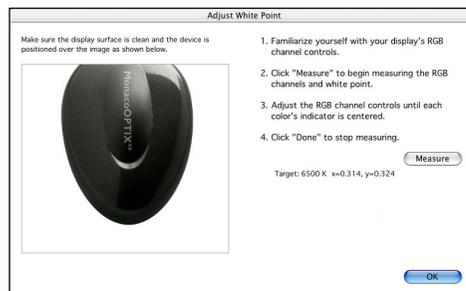
- Select **Measure Ambient Light...** and follow the prompts to measure the white point of your viewing conditions. For best results, point the measurement device towards a white sheet of paper which reflects the ambient light, and never directly at a light source or bulb.
2. Choose a gamma setting from the **Gamma** list.  
The available settings are 1.8 and 2.2.
  3. Set the hardware white point. (Calibrate & Profile workflow)

If your monitor's white point is not selectable, skip this prompt and MonacoEZcolor software will use your monitor's built-in white point.

If your monitor's white point is adjustable, use the controls on the front of your monitor or in the software associated with your monitor to set your monitor's white point to match the target *profile white point* selected above. If the target white point is not an available preset, select the closest match.

Optionally, if your monitor has adjustable RGB controls, you can use the software to maximize the monitor's dynamic range by using measurement results to set the RGB levels. RGB levels set using measured results are more precise than the factory presets and result in more accurate profiles.

To set the monitor white point using measured results, click **Adjust White Point...** and follow the prompts.



4. When you've obtained the target white point, click the next (>) arrow to continue.

If you are performing the **Profile Only** procedure, skip steps 4 through 6 in this guide, and continue with step 7. The software will automatically advance to the appropriate screen (*Measure Color Patches*).

## About White Point

The white point setting used by your monitor determines the color of your monitor's white. This displayed white can range from warm (yellow-red) to cool (blue) white. A color temperature of 5000 K appears yellowish, and a color temperature of 9300 K appears bluish.

When selecting a white point, your objective is to choose the setting that is closest in color temperature to the white point of the lighting in your room or viewing environment. If you are a designer and view images and proofs using a viewing booth, choose the white point that matches the temperature of the lights used in the viewing booth. Standard viewing booths use 5000 K to 6500 K illuminants.

Once you've determined the white point in your viewing environment, you can set the monitor's white point to match. (Note that not all monitors have a white point adjustment.)

A white point of 5000 K or 6500 K is typically used in most settings. There are varying intensities of simulated daylight.

Source	Degrees K
<b>Artificial Light</b>	
Match Flame	1700
Candle Flame	1850
40-Watt Incandescent Tungsten Lamp	2650
75-Watt Incandescent Tungsten Lamp	2820
100-Watt Incandescent Tungsten Lamp	2865
200-Watt Incandescent Tungsten Lamp	2960
500-Watt Incandescent Tungsten Lamp	2980

Source	Degrees K
1000-Watt Incandescent Tungsten Lamp	2990
3200-Degree Kelvin Tungsten Lamp	3200
"C.P."(Color Photography) Studio Tungsten Lamp	3350
Photo Flood or Reflector Flood Lamp	3400
Daylight Blue Photo Flood Lamp	4800
White Flame Carbon Arc Lamp	5000
Xenon Arc Lamp	6420
<b>Daylight</b>	
Sunlight: Sunrise or Sunset	2000
Sunlight: One Hour After Sunrise	3500
Sunlight: Early Morning	4300
Sunlight: Late Afternoon	4300
Average Summer Sunlight at Noon (Washington DC)	5400
Direct Mid-summer Sunlight	5800
Overcast Sky	6000
Average Summer Sunlight (plus blue skylight)	6500
Light Summer Shade	7100
Average Summer Shade	8000
Summer Skylight (will vary from)	9500 to 30000

Reference: Kodak Motion Picture Imaging, "Approximate Correlated Color Temperature for Various Light Sources" <http://www.kodak.com/country/US/en/motion/support/h2/temp.shtml>

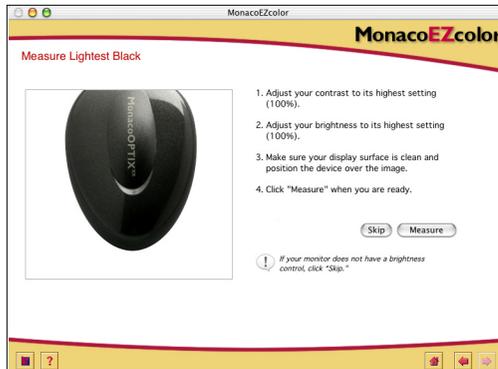
## Step 4: Measure Lightest Black

In this step, MonacoEZcolor software uses measurement results to determine the lightest black your monitor can display.

1. Set the contrast control to the maximum (100%) setting.
2. Set the brightness control to the maximum (100%) setting.

Accurately measuring your monitor's lightest black requires adjusting your monitor's brightness. If your monitor does not have a brightness control, click **Skip**, skip steps 5 and 6 in this guide, and continue with *step 7*. The software will automatically advance to the appropriate screen (*Measure Color Patches*).

3. Using the appropriate attachment and method for your measurement device, place the device over the image displayed on the screen.



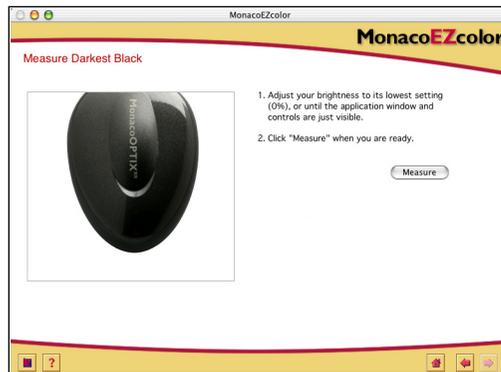
4. Click **Measure** to start the measurement process. When measurements are complete, a check mark appears.
5. Click the next (>) arrow to continue.

## Step 5: Measure Darkest Black

In this step, MonacoEZcolor software uses measurement results to determine the darkest black your monitor can display.

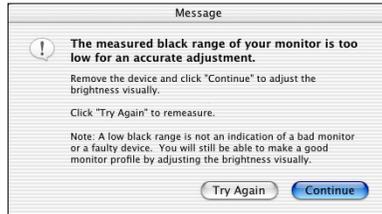
1. Set Brightness.

Using your monitor's brightness control, set the brightness to the minimum (0%) setting. The contrast setting should remain at 100%.



2. With the measurement device still in position, click **Measure**.
3. When measurements are complete, a check mark appears. Click the next (>) arrow to continue.

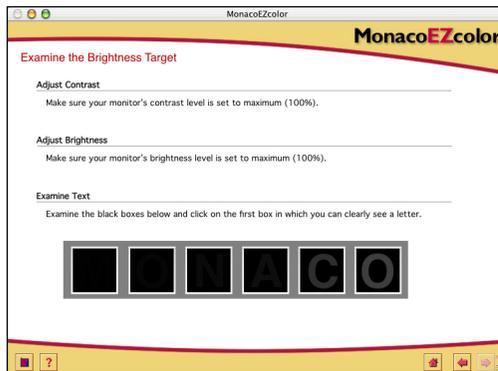
If the software determined that the black range of your monitor is too low for accurate adjustment, the following message appears:



Should this occur, remove the measurement device, click **Continue**, and follow the prompts to create a profile using the alternative visual method.

### Examine the Brightness Target

The *Examine the Brightness Target* window begins the process of visually determining the darkest black. This window appears only if the software was unable to determine the darkest black using measured readings. (This is often the case with inexpensive monitors.)



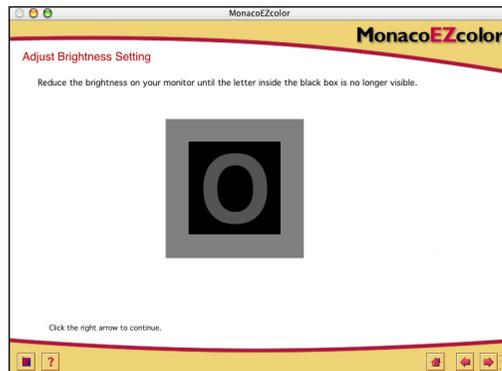
1. Set your monitor's contrast control to its maximum (100%) setting.

2. Set your monitor's brightness control to its maximum (100%) setting.
3. Examine the row of black squares and click on the first box in which you can clearly see a letter.



4. Click the next (>) arrow to continue.

The *Adjust Brightness Setting* window appears, displaying the selected letter.

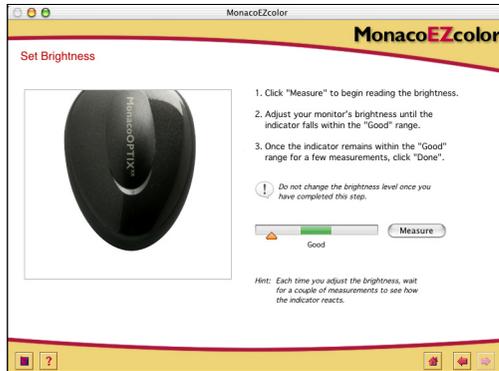


5. Slowly adjust the monitor's brightness control until the letter inside the black box is no longer visible.
6. Click the next (>) arrow to continue.

Skip step 6 in this guide, and continue with step 7. The software will automatically advance to the appropriate screen, (*Measure Color Patches*).

## Step 6: Set Brightness

In this step, MonacoEZcolor uses your measurement device to determine the monitor's optimal brightness setting. If the software previously detected that the black range of your monitor is not adjustable, this window will not appear.



1. With the measurement device still in position, click **Measure**.
2. Adjust your display's brightness control until the indicator falls within the **Good** range. Each time you adjust the brightness, wait until the indicator stabilizes before continuing.



3. When the indicator remains within the *Good* range, click **Done**.

A check mark is displayed.

4. Click the next (>) arrow to continue.

**IMPORTANT:** *Once you have completed this step, do not change the brightness or contrast controls. If you alter either of these controls, you will inadvertently change the monitor's white point.*

## Step 7: Measure Color Patches

In this step, MonacoEZcolor sends a series of color patches to the display and records the measured response. The difference between the detected values and the original values is used to determine the monitor's range of reproducible color.

1. With the measurement device still in position, click **Measure**.



The software displays a series of color patches and collects the data measured by your device.

2. When the measurements are completed, carefully remove the colorimeter from the display and click the next (>) arrow to continue.

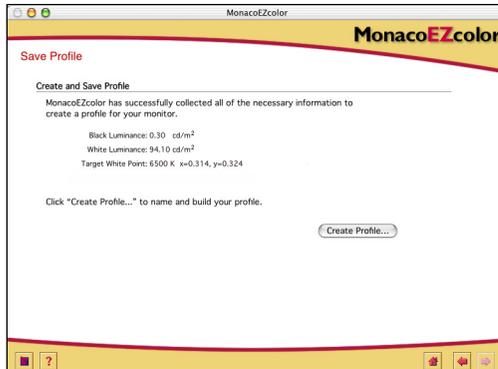
**NOTE:** *If the device comes loose during the measurement process, click Cancel and try again. If your device uses suction cup(s), you may need to dampen them with a moist, lint-free cloth before pressing the device to the display.*

## Step 8: Save Profile

The *Save Profile* window displays the collected settings that will be used to build an ICC profile for your monitor.

From the *Save Profile* window:

1. Click **Create Profile** to name, build, and save the profile.



**NOTE:** Make a practice of taping the controls/knobs (if applicable) once adjustments are properly made. If the brightness and contrast controls are accidentally changed, you will need to create a new profile for your monitor.

2. Follow the screen prompts. The software defaults to the following locations for storing profiles:

**Mac OSX:** /Library/ColorSync/Profiles  
**Win 98SE/ME:** Windows\System\Color  
**Win 2000:** WINNT\System32\spool\drivers\color  
**Win XP:** Windows\System32\spool\drivers\color.

**WARNING FOR WINDOWS USERS:** Do not let the number of profiles stored in the Color directory exceed 30 (approximately), or your O/S may apply the wrong profile.

3. Click the **Home** button or next (>) arrow to return to the main MonacoEZcolor window, or close the application.

## 5 Creating LCD Profiles Using a Colorimeter

This chapter explains using MonacoEZcolor software and a supported colorimeter to create a profile for a laptop or flat panel display (LCD). If you are profiling a CRT monitor, see “Chapter 4: Creating CRT Profiles Using a Colorimeter”.

There are two methods of profiling an LCD—visually, using your visual judgement and the software—or instrumentally, using a colorimeter and the software. Using a MonacoOPTIX colorimeter is optional, but results in a more accurate profile.

If you didn’t purchase the optional MonacoOPTIX<sup>XR</sup> colorimeter, follow the procedure in “Chapter 6: Creating a Profile Using the Software” to create your profile. To order a MonacoOPTIX colorimeter, visit [www.monacosys.com](http://www.monacosys.com).

You’ll need the following to get started:

- MonacoEZcolor software
- MonacoOPTIX or MonacoOPTIX<sup>XR</sup> colorimeter

### LCD Profile Basics

LCD profiles are created by sending color data to your display and measuring and evaluating the results. A custom profile is based on the collected data and certain other information you supply about your display—white point, gamma, brightness and contrast settings.

When profiling an LCD device, use a colorimeter that is designed for LCD profiling. The suction cups on devices intended for CRT profiling will damage an LCD display.

## Before you begin

Before you begin profiling your display, do the following:

1. Configure the colorimeter for use with an LCD.  
**Caution: Suction cup attachments are not designed for use with LCD display surfaces. Using a suction cup device will damage the display. Only use device attachments which are designed for LCDs.**
2. Check the current bit depth setting for your display. If necessary, change the display to maximum bit depth.
3. Set your room lighting to the level you typically use when evaluating images. Avoid bright lights; they may affect the profiling process. If you are creating a profile to use when evaluating images for press, turn the room lighting off with the exception of your viewing booth. In this manner you replicate the conditions used to evaluate proofs.
4. Set your desktop pattern to a light gray or as close to neutral as possible.
5. Do not use other calibration or gamma correction software with MonacoEZcolor software, or functionality may be impaired. Remove any other monitor calibration or gamma correction software from your system.
  - Macintosh: If using a version of Adobe Photoshop that includes the Adobe Gamma Control Panel, disable it.
  - Windows: If you are using Adobe Photoshop, uninstall the Adobe Gamma Loader, from you system. **Do not remove the Adobe Gamma Control Panel.**

## Step 1: Launch MonacoEZcolor

1. Launch MonacoEZcolor software.

The *Welcome to MonacoEZcolor* window appears.



2. Click **Create Monitor Profile**. The *Before You Begin* window appears (not shown).
3. The *Before You Begin* window outlines some of the previously discussed prerequisites for creating a valid monitor profile. If you have not already completed these, do so now.

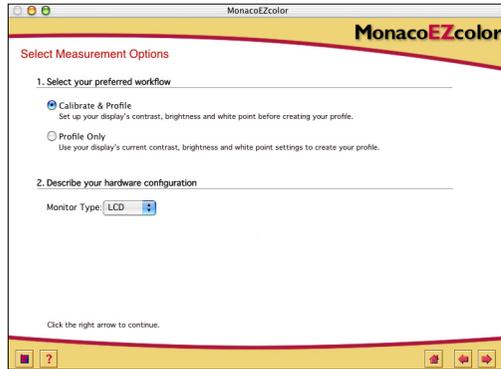
If your workstation has dual monitors, drag the application window onto the monitor to be profiled. The application must remain on this monitor throughout the profiling process

4. Click the next (>) arrow to continue.

The *Select Measurement Options* window appears.

## Step 2: Select Measurement Options

Use the *Select Measurement Options* window to define your workflow and display type.



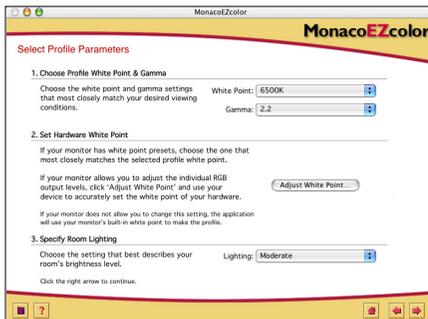
1. Select a workflow:
  - To perform a complete calibration and profiling procedure, select the **Calibrate & Profile** radio button.
  - To create a profile using the current calibration, select the **Profile Only** radio button.
2. Select **LCD** from the **Monitor Type** list.
3. Click the next (>) arrow to continue.

The application verifies the connection with your measurement device. Depending on which device you are using, you may be presented with device configuration or calibration windows. If this occurs, use the calibration plate that came with the device and follow the screen prompts to calibrate your device.

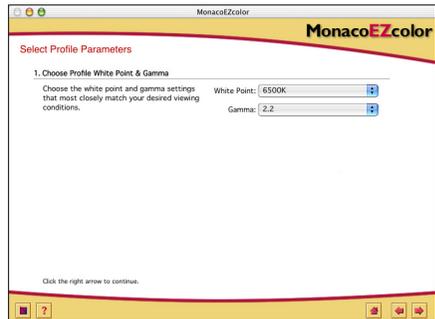
### Step 3: Select Profile Parameters

Before MonacoEZcolor software can be used to create a profile, you must input your target white point and gamma setting for the profile, and a description of the lighting conditions used in your work space.

The *Select Profile Parameters* window prompts you for this information. Options available in the *Select Profile Parameters*



▲ **Calibrate & Profile workflow**



▲ **Profile Only workflow**

The options available in the *Select Profile Parameters* window are dependent on the workflow selected in the previous step.

1. Identify a *target* white point for your profile by making a selection from the **White Point** list:
  - Select the white point preset with the correlated color temperature that matches or is closest to the temperature of your viewing environment:
 

5000 K	7500 K
5500 K	9300 K
6500 K	
  - Select **Monitor Native** to have the software determine the white point during the profiling process. This setting is used for monitors that have factory preset white points or for users who have already set the hardware white point and do not want to change it.

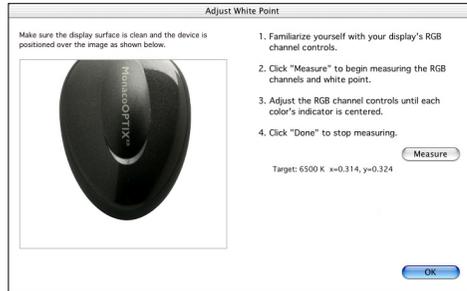
- Select **Custom...** and enter the correlated color temperature (K) or the xy chromaticity coordinates of your target white point.
  - Select **Measure Ambient Light...** and follow the prompts to measure the white point of your viewing conditions. For best results, point the measurement device towards a white sheet of paper which reflects the ambient light, and never directly at a light source or bulb.
2. Choose a gamma setting from the **Gamma** list.  
The available settings are 1.8 and 2.2.
  3. Set the hardware white point. (Calibrate & Profile workflow)  
If your display's white point is not selectable, skip this prompt and the software will use your display's built-in white point.

If your display's white point is adjustable, use the controls on the front of your monitor or in the software associated with your monitor to set your monitor's white point to match the target *profile white point* selected above. If the target white point is not an available preset, select the closest match.

**NOTE:** *Some LCDs offer RGB "white point" controls, but our testing has indicated better results may be achieved by using the native white point*

Optionally, if your display has adjustable RGB controls, you can use the software to maximize the monitor's dynamic range by using measurement results to set the RGB levels. RGB levels set using measured results are more precise than the factory presets and result in more accurate profiles.

To set the display's white point using measured results, click **Adjust White Point...** and follow the prompts.



For more information, see See “About White Point” on page 31.

#### 4. Specify room lighting. (Calibrate & Profile workflow)

Select a setting from the **Lighting** list that best describes the brightness level of your room lighting.

- Dim - Proofing
- Moderate - Typical office environment
- Bright - Brightly lit environment/outdoors

#### 5. Click the next (>) arrow to continue.

If you are performing the **Profile Only** procedure, skip steps 4 through 8 in this guide, and continue with step 9. The software will automatically advance to the appropriate screen (*Measure Color Patches*).

## Step 4: Measure Maximum Contrast

*Measure Maximum Contrast* is the first of several screens that are used to determine the optimal brightness and contrast settings for your display.

*TIP: Many LCDs require a “warm-up” and “cool down” period before the display stabilizes. For best results, wait a minute or two between adjusting the brightness and contrast, and clicking the Measure button.*



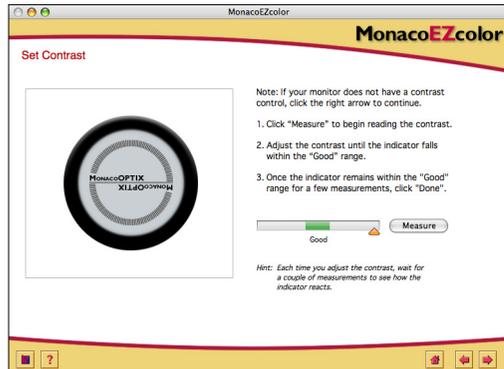
1. If your display has a contrast control, set it to the maximum level (100%), otherwise skip this prompt.
2. Adjust your display's brightness to the lowest level (0%), or until the application window and controls are just visible.
3. Position the colorimeter over the displayed outline.
4. Click **Measure**.

The software displays alternating white and gray patches and takes readings to determine if highlight clipping occurs.

5. Click the next (>) arrow to continue.

## Step 5: Set Contrast

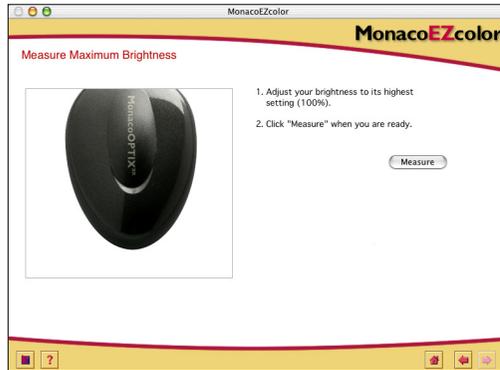
The *Set Contrast* window only appears if the software detected clipping in the previous step. The *Set Contrast* window prompts you to adjust the contrast to eliminate clipping.



1. If your display does not have a contrast control, click the next (>) arrow and proceed to the next step.
2. With the measurement device in position over its displayed outline, click **Measure**.
3. Adjust your display's contrast control until the indicator falls within the **Good** range. Each time you adjust the contrast, wait until the indicator stabilizes before continuing.
4. When the indicator remains within the **Good** range, click **Done**. A check mark appears.
5. Click the next (>) arrow to continue.

## Step 6: Measure Maximum Brightness

In this step, the software determines the brightest white your display can reproduce without introducing clipping.



1. With the contrast still set to the previously determined level, set your display's brightness to the maximum level (100%).
2. With the measurement device over its displayed outline, click **Measure**.

The software displays alternating white and gray patches and takes readings to determine if highlight clipping occurs.

3. Click the next (>) arrow to continue.

## Step 7: Set Brightness

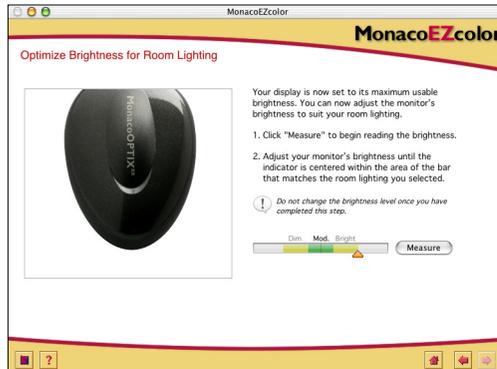
The *Set Brightness* window only appears if the software detected clipping in the previous step. The *Set Brightness* window prompts you to adjust the brightness until clipping is eliminated.



1. With the measurement device in position over its displayed outline, click **Measure**.
2. Adjust your display's brightness control until the indicator falls within the **Good** range. Each time you adjust the brightness, wait until the indicator stabilizes before continuing.
3. When the indicator remains within the **Good** range, click **Done**. A check mark appears.
4. Click the next (>) button to continue.

## Step 8: Optimize Brightness for Room Lighting

MonacoEZcolor software has set your display to its maximum usable brightness and contrast settings. This setting may be too bright for your particular room lighting. Use the *Optimize Brightness for Room Lighting* window to adjust the display's brightness to match your room lighting.



1. With the colorimeter still in position over its outline, click **Measure**.
2. Adjust your display's brightness control until the indicator falls within the range that matches the room lighting setting you chose in *Step 3: Select Profile Parameters*.
3. When the indicator falls within range, click **Done**.  
A check mark appears.
4. Click the next (>) arrow to continue.

## Step 9: Measure Color Patches

In this step, MonacoEZcolor sends a series of color patches to the display and records its response. The difference between the detected values and the original values is used to determine the monitor's range of reproducible color.

1. With the measurement device still in position, click **Measure**.

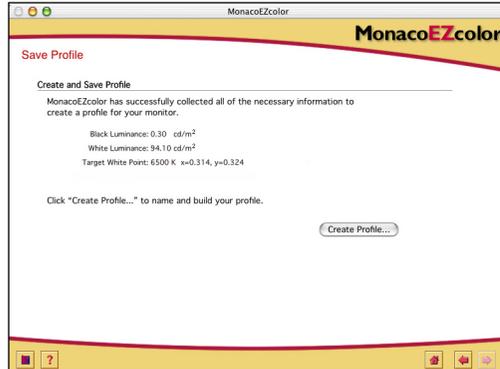


The program displays a series of color patches and collects the data measured by your device.

2. When measurements are completed, carefully remove the colorimeter from the display and click the next (>) arrow to continue.

## Step 10: Save Profile

The *Save Profile* window displays the collected settings that will be used to build an ICC profile for your monitor.



From the *Save Profile* window:

1. Click **Create Profile** to name, build, and save the profile.
2. Follow the screen prompts. The software defaults to the following locations for storing profiles:

<b>Mac OSX:</b>	/Library/ColorSync/Profiles
<b>Win 98SE/ME:</b>	Windows\System\Color
<b>Win 2000:</b>	WINNT\System32\spool\drivers\color
<b>Win XP:</b>	Windows\System32\spool\drivers\color

**WARNING FOR WINDOWS USERS:** Do not let the number of profiles stored in the Color directory exceed 30 (approximately), or your O/S may apply the wrong profile.

3. Click the **Home** or next (>) arrow to return to the main MonacoEZcolor window, or close the program.

When using your profile, keep in mind that it is only valid when used with the same display settings and lighting conditions that were used to build the profile. If you need to view images using different viewing conditions or settings, create a new profile for each set of conditions. In most cases you will have only one set of conditions and one monitor profile.

## 6 Creating a Profile Using the Software



This chapter details using MonacoEZcolor software to build a monitor profile for a desktop monitor (CRT) or laptop/flat panel display (LCD) without using a colorimeter.

### **Profiling a Monitor Visually**

There are two methods of profiling a monitor: visually, using your visual judgement and the software, or instrumentally, using a Monaco Systems colorimeter. Using a colorimeter is optional, but results in a more accurate profile.

For more information on building monitor profiles using a MonacoOPTIX<sup>XR</sup> colorimeter, see chapters 4 and 5. To order a MonacoOPTIX<sup>XR</sup> colorimeter, visit [www.monacosys.com](http://www.monacosys.com).

## Step 1: Before you begin

Prepare to create a profile by completing the following:

1. Turn your display on, and let it warm up for at least one hour prior to profiling. This will increase the accuracy of color readings.
2. Create a proper profiling environment by configuring your room lighting for viewing and evaluating images. Avoid bright lights and do not locate any brightly colored objects near the monitor. A more dimly lit environment is suggested. Set your desktop pattern to a light gray or as close to neutral as possible.
3. Check the current setting for your monitor. If necessary, change the display to 24 or 32-bit mode (True Color or Millions of Colors).
4. Clean your display with a soft, lint-free cloth and a monitor glass cleaner. **DO NOT** use household glass cleaners. They can damage the display surface. Use only cleaners manufactured for monitor displays. **DO NOT** spray cleaner directly onto the monitor screen. Any liquid that seeps into the monitor case can damage the electronics.
5. Macintosh: To minimize potential conflicts, remove any other monitor calibration software from your system and **disable** the Adobe Gamma Control Panel.  
Windows: To minimize potential conflicts, uninstall other monitor calibration software, including the Adobe Gamma Loader, from your system. **Do not remove the Adobe Gamma Control Panel.**
6. Become familiar with your monitor's brightness, contrast, white point and color controls. The white point control may be labeled *Color Temperature* or *RGB Setting*.

## Step 2: Launch MonacoEZcolor

1. Launch MonacoEZcolor.

The main application window appears.



2. Select **Create Monitor Profile**.

The *Before You Begin* window appears. (*not shown*)

3. The *Before You Begin* window outlines some of the previously discussed prerequisites for creating a valid monitor profile. If you have not already completed these, do so now.

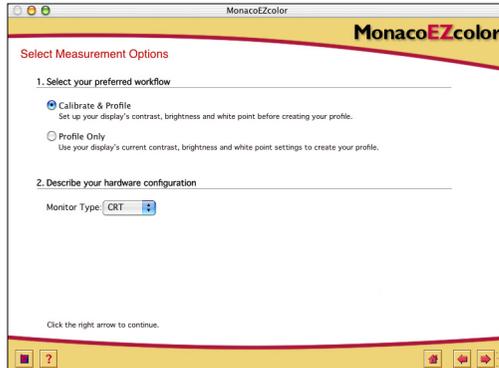
If your workstation has dual monitors, drag the application window onto the monitor to be profiled. The application must remain on this monitor throughout the profiling process

4. Click the next (>) arrow to continue.

The *Select Measurement Options* window appears.

### Step 3: Select Measurement Options

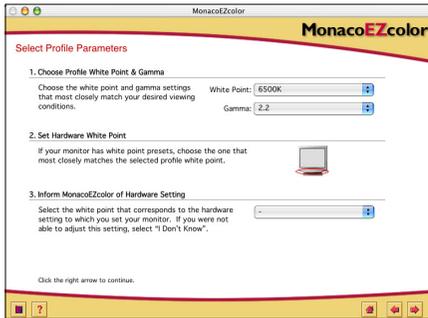
The *Select Measurement Options* window prompts you to define your workflow and monitor type.



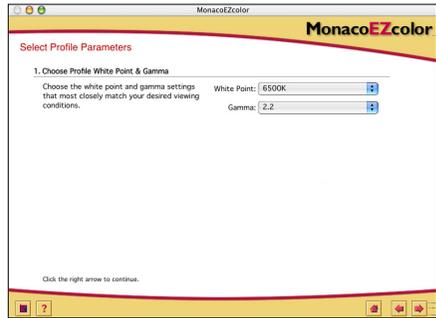
1. Select a workflow:
  - To perform a complete calibration and profiling procedure, select the **Calibrate & Profile** radio button.
  - To create a profile using the current calibration, select the **Profile Only** radio button.
2. Select your display type—**CRT** or **LCD**—from the **Monitor Type** list.
3. Click the next (>) arrow to continue.

## Step 4: Select Profile Parameters

Before you can use MonacoEZcolor software to build your profile, you must input the target white point and gamma settings for the profile. The *Select Profile Parameters* window prompts you for this information. Options available in the



▲ **Calibrate & Profile workflow**



▲ **Profile Only workflow**

*Select Profile Parameters* window are dependent on the workflow selected in the previous step.

When creating a monitor profile, the goal is to set the profile and hardware (monitor) white points to match, as closely as possible, the white point of the viewing conditions.

For example, if you are working with images intended for print, and will be evaluating your images using a light booth, you should set your profile and monitor white points to match the white point of your viewing booth.

For more information, see See “About White Point” on page 30.

1. Identify a *target* white point for your profile by making a selection from the **White Point** list. Select the white point preset with the correlated color temperature that matches or is closest to the temperature of your viewing environment:

5000 K	7500 K
5500 K	9300 K
6500 K	

2. Choose a gamma setting from the **Gamma** list.  
The available settings are 1.8 and 2.2.
3. Set the hardware white point. (Calibrate & Profile workflow)

If your monitor's white point is not user selectable, skip this prompt and MonacoEZcolor software will use your monitor's built-in white point.

If your monitor's white point is user adjustable, use the controls on the front of your monitor or in the software associated with your monitor to set your monitor's white point to match the target *profile white point* selected above. If the target white point is not an available preset, select the closest match.

4. In the previous step you adjusted your monitor to use a specific white point. MonacoEZcolor cannot automatically detect the white point setting your monitor is using; you have to input that information using the **Inform MonacoEZcolor of Hardware Setting** option.

Select the white point setting, from the drop-down list of presets, that you configured your monitor to use in the Set Hardware White Point step above. If your monitor did not have a white point selection feature, select **I Don't Know**.

5. Select next (>) to continue. If you are profiling an LCD display, skip steps 5 and 6 in this guide and continue with step 7. The software will automatically advance to the appropriate screen (*Adjust Monitor Color*).

## Step 5: Examine the Brightness Target (CRT)

The *Examine the Brightness Target* window only appears if you are profiling a CRT monitor.

Before your monitor can be profiled, the contrast and brightness settings must be adjusted to an optimal range. It is critical that you make these adjustments using the room lighting that you will use to view images. The ambient light surrounding your monitor can adversely affect your visual perception. If you make these adjustments using one set of lighting conditions and change the room lighting when using the profile, the onscreen image will not be accurate.

1. Set your monitor's contrast and brightness controls to their maximum level (100%).
2. Look closely at the displayed target. The target is a sequence of five letters on black squares. Moving from left to right, look at each black square and click on the first square in which you can clearly see a letter. Do not select a square if the relationship between the letter and the background is subtle. Select the first square where the letter is clearly visible.



## Step 6: Adjust Brightness Setting (CRT)

The *Adjust Brightness Setting* window only appears if you are profiling a CRT monitor. If you are profiling an LCD display, skip this step and continue with "Step 7: Adjust Monitor Color" in this guide.

The software displays an enlargement of the black square you previously selected.



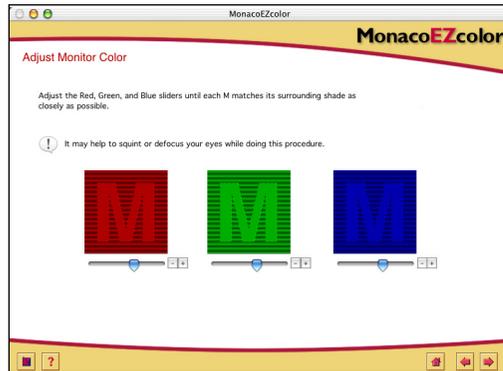
1. Adjust the monitor's brightness control until the displayed letter is indistinguishable from the background, then stop. Do not adjust the brightness more than is necessary.

It is important that you make this adjustment using controlled lighting and viewing conditions.

2. Click the next (>) button to continue.

## Step 7: Adjust Monitor Color

In this step, the software detects the monitor's phosphor type and determines the phosphor's RGB output.



1. LCD only: Set your display's brightness and contrast controls to their default factory settings.
2. CRT and LCD: Adjust the RGB sliders until the three colored Ms match the three squares as closely as possible. Green is the most difficult color to match. Don't worry if it isn't exact; your goal is to match them as closely as you can.  
**HINT:** Squint your eyes as you adjust the sliders.
3. Click the next (>) button to continue.

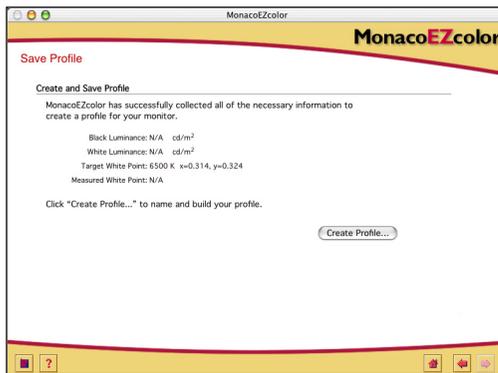
## Step 8: Name and Save the Profile

1. Follow the prompts to name and save your profile. The software will default to the following platform specific location for storing profiles:

**WARNING FOR WINDOWS USERS:** Do not let the number of profiles stored in the Color directory exceed 30 (approximately), or your O/S may apply incorrect profiles.

**Mac OSX:** /Library/ColorSync/Profiles  
**Win 98SE/ME:** Windows\System\Color  
**Win 2000:** WINNT\System32\spool\drivers\color  
**Win XP:** Windows\System32\spool\drivers\color.

Do not alter the location if you are using Photoshop. For more information on storing profiles, see *"Using Profiles"*.



2. Click the **Home** button or next (>) arrow to return to the main MonacoEZcolor window, or close the application.

**NOTE:** Once your monitor profile is created, we recommend taping the monitor's brightness and contrast controls so they are not inadvertently moved. If the positions of the controls are changed, the monitor will not display accurate color and you will need to re-profile the monitor.

## 7 Building a Scanner Profile



Creating a scanner profile requires scanning an IT8 target. You can scan the target using your scanner software and load the saved scan, or if you are using a Windows workstation with a compatible scanner, you can scan the target directly into MonacoEZcolor. The software will guide you through the process by prompting you to provide certain information and to perform tasks with your scanner.

This procedure requires an IT8 target, a reflective or transparency scanner, and MonacoEZcolor software.

### **Before you begin the profiling process, do the following:**

*NOTE: Kodak 35mm IT8 transparency targets are available for both Ektachrome and Kodachrome slide film. Be sure to purchase the correct target for the type of slide film you scan.*

1. If you have both reflective and transparency (not included) IT8 targets, you must create unique profiles for each one.
2. Turn your scanner on and wait approximately 1/2 hour before beginning the profiling process.
3. Clean your scanner's glass with a lint-free cloth.
4. When scanning the IT8 target, never use any automatic color correction or color management options that may be included in your software. Consult your scanner's software manual to determine how to disable these settings.
5. Make a note of the scanner settings used to scan the target. You will need to use the same settings when scanning images for use with the profile.

## Step 1: Launch MonacoEZcolor

1. Launch MonacoEZcolor software.

The main application window appears.



2. Select **Create Input Profile**.  
The *Before You Begin* window appears. (*not shown*)
3. The *Before You Begin* window outlines some of the previously discussed prerequisites for creating an input profile. Review the information. If you have not completed these tasks, do so now.
4. Click the next (>) button to continue.

## Step 2: Select Target Type

Use the *Select Target Type* window to identify the type of IT8 target you are using.

1. Select the radio button for your target type.
  - If you are using a reflective scanner, select **5x7 Reflective**.
  - If you are using a transparency scanner, select **4x5 Transparency**, or **35mm Transparency**.
2. Select the next (>) button to continue.

### Step 3: Position the Target

The *Position the Target* window provides general guidelines for positioning the IT8 target in preparation for scanning.

#### If you are using a reflective scanner:

1. Remove the reflective IT8 target from its protective sleeve and position it face down on the glass surface so that it is square to the edges of the surface.
2. Close the scanner cover.
3. Click next (>).

#### If you are using a transparency scanner:

1. Remove the IT8 target (35mm or 4x5) from its protective sleeve.

Position the target in the scanner so that it produces a squared, right-reading (not reversed) image when scanned.

Refer to your scanner's documentation for more information on positioning images.

2. When you are satisfied that the target is correctly positioned, click next (>).

**NOTE:** Targets are fragile. Handle them with care and store them in the original packaging, away from light, when not in use. If your target requires cleaning, only use cleaning materials intended for photographic emulsions. If your target tears or becomes scratched, you may purchase a new target from Monaco Systems at [www.monacosys.com](http://www.monacosys.com).

## Step 4: Input the Target

If you are using a Windows platform, you can optionally scan the target into MonacoEZcolor using a compatible scanner plug-in. If you are using a Macintosh workstation, scan the target using your scanner application and load the saved scan into MonacoEZcolor. Both methods produce the same result.

### Scan the target using your scanner application when:

- you are using a Macintosh workstation
- you are using a Windows workstation and your scanner is not connected to the computer you are working on, or your scanner driver is incompatible with MonacoEZcolor

#### **Windows: Direct scan method**

1. Click **Twain Acquire**.
2. Follow the scanning guidelines below.

**NOTE:** At the appropriate time, MonacoEZcolor will attempt to launch your scanner driver. If your driver malfunctions, the software freezes, or nothing happens, the driver is incompatible with MonacoEZcolor. In that case, you will need to use the second method *Load An Image*.

#### **Macintosh: Load An Image method**

You must have a previously saved scan of your target in order to use this method. If you haven't already scanned the target, launch your scanner application now and follow the scanning guidelines below. When scanning is complete, return to the MonacoEZcolor *Input the Target* window and load the scan.

1. Select **Load An Image**.
2. When the *Open* dialog appears, locate and load your saved TIFF file.

## Scanning Guidelines

Regardless of scanning method you use, the procedures are the same.

1. Clean the glass surface of your scanner.
2. Place the targets face down on the scanner glass, and close the scanner cover.
3. Set your scanning resolution to **200 dpi** (reflective), **800 dpi** (35mm slide), or **200 dpi** (4x5 transparency).

*In the future, when you scan an image to use with the profile, you may change the resolution setting. However, all other settings (originally used to scan the IT8 target) must be duplicated exactly for the profile to render color accurately.*

Scanning at higher resolutions will not produce a better profile, and may result in cropping errors. If your scanner will not allow you to enter a custom resolution setting, select a resolution setting which is higher than the required resolution and downsample (reduce the resolution) to the required resolution in Photoshop or another imaging application.

4. Turn off all auto color correction and color management options. If you are not familiar with these options in your scanner software, contact your device manufacturer.
5. Set the software to **prescan** (or *preview*) and prescan the targets.
6. Crop the prescan or preview to the dashed gray box, excluding all white space around the targets.
7. Scan the targets.
8. Make a note of your scanner settings for future use.
9. If you are scanning using your scanner application, save the scan as an **uncompressed TIFF**, return to MonacoEZcolor and load the saved scan. If you are scanning directly into MonacoEZcolor, close the plug-in if it doesn't automatically close.

### **What's Prescan?**

*Prescan or Preview is an option in scanner software that is used to preview the image before it is scanned. In the Prescan or Preview mode you can crop the image to include only the portion you want scanned.*

## Step 5: Verify the Scan

The software displays a thumbnail view of the target as you scanned it.

*The displayed targets are for reference only. Don't be concerned if they do not match the target type you are using. They are for comparison purposes only.*

1. If you are using the reflective IT8 target, check to be sure the scanned image is straight, right-side-up, and cropped correctly (to the edge of the target).  
If you are using a transparency target, check to be sure the scanned image is straight, right-reading (not reversed), and right-side-up.
2. If the image displays incorrectly, click back (<) and re-scan the target.

If the image appears to be acceptable, click next (>).

## Step 6: Select Reference File

Use the *Select Reference File* window to load the matching reference file for your IT8 target.

1. Click **Select Reference**, locate the matching reference file, and click **Open**.
2. Click the next (>) button to continue.

### Selecting a Monaco Systems reference file:

Choose a reference file for a Monaco Systems reflective or 4x5 transparency target by selecting the reference file name that matches the code on the bottom left-hand corner of the target. If necessary reposition the small rectangle over the on-screen image to display the file name. The reflective target file is appended with **.mrf** (Monaco reference file), and the 4x5 transparency target is appended with **.txt**. Reference files are stored in the following locations:

Mac OS X: /Library/Application Support/Monaco/IT8 targets

Windows: Program Files/Monaco Systems/MonacoEZcolor 2.6/Preferences

### Selecting a Kodak reference file:

MonacoEZcolor supports Kodak IT8 transparency targets. Kodak IT8 reflective targets are not supported. Kodak reference file names are codes that indicate the target type, date of manufacture, and lot number that are found on each target.

*35mm IT8 transparency targets are available for both Ektachrome and Kodachrome slide film. Be sure to purchase the correct target for the type of slide film you scan.*

Kodak manufactures four target types:

- 5x7 reflective target (Q-60R1)
- 35mm Ektachrome target (Q-60E3)
- 35mm Kodachrome target (Q-60K3)
- 4x5 transparency (Q-60E1).

A Kodak reference file named **E3199601.Q60** is interpreted as a 35mm Ektachrome target (**E3**), with a manufacturing date of (**1996**), and a lot number of (**01**). The (**.Q60**) indicates it is a Kodak target.

**NOTE:** To obtain a reference file for a Kodak or Monaco Systems target, go to [www.monacosys.com](http://www.monacosys.com) and click **Downloads>Reference Files**.

When downloading a Kodak reference file, click and hold the file link until a pop-up menu appears, then select **Save Link to Disk** (or whatever your browser gives you to save a link). If your application has problems recognizing the file, append the file name with.txt, for example, E3200005.Q60.txt.

### Error on Cropping

If you receive an error after clicking (>) in the *Select Reference File* window, check for one or more of the following:

- Crop marks are improperly placed.
- Color management or auto adjustment settings in the scanner software are not disabled. Automatic scanner settings shift the dynamic range of the IT8 during the capture process. For this reason, it is important that you don't use any preset settings. When capturing the IT8, always use your input device's default settings with all color manage-

ment features turned off. If you are unsure of how to disable these features, check with your device manufacturer.

- Unsharp mask is not disabled in the scanning software. In some scanning software, this option is on by default. It must be disabled to create a profile.
- Resolution is set incorrectly.
- The wrong reference file is selected. Reference files and IT8 targets are manufactured in matched lots. You must use a matching reference file.

### **To check the position of crop marks:**

1. Click **OK** in the error message.
2. The *Crop the IT8 Target* window appears.

On the left side of the program window, a thumbnail image of your scanned target is displayed. Four brightly colored rectangles (green, red, yellow, and blue) are superimposed over the thumbnail image. On the right side of the window, four close-up views of the contents of the colored rectangles are displayed.

3. Drag each of the small colored rectangles over the “Locator Image” to find the general location of the four corner crop marks.
4. Using the four close-up views on the right, check to be sure the four crop marks are superimposed over four crop marks on the IT8 target. If necessary, re-crop the image by positioning the cursor over each crop mark and clicking the mouse button.
5. When all four crop marks have been placed, click next (>).

## Step 7: Name and Save the Profile

1. Follow the screen prompts to name and save your profile. The software defaults to the following locations for storing profiles:

**Mac OSX:** /Library/ColorSync/Profiles  
**Win 98SE/ME:** Windows\System\Color  
**Win 2000:** WINNT\System32\spool\drivers\color  
**Win XP:** Windows\System32\spool\drivers\color.

Profiles are stored in platform specific locations. Do not alter the location if you are using Photoshop. For more information on storing profiles, see "*Chapter 11: Using Profiles*".

2. Click the **Home** button or next (>) arrow to return to the main MonacoEZcolor window, or close the application.

**NOTE:** When scanning images for use with your scanner profile, be sure to use the same scanner settings that were used to scan the IT8 target. You can change the resolution setting and use sharpening options in your scanner software if they are performed in the luminance channel, but never change other scanner settings. If these scanner settings are changed, you will get unpredictable color. Profiles are created for specific scanner settings. If you desire to use multiple scanner settings, create a separate profile for each set of settings used.

If you create a scanner profile for use with 35mm slides and using the profile results in color shifts, you may have created the profile using the wrong IT8 target for your film type. Transparency targets are available for both Ektachrome and Kodachrome slide film. Be sure to use the correct target for your film type.



## 8 Building a Digital Camera Profile

Use the **Create Input Profile** option to create profiles for digital cameras. Digital camera profiles are only valid when used with images shot under the same lighting conditions that were used to shoot the IT8. Consequently, profiling a digital camera for a non-studio setting is impractical.

**Before you begin the profiling process, do the following:**

1. In a studio setting, set up a subject you desire to shoot.
2. Place the IT8 target in a central location within the scene, so its position is parallel to the camera's back.
3. Illuminate the scene from both sides at a 45 degree angle. All lights should be of the same color temperature.
4. Turn off all available auto color correction and color management options in your camera software. If you are not familiar with the location of these options, contact your camera manufacturer.
5. Determine the correct exposure. A correct exposure will fully fill a histogram without clipping any highlights or shadows.
6. Manually white balance (sometimes referred to as gray balance) the image based on manufacturer's instructions.
7. Configure the camera so the IT8 target fills the viewfinder (cropping out the remainder of the scene), and capture the target.
8. Save the image as an uncompressed TIFF.
9. Remove the IT8 target from the scene.
10. Recompose the scene within the viewfinder as desired. This may include repositioning lighting and changing

*Create a profile for each photo session. It is not necessary to create a profile for each image in a session unless you change the light source or the exposure.*

exposure as long as the temperature of the lights and white balance are not changed.

After recomposing the scene, check the histogram to be sure the new lighting configuration does not result in highlight or shadow clipping.

11. Capture and save the scene as an uncompressed TIFF.
12. Open the saved TIFF that includes the IT8 target into Adobe Photoshop or another imaging application.
13. Crop the image to the edges of the IT8 target and resize the IT8 image to result in a 4 MB file.  
  
If resizing the target in Adobe Photoshop, use the Nearest Neighbor resample method.
14. Save the cropped target as an uncompressed TIFF.

### **Step 1: Select Target**

1. Launch MonacoEZcolor and select **Create Input Profile**.
2. Select the **5x7 Reflective** radio button.
3. Click the next (>) button to continue.

### **Step 2: Position the Target**

This screen does not apply to digital camera profiles, click the next (>) button to continue.

### **Step 3: Input the Target**

1. Select **Load Image**.
2. Locate, select, and open the cropped TIFF of the IT8.  
  
If the image does not open, you may have compressed the TIFF. The program will not open a compressed file. Reopen the original uncropped image, recrop the image, and save as an uncompressed TIFF.

## Step 4: Verify the Scan

The software displays a thumbnail view of the target as you cropped it. Verify that the image was captured correctly.

1. Check to be sure the captured image is straight and cropped to the edges of the target. If necessary, reshoot the scene, crop the IT8, and begin again.
2. If the image appears to be acceptable, click next (>).

## Step 5: Select Reference File

Use the *Select Reference File* window to load the matching reference file for your IT8 target.

1. Click **Select Reference**, locate the matching reference file, and click **Open**.
2. Click the next (>) button to continue.

MonacoEZcolor uses the Monaco IT8 target when building digital camera profiles. To identify the matching reference file, locate and select the reference file name that matches the code on the bottom left-hand corner of the target. If necessary reposition the small rectangle over the on-screen image to display the file name. The file is appended with **mrf** (Monaco reference file). Reference files are stored in the following locations:

Mac OS X: /Library/Application Support/Monaco/IT8 targets

Windows: Program Files/Monaco Systems/MonacoEZcolor 2.6/Preferences

## Error on Cropping

If you receive an error after clicking (>) in the *Select Reference File* window, check for one or more of the following:

- Crop marks are improperly placed.
- Color management or auto adjustment settings in the scanner software are not disabled. Automatic scanner settings shift the dynamic range of the IT8 during the capture

process. For this reason, it is important that you don't use any preset settings. When capturing the IT8, always use your input device's default settings with all color management features turned off. If you are unsure of how to disable these features, check with your device manufacturer.

- Unsharp mask is not disabled in the scanning software. In some scanning software, this option is on by default. It must be disabled to create a profile.
- Resolution is set incorrectly.
- The wrong reference file is selected. Reference files and IT8 targets are manufactured in matched lots. You must use a matching reference file.

### **To check the position of crop marks:**

1. Click **OK** in the error message.
2. The *Crop the IT8 Target* window appears.

On the left side of the program window, a thumbnail image of your scanned target is displayed. Four brightly colored rectangles (green, red, yellow, and blue) are superimposed over the thumbnail image. On the right side of the window, four close-up views of the contents of the colored rectangles are displayed.
3. Drag each of the small colored rectangles over the "Locator Image" to find the general location of the four corner crop marks.
4. Using the four close-up views on the right, check to be sure the four crop marks are superimposed over four crop marks on the IT8 target. If necessary, re-crop the image by positioning the cursor over each crop mark and clicking the mouse button.
5. When all four crop marks have been placed, click next (>).

## **Step 6: Name and Save the Profile**

Follow the displayed prompts to name and save your profile. The software will default to the correct location for storing profiles. Profiles are stored in platform specific locations. Do not alter the location if you are using Photoshop. For more information on storing profiles, see "*Chapter 11: Using Profiles*".



## 9 Building a Printer Profile



Profiling a printer requires using a reflective scanner as a measurement device. The procedure results in the creation of both an RGB scanner profile and a printer profile.

### The profiling process consists of:

- outputting a target from the printer being profiled
- positioning and taping the supplied IT8 target over the lower half of the printed target
- scanning both targets in a single scan
- cropping both targets using the software
- naming and saving the profiles

This procedure uses the supplied IT8 target, a printer, a reflective scanner, and the MonacoEZcolor software.

**NOTE:** Profiles are created for specific combinations of media (paper/film), output resolution, and printer settings.

When creating printer profiles, create a separate profile for each combination of media, resolution, and printer settings you use. If you print an image using the profile and vary the media, resolution or printer settings, you will get unpredictable color. For example, if you desire to use multiple resolution settings with a glossy photo-quality paper, create a separate profile for each combination of paper/resolution used.

**Before you begin the profiling process, do the following:**

1. Power on your printer and load the paper you will be using with the profile.

Always create a printer profile using the same paper, resolution, and printer settings you will use when printing images with the profile. If you intend to use multiple paper/resolution combinations, create a separate profile for each one.

2. Profiling a printer requires using a reflective scanner as a measurement device. Power on your scanner and wait approximately 1/2 hour before beginning the process. This will ensure more accurate measurements.
3. Clean your scanner's glass with a damp, lint-free cloth.
4. During the profiling process, you will be required to turn off any automatic color correction or color management options that may be available in your scanner software or printer driver. If you are unfamiliar with the location of these options, contact your device manufacturer.
5. Remove the Monaco IT8 target from its protective sleeve.

Printer profiles can only be created using a Monaco Systems IT8 target. Targets from other manufacturers cannot be used.

IT8 targets are fragile. Handle them with care and store them in the original packaging when not in use. If your target requires cleaning, only use cleaning materials intended for photographic emulsions. If your target tears or becomes scratched, you may purchase a new target from Monaco Systems.

## Step 1: Launch MonacoEZcolor

1. Launch MonacoEZcolor software.

The main application window appears.



2. Select **Create Printer Profile**.

The *Before You Begin* window appears (*not shown*).

3. The *Before You Begin* window outlines some of the previously discussed prerequisites for creating a printer profile. Review the information. If you have not completed these tasks, do so now.
4. Click the next (>) button to continue.

## Step 2: Specify Printer Information

MonacoEZcolor creates output profiles for both RGB and CMYK output devices.

*A RIP converts Post-Script code into a format acceptable by the printer.*

Most non-PostScript printers use RGB output profiles. Post-Script devices such as a *RIP* (Raster Image Processor) use CMYK profiles. If you're not sure which profile type your device uses, see your device's user manual or call the device manufacturer.

1. Select the radio button for the profile type your device uses.
2. The **Select Printer Model/Technology** option is normally grayed out. If your software is an upgrade, compensation tables from an earlier version may appear in the drop-down list. Unless a special compensation table has been issued through Technical Support, this option remains grayed out.
3. Click the next (>) button to continue.

### Step 3: Print a Target

When you create a printer profile, you are actually creating a profile for the specific paper and resolution combination that you are using at that moment. If you always use the same paper and print images at the same resolution, then you only need one printer profile. However, if you plan on printing images using different combinations of resolutions and papers, you must create a separate profile for each combination.

MonacoEZcolor includes a printer target file. Creating a printer profile requires printing this target file using the same paper, resolution and printer settings that you will use when printing images using the profile. You can print the target directly from MonacoEZcolor or save the target as a TIFF file for printing from another application.

#### To print the target from MonacoEZcolor:

1. Click **Print**.
2. Configure the Print dialog box with the following settings:
  - Media or Paper:** select the paper you will use with the profile and be sure it is loaded in the printer.
  - Resolution:** select the resolution you will use when printing images with the selected paper.
  - Auto Color Correction:** turn off any auto color correction or color management options that may be available in your print driver. If you are unfamiliar with the location of these options in your driver, contact your device manufacturer.
3. Print the target at 100%.
4. Return to the MonacoEZcolor *Print a Target* screen, and click next (>).

**IMPORTANT:** It is important that you remember the resolution, media type, and other settings used when creating your profile. We suggest you write them down. You will use the exact same media, and settings when printing images using the profile. If you desire to print using multiple paper stocks and resolutions, you must create a separate profile for each combination.

**To save the target and print from another application:**

1. Click **Save TIFF**. Save the TIFF file to the location of your choice.
2. Launch a graphics or layout program that you use. Open or place the TIFF file into the application.
3. Configure the Print dialog box with the following settings:
  - Media or Paper:** select the paper you will use with the profile and be sure it is loaded in the printer.
  - Resolution:** select the resolution you will use when printing images with the selected paper.
  - Auto Color Correction:** turn off any auto color correction or color management options that may be available in your print driver. If you are unfamiliar with the location of these options in your driver, contact your device manufacturer.
4. Print the target at 100%.
5. Return to the MonacoEZcolor *Print a Target* screen, and click next (>).

## Step 4: Attach IT8 to Printed Target

In the previous step, you printed a target using your paper and resolution choices for this profile. Now you will scan the target to measure the color values output by your printer. But before scanning the target, you need to tape the supplied IT8 target over its image on the printed target. In this manner, your scanner will simultaneously be profiled, ensuring its use as a measurement device is as accurate as possible.

1. Remove the printed target from the printer output tray and place it in a dark location (not a folder), or out of direct light, both natural and incandescent.

Wait approximately 1 hour to ensure the ink is dry. Scanning the target while the ink is wet results in an inaccurate profile. This is especially important when profiling an ink jet printer.

2. Tape the supplied IT8 target over its image on the printed target. Apply tape only to the very edges of the target, taking care not to cover any color patches. Be sure the target is positioned squarely inside the printed frame.

Some printers may output the target at slightly different sizes. Regardless of the size of the printed image, your goal is to align the IT8 target with the top of the printed IT8 and be sure it is not crooked.

3. When ready, click the next (>) button in the program.

**NOTE:** Printer profiles can only be created using a Monaco Systems IT8 target. Targets from other manufacturers cannot be used.

## Step 5: Prepare to Scan

The *Prepare to Scan* window provides general guidelines for positioning the targets in preparation for scanning.

1. Place the taped targets face down on the scanner's glass.
2. Align the edges of the page with the edge of the glass.
3. Close the scanner cover, and click next (>).

**NOTE:** Targets are fragile. Handle them with care and store them in the original packaging, away from light, when not in use. If your target requires cleaning, only use cleaning materials intended for photographic emulsions. If your target tears or becomes scratched, you may purchase a new target from Monaco Systems at [www.monacosys.com](http://www.monacosys.com).

## Step 6: Input the Target

Windows users can optionally scan the target into MonacoEZcolor using a compatible scanner plug-in. Macintosh users must scan the targets using a scanner application and load the saved scan into MonacoEZcolor. Both methods produce the same results.

### Windows: Direct scan method

1. Click **Twain Acquire**.
2. Follow the scanning guidelines below.

**NOTE:** At the appropriate time, MonacoEZcolor will attempt to launch your scanner driver. If your driver malfunctions, the software freezes, or nothing happens, the driver is incompatible with MonacoEZcolor. In that case, you will need to use the second method *Load An Image*.

### Macintosh: Load An Image method

You must have a previously saved scan of your targets in order to use this method. If you haven't already scanned the targets, launch your scanner application now and follow the scanning guidelines below. When scanning is complete,

return to the MonacoEZcolor *Input the Target* window and load the scan.

1. Select **Load An Image**.
2. When the Open dialog appears, locate and load your saved TIFF file.

### Scanning Guidelines

Regardless of scanning method you use, the procedures are the same.

1. Clean the glass surface of your scanner.
2. Place the targets face down on the scanner glass, and close the scanner cover.
3. Set your scanning resolution to **200 dpi**. If you scan at a higher resolution, you may receive cropping errors.
4. Turn off all auto color correction and color management options. If you are not familiar with these options in your scanner software, contact your device manufacturer.
5. Set the software to **prescan** (or *preview*) and prescan the targets.
6. Crop the prescan or preview to the dashed gray box, excluding all white space around the targets.
7. Scan the targets.
8. Make a note of your scanner settings for future use.
9. If you are scanning using your scanner application, save the scan as an **uncompressed TIFF**, return to MonacoEZcolor and load the saved scan. If you are scanning directly into MonacoEZcolor, close the plug-in if it doesn't automatically close.

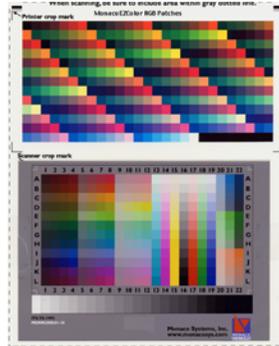
#### **What's Prescan?**

*Prescan or Preview is an option in scanner software that is used to preview the image before it is scanned. In the Prescan or Preview mode you can crop the image to include only the portion you want scanned*

The following is an example of a properly cropped set of targets. The colors in your actual target may not look the same.



*IT8 target taped to Printer target before scanning*



*Scanned Targets after cropping the prescan\**

*\* DO NOT SCAN THE ENTIRE TARGET PAGE. It is important that you crop the prescan (or preview) to the edges of the dashed line. Scan only the area within the dashed lines, not the entire target page.*

## Step 7: Verify the Scan

The software displays a thumbnail of the targets as you scanned them.

1. Check to be sure the image is straight, right-side-up, and cropped to the dashed gray box.
2. If the image appears to be scanned incorrectly or you did not crop the prescan to the dashed gray box (a large amount of white space is surrounding the image), click back (<) and re-scan the targets.
3. When you are satisfied that the targets are scanned correctly, click next (>).

## Step 8: Select Reference File

Use the *Select Reference File* window to load the matching reference file for your IT8 target.

1. Click **Select Reference**, locate the matching reference file, and click **Open**.
2. Click the next (>) button to continue.

### Selecting a reference file:

To choose a reference file, locate and select the reference file name that matches the code on the bottom left-hand corner of the target. If necessary reposition the small rectangle over the on-screen image to display the file name. The file is appended with **mrf** (Monaco reference file). Reference files are stored in the following locations:

Mac OS X: /Library/Application Support/Monaco/IT8 targets

Windows: Program Files/Monaco Systems/MonacoEZcolor 2.6/Preferences

### Error on Cropping

in the *Select Reference File* window, if you receive an error when clicking the (>) arrow, check for one or more of the following:

- Crop marks are improperly placed.
- Color management or auto adjustment settings in the scanner software are not disabled. Automatic scanner settings shift the dynamic range of the IT8 during the capture process. For this reason, it is important that you don't use any preset settings. When capturing the IT8, always use your input device's default settings with all color management features turned off. If you are unsure of how to disable these features, check with your device manufacturer.
- Unsharp mask is not disabled in the scanning software. In some scanning software, this option is on by default. It must be disabled to create a profile.
- Resolution is set incorrectly.

- The wrong reference file is selected. Reference files and IT8 targets are manufactured in matched lots.

### To check the position of crop marks:

1. Click **OK** in the error message.
2. On the left side of the program window, a thumbnail image of your scanned target is displayed. Four brightly colored rectangles (green, red, yellow, and blue) are superimposed over the thumbnail image. On the right side of the window, four close-up views of the contents of the colored rectangles are displayed.

Drag each of the small colored rectangles over the “Locator Image” to find the general location of the four corner crop marks.

3. Using the four close-up views on the right, confirm that the software properly superimposed the four crop marks over the four crop marks on the IT8 target. If necessary, manually re-crop the image by positioning the cursor over each crop mark and clicking the mouse button.
4. When all four crop marks have been placed, click next (>) and repeat the procedure if required with the top half of the target.

## Steps 9 & 10: Profile Options & Name and Save Profile(s)

### Select Profile Options

Depending on your printer technology, you may or may not be presented with the *Select Profile Options* window. If the window does appear, not all options may be available for your printer type.

1. Select your scanner make and model from the **Scanner** list. If your scanner is not listed, select **Other**.

2. If the paper option is available, select the paper you are using with this profile from the **Paper** list.
3. Select a **Black Generation** setting.

The Black Generation option is only available for CMYK profiles. Black Generation refers to the appropriate level of black ink that is used to replace the CMY colorants without affecting image quality. Black Generation has the following advantages:

- increases density and contrast in shadows
- prevents excessive ink buildup (profiles for press)
- saves the cost of color cartridges (digital printers)

The available choices for Black Generation are— None, Light, Medium, and Heavy. Each level increases the amount of black used.

If you are unsure which to choose, create a profile using the Medium setting. When printing images using the profile, look at the highlights and shadows. If the Medium setting is too much, the highlights and shadows will appear too dark. In this case, reprofile the device using a lesser setting.

4. Click the next (>) arrow to continue.

### Name and Save Profile(s)

By default, the software creates a scanner profile during the printer profiling process. If you would like to save the scanner profile, check the **Scanner Profile** checkbox.

1. Follow the screen prompts. The software defaults to the following locations for storing profiles:

**Mac OSX:** /Library/ColorSync/Profiles  
**Win 98SE/ME:** Windows\System\Color  
**Win 2000:** WINNT\System32\spool\drivers\color  
**Win XP:** Windows\System32\spool\drivers\color.

Do not alter the location if you are using Photoshop. For more information on storing profiles, see "*Chapter 11: Using Profiles*".

2. Click the **Home** button or next (>) arrow to return to the main MonacoEZcolor window, or close the application.

**NOTE:** When you scan and print images using your profiles, use the same scanner settings, printer settings and media that were originally use to scan and print the targets. The profiles were created for these specific settings. If these settings are changed, you will get unpredictable results. If you wish to alter the settings, create new profiles for the different media and settings you wish to use.

## 10 Editing Printer Profiles



This chapter provides instructions for using the Edit Printer Profile option. The Edit Printer Profile option allows you to edit a printer profile by making color adjustments to a reference image and saving the results in the profile. You can edit an output profile to achieve the following:

- a better match between the image on your monitor and the printed image
- a better match between the original image and the printed image
- more accurate color or tonal relationships

## Profile Editing Workflow

Editing a printer profile is a two part process—evaluating the profile using an application that supports color management, and modifying the profile using the Edit Printer Profile option in MonacoEZcolor.

To evaluate a profile, a color-managed application is used to print a variety of images using the profile. Each printed image is compared to its displayed Preview image. If the printed images consistently do not match the Previews, the printer profile is modified to obtain a better match. If the displayed and printed images match but there is a consistent problem with the overall color quality, the printer profile is modified to obtain more pleasing color.

Modifying the profile consists of using the Edit Printer Profile option to edit a reference image that has been rendered using the profile. There are two methods of editing the profile. Method 1 is used to edit the portion of the profile that affects the image as it appears on your monitor. Method 2 is used to edit the portion of the profile that controls the printed image.

Using Method 1, the displayed Preview of the reference image is edited until it better matches the print. When a reasonable match is achieved, the reference image is reprinted, and the Preview is refreshed. The new print and new Preview are compared. You should see an improvement. If they do not match, you can continue the editing process until the Preview and the printed image reasonably match.

Method 2 involves editing the portion of the profile that controls the color in the printed image. Use Method 2 whenever you desire to edit the profile to create a better match between the printed image and an original image, or to correct for inaccurate color balance or tonal relationships in the printed image. It is important that you start with a profile that achieves a reasonable match between your monitor and your printed image, or that you use Method 1 to achieve a reasonable match before using Method 2 to edit the profile.

## Printer Profile Evaluation Workflow

*Monaco ColorWorks software is included on the MonacoEZcolor CD.*

Before you can edit your printer profile, you must evaluate it by using it to print a wide variety of images. The following workflow uses Monaco ColorWorks to apply profiles and print images. You can use Adobe Photoshop or any other color-managed application for this purpose. Your goal is to look for consistency in output. For example, do the displayed Previews always match the prints? If they do match, is the color quality acceptable to you?

1. Be sure the ColorSync control panel (Mac) or Display control panel (Win) is configured to use your monitor profile.
2. Launch **Monaco ColorWorks**.
3. Click **Open** (folder icon), and open a TIFF image.
4. Select a source profile for the TIFF image from the **Source Profile** list.
5. Select your printer profile from the **Printer Profile** list.
6. Select **Perceptual** from the **Rendering Intent** list.
7. Click **Print** and configure the printer dialog box with the same settings that you used to create the printer profile. Turn off color management, Monaco ColorWorks will automatically apply the correct profile. Print the image.
8. Compare the Preview (on your monitor) with the printed image. Be sure your comparisons are made under the same controlled lighting conditions that were used to create the monitor profile.  
  
Does the Preview image match the print? If the two images reasonably match, is the color quality pleasing? Note your observations.
9. Repeat *steps 3 through 8* with other images.
10. If either of the following conditions exist, return to MonacoEZcolor and use the Edit Printer Profile option to edit the printer profile:
  - the Preview images consistently do not match the prints

*If you are using an ink jet printer, wait until the ink is thoroughly dry (approx. 1 hr.) before making the comparison.*

- both sets of images consistently match, but there are issues with overall color quality

If an occasional image is problematic (the color is not what you desire), use an image editing application, such as Adobe Photoshop, to edit the individual image. Do not edit a profile to correct for the deficiencies of a single image, otherwise, you will be changing the color quality of all images printed with the profile.

## Printer Profile Editing Workflow

This workflow is an overview of both methods of editing the printer profile. It assumes you have evaluated your profile by completing the “Printer Profile Evaluation Workflow”, and have:

- decided to edit the profile to obtain a better monitor-to-print match (Method 1)
- and, decided to edit the profile to achieve more pleasing color (Method 2).

In actual practice, you may be editing your profile for only one of these conditions. If you have not completed a profile evaluation, do so now before attempting to edit your profile.

### Method 1: Adjust Profile for Better Monitor-to - Print Match

1. Launch **MonacoEZcolor** and select **Edit Printer Profile**.
2. Following the prompts in the first few wizard windows:
  - open the printer profile you desire to edit
  - select a Preview image to reference during the editing process
  - load a source profile for the Preview image
  - print the Preview image
3. In the “Choose Your Editing Method” window you are prompted to compare the displayed Preview image to the printed image. Since this overview assumes the Preview image does not match the printed image, select **Method 1**.

4. An instructional window displaying highlights of the Method 1 editing procedure opens. Review the instructions, then click next (>).
5. The “Adjust the Profile for Better Monitor-to-Print Match” editing window opens with your selected Preview image displayed. Use this window to edit your printer profile.

A toolset also opens along side the editing window. Using the available tools, edit the Preview image until a reasonable match with the printed image is obtained.

Your goal is to make the Preview image look as much like the printed image as possible (even if the printed image looks “off”). **Do not try to make the Preview look better than the printed image.** And remember to edit under the same controlled lighting conditions that were used to create the monitor profile.

6. When you have obtained the best possible match, click next (>).
7. Following the prompts in the “Reprint Your Image with Edits Applied” window, reprint the image. *Discard your original printed image.* It will no longer be used.
8. In the “Evaluate Profile Edits” window you are prompted to compare the *new Preview image* with the *new printed image*. If they do not match, click **Continue**, and repeat steps 4-8 until the best possible match is obtained. If you’ve achieved a reasonable monitor-to-print match, select **Done** and save your edited profile.

*Remember, the edits you make using Method 1 only affect the displayed image with the effect of improving the match between the displayed image and the printed image. They do not affect color in the printed image.*

*If you are using an ink jet printer, wait until the ink is thoroughly dry (approx. 1 hr.) before making the comparison.*

## **Method 2: Edit the Profile to Achieve the Desired Result**

1. If you have just completed Method 1, select the **Home** button, otherwise launch **MonacoEZcolor** and select **Edit Printer Profile**.
2. Following the prompts in the first few wizard windows:
  - open the printer profile you desire to edit
  - select a Preview image to reference during the editing process

- load a source profile for the Preview image
  - print the Preview image
3. In the “Choose Your Editing Method” window you are prompted to compare the displayed Preview image to the printed image. Since this overview assumes the Preview image matches the printed image, and you desire to edit the profile to affect the color in the printed image, select **Method 2**.
  4. An instructional window displaying highlights of the Method 2 editing procedure opens. Review the instructions, then click next (>).
  5. The “Edit the Profile to Achieve the Desired Result” window opens with your Preview image displayed.  
Using the available tools, edit the Preview image until you achieve the desired color quality.
  6. When you are satisfied with the color quality in the Preview image, click **Print Image**.
  7. Evaluate your edits to the profile by viewing the *new printed image*. You should see an improvement in the color quality in the image.
  8. When you are satisfied with the color quality in the printed image, select **Save Profile** and save your edited profile.

*If you are using an ink jet printer, wait until the ink is thoroughly dry (approx. 1 hr.) before making the comparison.*

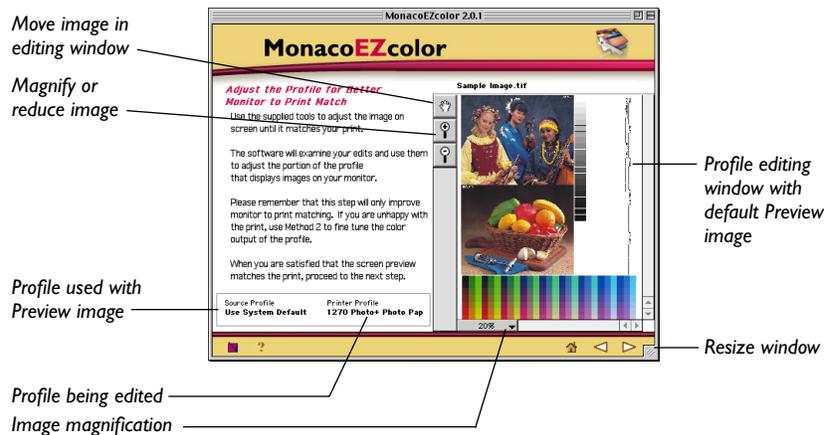
When you have completed the profile editing process, reevaluate the edited profile by printing some images using the Perceptual rendering intent and comparing the prints to the corresponding Previews. When making your comparisons, it is important that you print a variety of images and look for consistency in output. If an occasional image does not print properly, this may be due to the limitations of your printer. In this case, use an imaging application to edit the individual image.

## Using the Profile Editing Windows

During the course of using the wizard, two similar profile editing windows become available. One is used for editing the portion of the profile that controls how images are displayed (Method 1), the other is used to edit the portion of the profile that controls how images are printed (Method 2).

### Using the “Adjust the Profile for Better Monitor to Print Match” editing window (Method 1)

If you find that you have a monitor-to-print mismatch (your monitor images consistently do not match your prints), choose editing Method 1 and edit your profile using the available toolset and the reference image in the “Adjust the Profile for Better Monitor to Print Match” window.



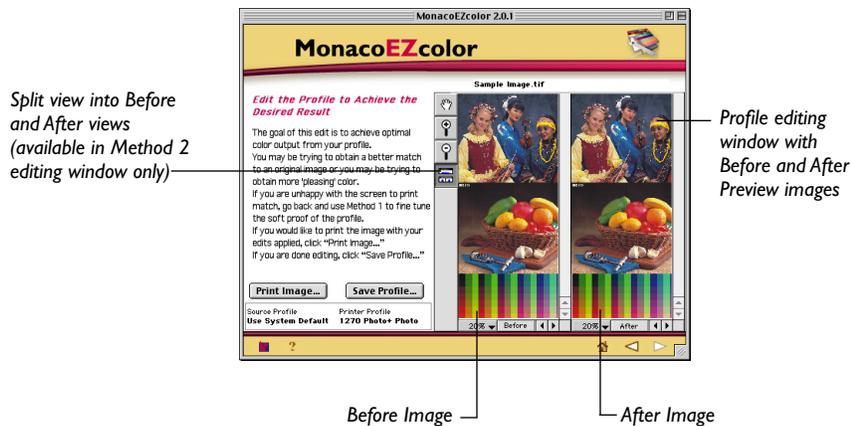
When using Method 1, your goal is to edit the Preview image until it matches the print. Remember you are only affecting the portion of the profile that affects the displayed image. Editing Method 2 is used to affect the print.

### Using the “Edit the Preview Image To Achieve the Desired Result” editing window (Method 2)

The Method 2 editing window, “Edit the Preview Image To Achieve the Desired Result”, is used to adjust tonal relationships and color balance in the profile. Use Method 2 to edit the profile when you desire to affect the printed image.

This window offers an additional “split view” function not found in the Method 1 editing window. Using “split view” allows you to split the Preview image into *Before* and *After* views. The Before view displays the Preview image using the *original* profile, and the After view displays the image using the *edited* profile. Using split view allows you to preview the effects of your edits, without printing the image.

Because using the split view option relies on using your monitor as a proofing device, we do not recommend editing in this window until you have obtained a reasonable monitor-to-print match using Method 1.



## Using the Preview Image

The Preview image is used as a visual reference to evaluate, alter, and preview the effects of your edits on the profile.

You can use any high quality TIFF image that you have a source profile for as a Preview image. It is important that you choose a Preview image that has a wide variety of tonal values and colors. If you do not have a suitable image, we recommend using the default Preview image.

If you use your own Preview image, the wizard will prompt you to load the *Source Profile* for the image. This may be a scanner profile if you are using a scanned image, or a monitor profile if the image was created onscreen, or a *working space profile* if the image was opened and worked on in a Photoshop working space. For example, you scan an image, apply the scanner profile in Adobe Photoshop, convert it to Adobe RGB, and save the image with the profile embedded. The Source profile is now Adobe RGB, and not your scanner profile. In general, use the profile that was last associated with the Preview image as your source profile.

The **Source Profile** field, to the left of the image in the editing window, displays the source profile used with the Preview image.

## Magnifying and Reducing the View



The Preview window is scalable. To increase the size of the window, press and drag the mouse over the lower-right corner of the window.

You can magnify or reduce the view of the Preview image within the window using two methods.

### To increase magnification:

- Click the (+) Magnifying Glass icon and click on the Preview image. Each click increases magnification.
- Choose a percent magnification from the Magnification list located in the lower-left corner of the editing window.

### To decrease magnification:

- Click the (-) Magnifying Glass icon and click on the Preview image. Each click decreases magnification.
- Choose a percent magnification from the Magnification list located in the lower-left corner of the editing window.

## Moving the Preview Image



You can move the Preview image in the profile editing window by using the Move tool.

### To shift the image within the editing window:

1. Click the **Move** icon.
2. Place the cursor over the Preview image. Press and drag the mouse in the direction of desired movement.

**NOTE:** The Move tool is only functional when the Preview image is larger than the profile editing window.

## Splitting the View of the Preview Image



The Preview image can be displayed as a single image, or as a split *Before* and *After* image.

This option is only available when editing in the “Edit the Preview Image To Achieve the Desired Result” (Method 2) window. When editing the Preview image for monitor-to-print match, your goal is to edit the Preview to match the print, consequently, your comparison is made to the print, not a *Before* image.

Toggle the Split View icon to alternate between a single view or the split *Before* and *After* view. The *Before* image, on the left, displays the Preview image with the original profile (before editing) applied. Use the *Before* image to evaluate how the profile (before edits) is currently rendering color.

The *After* image, on the right, displays the same image with any edits you’ve made to the profile applied to the image. In the single view, only the *After* image is displayed.

## Using the Color Tools

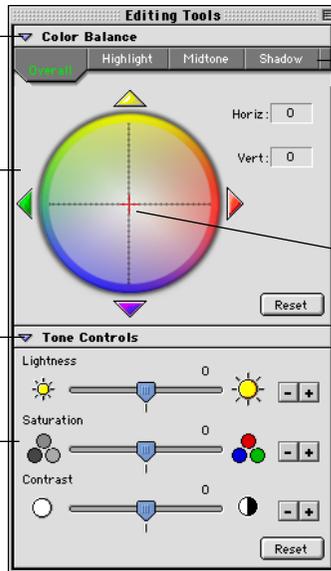
MonacoEZcolor includes two color tools—Color Balance and Tone Controls—that let you modify the color and tonal values produced by your printer profile. Both color tools are presented in one editing palette.

Hide Color Balance portion of window

Use the Color Balance tool to shift color relationships

Hide Tone Controls portion of window

Use the Tone Controls to shift tonal relationships



Color Balance edits are restricted to the tonal range defined by tab.

The center of the color wheel represents the most neutral colors in the selected tonal range. The colors become progressively more saturated as they near the edge of the color wheel.

## Adjusting Color Balance

Use the Color Balance tool to shift color or to remove a color cast in the Preview image. The Color Balance tool lets you adjust color in the overall image, or restrict the edit to high-light, midtone, or shadow areas.

### To adjust color balance in a profile:

1. Choose the **Overall**, **Highlight**, **Midtone**, or **Shadow** tab to define the tonal range you desire to adjust.
2. Select a color by doing one of the following:
  - click on a color in the color wheel
  - click on the colored arrows, or use the keyboard arrows to move the selection cursor over the color wheel

All colors in the selected tonal range are shifted towards the selected color. (If you are using a Windows system, you must click **Apply** to see the change.)

3. If you need to change your selection, click a tab to define the tonal range you desire to affect and choose a different color by clicking the mouse, clicking the colored arrows, or using the keyboard arrows.
4. Repeat the above procedure in the other tonal areas (tabs) as desired.

### When to adjust color balance

Evaluate the brightest areas and neutrals in both the print and the Preview image to detect any overall color casts (unwanted colors). Color casts are easier to see in the high-lights because the eye is more sensitive to highlight areas than shadows. If you notice an unwanted color in any tonal area (highlights, midtones, shadows) of the print, use the Color Balance tool to shift color in that tonal area of the image.

## Understanding the color wheel

Your goal when you use the color balance tool is to shift all of the colors in a selected tonal range towards a selected color.

Think of the color wheel as a color picker that is used to select the color towards which you wish to shift the selected tonal range.

First you define the tonal range that will be affected by the edit by selecting a tab (Overall, Highlight, Midtone, Shadow). Then, select a color by clicking on the wheel, using the colored arrows, or using the arrow keys on your keyboard.

For example, if you've achieved a monitor-to-print match and now you are editing the profile for pleasing color, and the highlights in your Preview and print appear greenish, you would use the color balance tool to shift the highlights in both images away from green (towards red). In this example, you would select the Highlights tab to define the tonal area to be affected, then select the desired color (red) by clicking on the color wheel. This edit would shift all of the highlights in the profile towards the desired color (red), in this case, away from green.

You can edit each tonal range separately by selecting a tab (Highlights, Midtones, or Shadows) and performing a color shift, or you can choose Overall to affect all tonal areas at the same time.

## Using Tone Controls

Use the Tone Controls to shift tonal values towards a desired result. MonacoEZcolor includes three tonal tools—Lightness, Saturation, and Contrast.

## Adjusting Lightness

Use the Lightness slider to increase or decrease the overall lightness in the image.

When an image is too light, the lightest areas are washed out and appear to have little detail. When an image is too dark, all areas lack detail.

### To adjust lightness in a profile:

1. Move the Lightness slider to the right to increase overall lightness, or to the left to decrease overall lightness.
2. If you are using a Windows system, you must click **Apply** to see the change.

## Adjusting Saturation

Use the Saturation slider to adjust overall saturation— or color purity. Saturation is a measure of the amount of gray in proportion to pure color. For example, fire-engine red is more saturated than brick red. A fully saturated color contains no neutral or gray component.

Low contrast images can appear to be undersaturated. For this reason, it's good practice to check for correct contrast before adjusting saturation.

### To adjust saturation in a profile:

1. Drag the saturation slider to the right to increase overall saturation, or to the left to decrease overall saturation.
2. If you are using a Windows system, you must click **Apply** to see the change.

## Adjusting Contrast

Use the Contrast slider to adjust overall contrast— or the relationship between the lightest and darkest areas in the image.

Increasing contrast has the effect of making lights lighter and darks darker. In a high contrast image there is little detail, the darks are too dark and the lights are too light. Decreasing contrast has the effect of making lights darker and darks lighter. An image containing too little contrast seems flat, without any true highlights or shadows.

An image displaying good contrast has a good range of mid-tones with detail in both the highlights and shadows.

### To adjust contrast in a profile:

1. Move the slider to the right to increase overall contrast, or to the left to decrease overall contrast.
2. If you are using a Windows system, you must click **Apply** to see the change.

# 11 Using Profiles

This chapter provides information on:

- storing and managing profiles
- configuring your O/S to use your monitor profile
- using profiles with MonacoEZcolor
- where to get more information

## Storing and Managing Profiles

Profile storage locations are O/S specific. Most color-managed applications will default to these locations when using profiles. Although you can choose another location for saving profiles, MonacoEZcolor will always default to the correct location.

Platform	Profile Location
Macintosh OSX	Library>ColorSync>Profiles
Windows 98/ME	Windows\System\Color
Windows 2000	WINNT\System32\spool\drivers\color
Windows XP	Windows\System32\spool\drivers\color

**WARNING FOR WINDOWS USERS:** Do not let the number of profiles stored in the Color directory exceed 30 (approximately), or you O/S may apply improper profiles.

When you create profiles, give them meaningful names that include the device name, settings used, and date created. Some devices, such as printers, will use more than one profile. For this reason, it is suggested you encode the name with the media and settings used to create the profile.

When you scan images for others, be sure to pass along a copy of your scanner profile with the image. This will allow others using the image to use accurate color. Likewise, when you store images, be sure to store a copy of the profile as well. If you only work with one input device and one printer, these suggestions may not pertain to you. If you use multiple input and output devices, it is always good practice to keep track of your profiles.

## Configuring your O/S to use your Monitor Profile

When you create a monitor profile using MonacoEZcolor, the program automatically loads the profile into the ColorSync (Macintosh) or Display (Windows) control panel. If you experience problems or need to change the default profile, follow the directions below.

### Configuring the ColorSync Control Panel (Mac)

Use the following workflow to load a monitor profile using the ColorSync control panel.

1. Select **Apple Menu>System Preferences>ColorSync**.
2. If not already active, select the **Profiles** tab, and **Profiles for Standard Devices** from the uppermost pop-up list.
3. Select **your monitor profile** from the **Display:** pop-up list.
4. Close the control panel.

Selecting Input, Output, and Proofer profiles is not required. These selections are directly available in color-managed applications.

### Configuring the Display Control Panel (Win)

Use the following workflow to associate a profile with a monitor on Windows operating systems:

1. Select **Start\Settings\Control Panel (98/2000/ME)** or **Start\Control Panel (XP)**.
2. Double-click the **Display** control panel.
3. Click the **Settings** tab, then click **Advanced**.
4. Click the **Color Management** tab.
5. Select **your monitor profile** and click **Set as Default**.

If your profile is not in the list, click **Add** and select your profile from:

- Windows\System\Color folder (98,ME)
  - WINNT\System32\spool\drivers\COLOR folder (Win 2000)
  - Windows\System32\spool\drivers\color folder (Win XP)
- Then, click **Add** in the Add Profile Association dialog box, then click **Set as Default**.
6. If you are using a Windows 98 operating system, select all other profiles in the list and click **Remove**.
  7. Click **Apply**, then **OK** in the Advanced Display Properties dialog box.
  8. Click **OK** in the Display Properties dialog box.

### Using Monaco Gamma (Win)

Due to limitations in the Windows operating system, the gamma table contained in a monitor profile is not loaded. MonacoEZcolor includes Monaco Gamma, a startup utility that automatically loads monitor gamma tables. After creating a monitor profile and restarting your computer, Monaco Gamma automatically accesses the monitor profile from the Display control panel and loads its gamma table.

If you're using another monitor profiling package, the Monaco Gamma startup utility may interfere with its operation. To disable the utility, remove the shortcut to the Monaco Gamma file from the C:\Windows\Start Menu\Programs\Startup folder and restart your computer.

### Using Profiles with MonacoEZcolor

When you edit a printer profile using the Edit Printer Profile option, MonacoEZcolor uses your device profiles to color-manage the editing process.

### Monitor Profiles

The Edit Printer Profile option uses your monitor profile to ensure the Preview image is accurate. On the Macintosh platform, MonacoEZcolor automatically uses the current moni-

tor profile loaded in the ColorSync control panel. On the Windows platform, MonacoEZcolor automatically uses the profile currently associated with your monitor in the Display control panel.

## **Input Profiles**

When you use the Edit Printer Profile option, you are asked to select a Preview image and a Source profile to use with the Preview image. The Preview image is used as a visual reference when editing the profile. The Source profile is used to ensure that the color in the Preview image accurately reflects the original image. If the Preview image you selected was scanned using your scanner, select your scanner profile as the Source profile. The profile is not automatically used by the software. You must select it when prompted.

## **Printer Profiles**

When you use the Edit Printer Profile option, you are asked to select a printer profile to edit. You can edit any RGB or CMYK printer profile. When prompted, simply select your printer profile.

## **Where Can I Get More Information**

MonacoEZcolor ships with Monaco ColorWorks; an application that is used for editing and printing images using profiles. For complete information on using Monaco ColorWorks, see the PDF located on the CD or select the Help button within the ColorWorks application.

Monaco Systems supports using profiles with the full version of Adobe Photoshop (5.0 or later). For more information on these workflows, visit the Monaco Systems web site @ [www.monacosys.com](http://www.monacosys.com).

Adobe Photoshop Limited Edition does not support color management and Adobe Photoshop Elements has limited color management support. If you are using Adobe Photo-

shop LE and desire to implement color management, you must upgrade to the full version or use a utility, such as Monaco ColorWorks, that supports color management.

If you have other color managed applications, consult the software manufacturer for instructions on applying profiles with their product.



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