User Guide

English

Harmony

version **1.2**

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www.creo.com

Harmony

version 1.2

User Guide

creo™

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5103407	5325217	5497252	5652804	5875288	6060208	6181439
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5113249	5333064	5509561	5691828	5900981	6063546	6189452
5122871	5339176	5517359	5696393	5934196	6072518	6191882
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5208818	5384648	5579115	5764381	5973801	6121996	
5208888	5384899	5592309	5771794	5986819	6130702	
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Who Should Use This Manual

This manual describes how to use Harmony release 1.2 calibration software. It also contains reference material about tonal calibration. Use this manual with the accompanying Harmony reference documentation for your specific workflow.

This manual is intended for prepress operators responsible for calibrating tonality.

This manual assumes that:

You have a working knowledge of prepress operations.

You are familiar with the use of a personal computer running the Windows operating system.

All the hardware, software, and network components of your CreoScitex system are installed, configured, and operating correctly.

Files submitted to the CreoScitex system are free of common errors usually dealt with during preflight, such as missing fonts and PostScript errors.

Conventions Used in This Manual

This section describes the fonts, terminology, and symbols used in this manual.

Workflow-Specific Text Indicators

Some information in this manual applies only if you have a particular workflow. In these cases, the name of the workflow is indicated in the margin.

The workflow-specific indicators in this manual are:

Copydot	Indicates information for those using Harmony with CreoScitex Copydot Toolkit only.
Delta	Indicates information for users with a Delta workflow only.
iMPAct	Indicates information for users with an iMPAct workflow only.

Prinergy	Indicates information for users with a Prinergy workflow only.
Spectrum	Indicates information for users with a Spectrum digital halftone proofing workflow only.

Fonts

Frutiger bold is used to refer to buttons and other items in a dialog box, file names, folders, menu names, and menu commands.

Minion Italic is used to refer to other chapters in the manual, book titles, and titles of other manuals.

Frutiger is used for figure and table captions.

`Letter Gothic` is used for messages on your computer screen and for information that you must type.

SMALL CAPS is used for a key or key combination on your keyboard.

Terminology

Clear	Place the mouse pointer over the check box for the specified option, and click the left mouse button so that the X or check mark is removed from the check box.
Click	Place the mouse pointer over the specified option or button and press and release the left mouse button.
Double-click	Place the mouse pointer over the specified option or button and quickly press and release the left mouse button twice.
Drag	Hold down the left mouse button while moving the mouse and release the button.
Enter	Type the information and press the ENTER or RETURN key.
Point	Position the mouse pointer over a submenu or menu command. For example, point to the **File** menu.
Press	Press the specified key or key combination on your keyboard, for example, press CTRL+ALT+DEL.
Right-click	Place the mouse pointer over an area of the application window, and then press and release the right mouse button to display the shortcut menu. For more information about using shortcut menus, see your Windows documentation.
Select	Place the mouse pointer over the check box for the specified option, then click the left mouse button so that an X or check mark appears in the check box. Or: Place the mouse pointer over the specified box or button, and then click the left mouse button.
Type	Type the information. Do not press the ENTER or RETURN key.

Symbols



Attention: This symbol alerts you to things that may cause loss of data or damage to your computer hardware.



Important: This tells you about things that may cause process delays or reduce functionality, reliability, or quality.



Note: A note provides additional information that you may need to consider.



Tip: This symbol draws attention to information that can help you perform a task more quickly or easily.



The reference symbol tells you that related information on the topic is available in other CreoScitex documents.

PDF Document

This manual is also provided in PDF (Portable Document Format).

The PDF document can be used for online viewing and printing using Adobe Acrobat Reader. When printing the manual, please print the entire manual, including the copyright and disclaimer statements.

1 Overview

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What Is Harmony?

Harmony software lets you calibrate output in a digital prepress workflow. You can use Harmony to create, apply, and manage calibration curves. Calibration curves control tonal reproduction on press and are applied when the digital file is rasterized by your output raster image processor (RIP). By controlling tonality in the print reproduction process, Harmony lets you achieve the presswork quality you want without adjusting the press.

Copydot

Depending on your workflow, calibration can be applied to continuous one representation of tints and to copydot (screened) data.

Harmony lets you match your output with an output sample you choose, called a target. It also lets you calibrate proofs imaged with proofing devices such as the Trendsetter Spectrum digital halftone proofing option.

Harmony has two components:

- the Harmony application, which lets you create, edit, import, and export curves
- the Harmony database, which stores the curves that you create, edit, or import

Benefits of Using Harmony

Most other calibration tools are built to calibrate film. Film calibration assumes that you want to linearize the curve, which means output the same tint percentage as was input. In other words, these tools assume a linear target and don't let you to enter a different target.

Harmony can be used to calibrate film (you enter a linear target to achieve film calibration); however, it may also be used to calibrate plates, proofs, and press sheets. For plate, proof, and press sheet calibration, a linear target curve is not usually desirable, so Harmony lets you enter a different target.

By controlling tonal reproduction and incorporating tone value increase as a fundamental component of the printing process, Harmony gives you accurate control of the product you sell. It also gives you the flexibility to tailor the result to meet different customer expectations.

For more information about calibrating various output types (for example, film, plate, or press sheet), see *Choosing Which Output Type to Calibrate* on page 14.

Limitations of Harmony

Harmony can be used only with RIPs that read its database format.

See also *Limitations of Tonal Calibration* on page 3.

Why Calibrate?

You need to calibrate to control the tones on the press sheet. Tonal values can change during print reproduction. This change is called tone value increase; it is a normal part of the print reproduction process.

In a halftone workflow, tone value increase occurs because the size of the halftone dots changes during the halftone reproduction process. This change in the size of halftone dots (tone value increase) is called dot gain.

Controlling tones using calibration means that you can manipulate the exact size of the dots on the printing plates so that tone saturation and gray balance are controlled on the press sheet.

Tonal calibration can account for:

- type of plate or film used
- type of paper stock used for printing
- type of dot shape used
- type of screening used—for example, stochastic or conventional, lines per inch (lpi), and dots per inch (dpi)



Important: If you are using computer-to-plate technology, for example, a Trendsetter, do not adjust the laser exposure to increase or decrease tints. Adjusting laser exposure is not tonal calibration and will affect the run length of the plate.

Limitations of Tonal Calibration

You cannot use tonal calibration as a substitute for stable operating conditions. Operating conditions must be controlled as a separate process. In fact, without a stable operating environment, you cannot achieve accurate tonal calibration.

Press operating conditions that must be stabilized are:

- appropriate ink tack
- correct ink-water balance
- good blanket conditions
- correct ink densities
- registration
- appropriate humidity and temperature

As well, tonal calibration cannot account for the color shift or tone break that occurs when halftone dots join. All conventional screens cause a jump in color at a certain tint when the ink of adjacent dots begins to touch. You cannot remove this jump by calibrating. For example, a Euclidean dot jumps at 50% because its shape causes all four sides to join at that tint percentage.

When Should You Calibrate?

If you are not happy with your current tonal reproduction, you should calibrate.

Once you have established a standard set of calibration curves that work well, you only need to add or adjust curves when something in your process changes or when your printing objectives (your targets) change.

For example, your printing operation has one target and uses a calibration curve that lets you achieve that target on all your work. However, one of your customers likes the fuller printing achieved with a negative film workflow. To satisfy this customer using computer-to-plate technology, you need to create a new target curve and derive a new calibration curve to meet that target. You can still retain the previous target curve and its associated calibration curve for other work.

To use Harmony successfully in your workflow, it is helpful if you understand the theory of tonal calibration.

What Is Tonal Calibration?

This section is included to help you understand the idea behind Harmony calibration. Having a basic knowledge of tonal calibration may help you decide when and how to create and modify curves, as well as troubleshoot problems.

What Is Tonality?

Tonality in printing is the progression of tints from blank paper to solid ink for each color in a printing job. You can determine tonality by measuring a series of tint patches—ranging from the highlights to the shadows—on your output. The measurement you take for each tint is the percentage of light each tint patch absorbs—for example, 0% tint for blank paper (no light absorbed) or 100% tint for solid ink (all light absorbed). This measurement is called the tonal value.

Tonal value describes all visual representations of tints, including continuous tone tints and halftone tints. Tonal value on halftone output is also called effective dot area or Murray-Davies dot area.

What Is Tone Value Increase?

Tonal values can change during the print reproduction process so that the tonal values on your final output are greater than the tonal values you expected. This change is called the tone value increase. Tone value increase is a normal part of printing, and there are a number of reasons why tone value increase happens during the print reproduction process. Tone value increase on halftone output is called dot gain.

For more detail on why and where tone value increase happens, see *Tone Value Increase in Digital Tonal Reproduction*.

Tone Value Increase in Digital Tonal Reproduction

In a digital workflow, tone value increase happens when a digital file is turned into an image on a press sheet or proof. The result is that the tint values specified in the digital file do not match the tonal values on your output. By using Harmony to calibrate tonality, you can control the tonal values on your output and achieve desired results under a variety of printing conditions.

To fully understand why you need to calibrate, you must understand how the change between the tint percentage specified in the digital file and the tonal values on the press sheet happens during tonal reproduction. In other words, you need to understand how and where tone value increase happens in this process.

Overview of Digital Tonal Reproduction

The digital tonal reproduction process involves a number of steps. Figure 1 illustrates these steps.

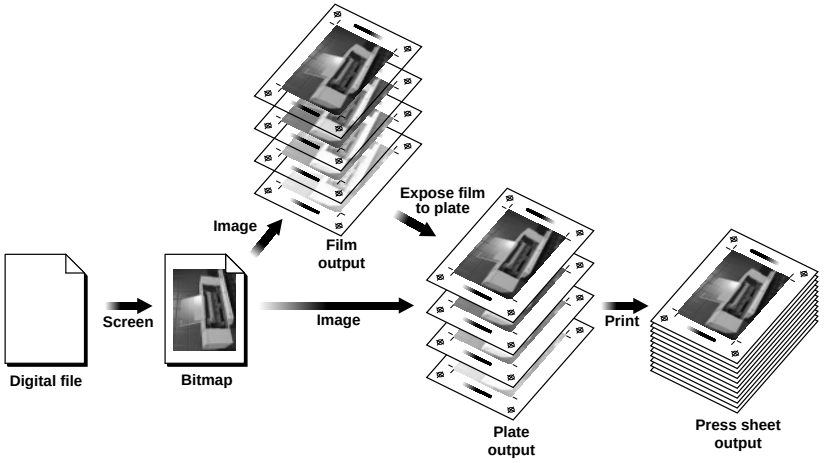


Figure 1: Digital tonal reproduction

The steps in the tonal reproduction process are:

1. You start with a digital file (for example, PostScript or PDF). In the file, all tints are assigned a continuous tone percentage value between 0 and 100 that corresponds to a specifically sized halftone dot.
2. The file is turned into a bitmap by the screening engine of the RIP. The RIP converts the file by reading the percentage values defined in the file and creating a screen of halftone dots, each with a tint percentage value. For example, 50% means that half percent of the halftone cell area is covered by the halftone dot.

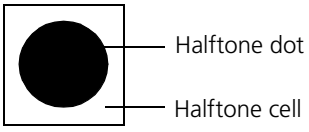


Figure 2: Halftone cell

3. The bitmap is output to plates or proofs. In this step, each halftone dot is imaged on the plate or proof using a series of laser spots.



Note: If you are not using computer-to-plate technology, the bitmap is first imaged to film, and then the film is exposed on the plate to transfer the image to the plate.

4. A printing press is used to transfer the image from the plate to the press sheet.

When Tone Value Increase Occurs in Digital Tonal Reproduction

Tone value increase happens in the process that converts a digital file to a visual tint rendered by ink on paper (shown in Figure 1 on page 6). Tone value increase is the absolute, not relative, increase in tonal value. For example, if a 50% tint specified in the file produces a 69% tonal value (effective dot area) on the press sheet, the overall tone value increase (dot gain) is 19%.

The graphical relationship between the tint values specified in the digital file and tonal values or effective dot area on the press sheet or proof is called the print characteristic. Figure 3 shows this relationship.

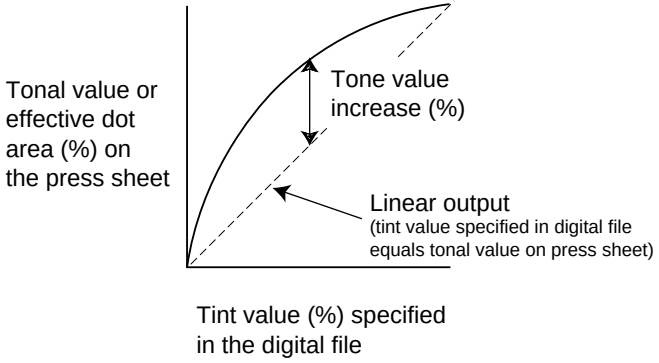


Figure 3: Print characteristic

On halftone output, there are two types of tone value increase (dot gain): physical dot gain and optical dot gain. Tonal value or effective dot area—that is, the perceived tint on the press sheet or proof—includes both physical and optical dot gain. It is a measure of the amount of light trapped by the dot on the sheet, compared to that trapped by solid ink.

Physical Dot Gain

Physical dot gain means there is a change in the physical size of the dots during tonal reproduction. Changes in the physical size of the dot can happen at three points in the process:

- imaging and processing the film or plate
- contacting and processing the plate in a film workflow
- printing on press

During the process of imaging to plate, either directly from the file or from film, a small change in dot size can happen. Typically, contacting negative film results in physical dot gain and contacting positive film produces physical dot loss.

Note: Physical dot gain (or loss) is minimal with CreoScitex-developed thermal laser head or HRX green head technology on most plate types.

Changes in the physical dot size occur on press as ink and water are transferred to the plate, as ink is transferred to the blanket and then to the paper, and by the pressure of subsequent printing units.

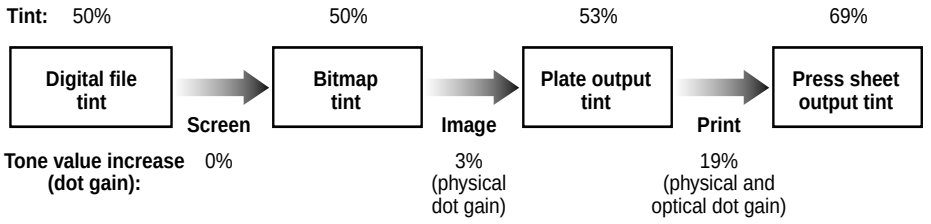


Figure 4: Example of tint value changes

For example, in Figure 4 on page 8, the overall tone value increase dot gain (from tint specified in the digital file to the press sheet output tint) is 19%, and the tonal value on the press sheet is 69% (from a 50% tint specified in the file).

Optical Dot Gain

Optical dot gain is the increase in the amount of light trapped by a dot, beyond the physical size of the dot. This increase happens because light striking white paper may be diffused by the paper and subsequently absorbed by a nearby ink dot, rather than leave the paper. The absorption of this diffused light makes the dots appear effectively larger than their physical size.

Under a microscope, the physical size of the dot corresponds directly to the bitmap tint percentage plus the physical dot gain. To the eye (or if measured with a densitometer), the amount of light corresponds to a dot area that is effectively greater than the physical dot. The overall light-absorbing effect of the dot, by virtue of its physical size and optical dot gain, is the tonal value.

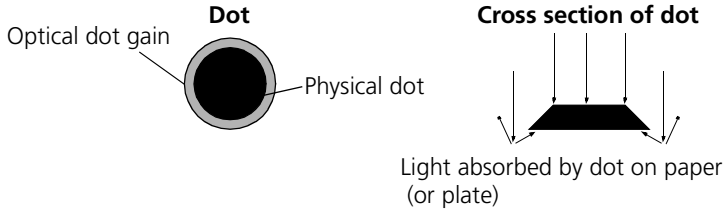


Figure 5: Tonal value

Does Harmony Calibration Remove Tone Value Increase?

A common misconception is that the purpose of calibration is to remove dot gain or tone value increase.

Harmony does not remove dot gain from the printing process because, as explained above, both physical dot gain and optical dot gain are part of the halftone reproduction process and cannot be removed.

What Harmony does do is compensate for the dot gain that you are currently getting. Harmony does this by adjusting the size of dots imaged on the plate, digital halftone proof, press sheet, or film. The RIP makes an adjustment, based on the tint value specified in the file, so that the desired result is reproduced on your final deliverable. See *How You Use Harmony*.

How You Use Harmony

Harmony lets you:

- create calibration curves that are applied to your output. See *Creating Curves*.
- import a predefined calibration curve that is applied to your output.



For more information on importing calibration curves, see *Importing and Exporting Harmony Curves* on page 92 or the Harmony reference documentation for your specific workflow.

- manage your Harmony database. For more information on managing your Harmony database, see the Harmony reference documentation for your specific workflow.

Creating Curves

If you want to create your own calibration curves, you must first define your printing objective, that is, what you want to achieve on press. This is called the target curve. For example, if calibrating to a press sheet, your target may be a proof or the previous press run. If calibrating to plate, your target may be a plate that achieves good printing. You measure the target sample and enter the dot area (tonal value) for the tints on the target curve graph in Harmony.

Then, you characterize the output you are producing now, called a current curve. You measure the current sample and enter the dot area (tonal value) for the tints on the current curve graph in Harmony.

Finally, you match the target curve (what you want to achieve) and the current curve (what you are achieving now). Harmony uses the dot area (tonal value) information you entered in the target and current curve graphs to create a derived calibration curve.

Based on the tints specified in your digital file, Harmony determines the adjustment needed to achieve the target. The definition of this change is the derived calibration curve. Harmony stores each of these curves in the Harmony database, as well as the link between the calibration curve and the target and current curves from which it was derived.

How Harmony Creates a Calibration Curve

The basic principles of Harmony are:

- Tone value increase (dot gain) exists in the print reproduction process.
- Under stable operating conditions, a press has a certain print characteristic—that is, a press produces consistent tone value increase. For example, each time a 45% tint is specified in the file, a press produces a tint that measures 58%.

Knowing these principles, Harmony calibrates by applying a different tint when the digital file is RIPed, rather than the tint specified in the file. The tint Harmony applies during RIPing is called a calibrated tint.

For example, you want a 45% tint specified in the file to produce a 70% tint on press; however, a 49% tint produces a 70% tint on press. You could adjust the press to change the print characteristic, but this is costly and time-consuming. The only way to change your results on press without altering the press is to input a different tint value at the RIP. In other words, by substituting a 49% tint, when a 45% tint is specified in the file, prior to screening, Harmony lets you achieve a 70% tint on press without adjusting the press.

Harmony determines which calibrated tint should be substituted by comparing the number pairs for the target and current curves you want to link together to create a calibration curve. The calibration curve it creates is a graph of the tint specified in the digital file and the calibrated tint that should be substituted.

Figure 6 shows that Harmony performs the following functions:

- Finds the same tonal value percentage on the final output (output tint) for both the current and target curves—in this case, 70%.
- Determines how to compensate for the current tint to achieve the target tonal value on press—in this case Harmony must input a 49% tint to the RIP every time a 45% tint is specified in the incoming digital file.
- Builds a calibration curve that says: every time a 45% tint is specified in the file, substitute a 49% tint at the RIP. By substituting a 49% tint, given your print characteristic, a 70% tint appears on the final output.

The original digital file still says a 45% tint, but you end up with a 70% tint on the final output. Your target is achieved.

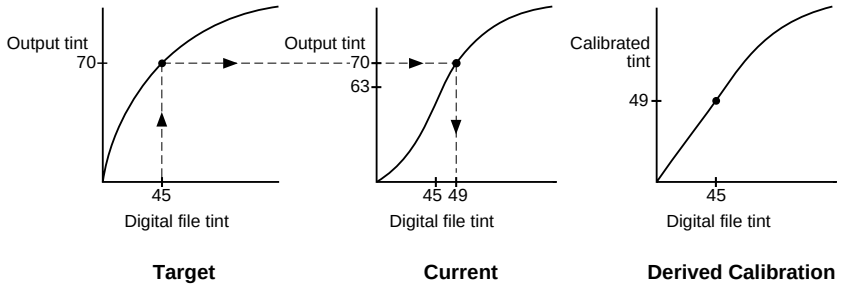


Figure 6: How Harmony derives calibration curves

This example describes a current response that is uncalibrated. If the current response was measured from calibrated output—that is, a calibration curve was applied in producing plates for the current curve sample—Harmony will consider the calibration used previously and adjust the substitution accordingly.

For more information about using a calibrated current response, see *Using Calibrated Data* on page 84.

Does Harmony Calibrate Color?

While Harmony is not a color management system, you can use it to create color-specific calibration curves that will be saved together as a **CMYK Curves** curve set. See *Curve Sets* on page 27.

When color-specific calibration is specified, a curve is created for each process color (cyan, magenta, yellow, and black).

The black calibration curve is applied to all spot colors, unless you create calibration curves for your spot colors. If you define spot color calibration curves, color-specific calibration curves are applied to process colors, and spot color calibration curves are applied to spot colors. For more information about spot color curves, see *Curve Sets* on page 27.

When to Use Color-Specific Curves

Spectrum

Color-specific curves are an advanced feature of Harmony. Always use color-specific curves when making proofs using the Trendsetter Spectrum digital halftone proofing option or the Proofsetter Spectrum digital halftone proofer.

Color-specific curves are also useful for:

- correcting a significant gray balance problem

  If your neutral three-color gray tints show a gray imbalance by displaying a significant hue or not matching the corresponding black screens, you need a **CMYK Curves** curve set to separately adjust your C, M, and Y colors to produce a neutral grayscale. See *Adjusting for Gray Balance* on page 96.

- tailoring the film calibration and plate exposure to each separation

  In other words, if the relative dot gain between press and proof varies from color to color, you can calibrate each separation. For example, if your press prints black heavier than other colors, you may want a separate curve for black that accounts for the greater tone value increase.

If you are not creating proofs on a CreoScitex-developed Spectrum output device, you usually need only one curve for all colors for the following reasons.

- Although the absolute dot gain characteristics are unique for each separation, the resulting calibration curves are similar and apply the same corrections to each separation.
- A **One Curve** curve set is easier to maintain and update, so consider carefully whether color-specific curves will add value to your printing.

If, in your conventional film workflow, you did not make film or plates differently for each separation, you shouldn't need to calibrate each separation using color-specific curves in a digital workflow.

How Many Calibration Curves Do You Need?

The number of calibration curves you need to create depends on many factors. Depending on your situation, you may need one calibration curve or many calibration curves.

Important points to consider are:

- For current curves, remember that the plate type, screen type and ruling, dot shape, ink, paper, and press can all have different effects on tonal reproduction. Multiple curves may be required to account for the role each factor plays in tonal reproduction.
- For target curves, remember that proofing and print expectations will determine how many curves you produce. For most, one target will be enough. For others, a different target may need to be produced for each type of proofing device and maybe even for different customers.
- Each combination of target and current curve that you link together will produce a different derived calibration curve (or transfer calibration curve of derived origin).

Choosing Which Output Type to Calibrate

When you create a current or target curve, you must specify the output type you want to calibrate. Harmony lets you calibrate three output types:

- **Film**
- **Paper**—includes both the printed result and proofs
- **Plate**—includes flexography

You must specify the output type you choose in the **Type** box when setting target curve and current curve properties. See *Setting Target Curve Attributes* on page 79 and *Setting Current Curve Attributes* on page 81.

You must also use this output type when measuring current and target samples. For example, if you want to calibrate the final result on press, select **Paper** in the **Type** box, and obtain current sample measurements from a press sheet and target sample measurements from a press sheet, proof, or industry standard.

For more detail on target and current samples, see *Chapter 4, Acquiring Target and Current Samples*.

We recommend choosing the same output type as your final deliverable. In general:

- A printing shop that produces press sheets and proofs should calibrate **Paper**.
- A shop that produces film should calibrate **Film**.

  Usually film calibration linearizes film output—that is, it ensures that the physical dot on film is the same size as the tint value specified in the digital file you input. In this case, your target curve is simply a straight line.



Note: If you image film using a CreoScitex-developed output device with a thermal head, you don't need to calibrate for linear film because CreoScitex SQUAREspot thermal technology produces accurate linear results. In this case, simply specify straight lines for both the current and target curves.

- A trade shop that produces plates can calibrate either **Paper or Plate**.

  For customers that you work closely with, you may want to calibrate the final result on their press rather than the plate. In this case, select **Paper**.

The advantages of selecting **Paper** rather than **Plate** or **Film** are:

- Plates can achieve different results on different presses.
- It is the most accurate way to reproduce desired tones on press because paper calibration accounts for dot gain (tone value increase) in all the steps of tonal reproduction, including optical dot gain on paper.

If you decide to calibrate plates, select a plate that produces acceptable printing as your target. This target can be used to recalibrate when changes occur in the platemaking process. For best results, use the same plate type for your current sample as you plan to use for the final deliverable.

See *Selecting Your Output Type* on page 60.



Note: If you image plates using a CreoScitex-developed output device with a thermal head, you don't need to calibrate for linear plates because CreoScitex SQUAREspot thermal technology produces accurate linear results. In this case, simply specify straight lines for both the current and target curves.

Tools Required

Hardware and Operating System

Harmony can be installed on an Intel or Alpha computer using any of the following operating systems:

- Windows NT 3.51, NT 4.0, or higher (recommended)
- Windows 95

Prinergy You will also need a Local Area Network (LAN) if your Harmony database and application are not installed on the same computer.



For more information about hardware and operating system requirements, see the Harmony reference documentation for your specific workflow.

Measuring Device

You will need a measuring device, such as a densitometer, strip reader, or plate reader, to measure the tints on your target and current output samples.

You can use various types of measuring devices with Harmony to calibrate tonality. Different types of measuring devices measure different attributes affecting tonality. Make sure you select a measuring device that is appropriate for the type of calibration you are using Harmony for.

Reflection Densitometers

Reflection densitometers illuminate the medium and measure the amount of reflected light. The illuminating or reflected light is filtered to discriminate among cyan, magenta, yellow and black colorants. If you use a reflection densitometer in dot area mode, the device can measure the effective dot area (EDA or optical dot area) of both halftone screens and continuous tone tints. Different filter standards—for example Status A or Status T—will give you different readings from the same measured sample, so make sure that the measuring instrument and filter type you use are consistent when you create curves.



Note: If your measuring device has a Yule-Nielson factor, do not adjust it. Leave the Yule-Nielson factor at 1.

Use a reflection densitometer to measure solid density and effective dot area on paper stock.

Transmission Densitometers

A transmission densitometer illuminates the medium you are measuring from one side and measures the amount of light transmitted to the medium's other side. You typically use a transmission densitometer to measure lithographic film, so these devices do not have color filters. If you use a transmission densitometer in dot area mode, the reading you get expresses the amount of light absorbed by a tint patch as a percentage of the amount of light absorbed by a fully exposed patch of film. This is a reasonably accurate measurement of the physical size of halftone dots on film, because film exhibits minimal optical dot gain.

Use a transmission densitometer to measure physical dot area (PDA) on lithographic film.

Spectrophotometers

A spectrophotometer illuminates the medium and measures the amount of reflected light. The reflected light is separated into many narrow spectral bands, and each band is measured separately.

Some spectrophotometers are capable of adding these spectral measurements together in various proportions to simulate standard densitometer filters and calculate effective dot area. These devices are often called spectrodensitometers. In addition to the capabilities of densitometers, spectrophotometers can also express color as LAB and other values.

Use a spectrophotometer or spectrodensitometer in dot area mode (like you use a reflection densitometer) to measure solid density and effective dot area on paper stock.

Strip Readers

Strip readers are either densitometers or spectrophotometers that automate the process of measuring tints. Strip readers measure the same characteristics as hand-held densitometers and spectrophotometers.

Dot Meters

Dot meters illuminate the medium and take a picture with a charge-coupled device (CCD) camera. The dot meter analyzes the resulting image to determine the physical dot area and screening characteristics of halftone

dots, rather than the light-absorbing properties of the tint patch. Dot meters measure reflective media. Some dot meters can also measure transmissive media.

Use a dot meter to measure physical dot area on plates and film.

Densitometers, Spectrophotometers, and Harmony

Harmony supports densitometer input through the serial port on your computer. You connect your densitometer to the computer's serial port and take tint measurements that Harmony can automatically detect and use.

Harmony comes preconfigured for a number of densitometers. You select the densitometer brand and model using the **Preferences** menu. If the densitometer you use is not listed in this menu, you need to specify the characteristics of your instrument in the **densitometers.cfg** file located in the **Harmony** folder.

For more information on configuring your densitometer for Harmony, see *Appendix C, Setting Up Your Densitometer*.

Strip Readers and Harmony

Harmony supports automatic strip reader input through the serial port on your computer. You connect your strip reader to the computer's serial port and take strip measurements that Harmony can automatically detect and use.

Harmony comes preconfigured for a number of strip readers. You select the strip reader brand and model using the **Preferences** menu.

For more information on setting up your strip reader for Harmony, see *Appendix C, Setting Up Your Densitometer*.

Dot Meters and Harmony

Harmony supports dot meter input through the serial port on your computer. You connect your dot meter to the computer's serial port and take plate measurements that Harmony can automatically detect and use.

Harmony comes preconfigured for a number of dot meters. You select the dot meter brand and model using the **Preferences** menu. If the dot meter you use is not listed in this menu, you need to specify the characteristics of your instrument in the **densitometers.cfg** file located in the **Harmony** folder.

For more information on configuring your dot meter for Harmony, see *Appendix C, Setting Up Your Densitometer*.

Tint Bar

Each output sample you use needs to have a tint bar from which tints can be measured.

Test forms and imposition marks with calibrated and uncalibrated color tint bars are provided with Harmony. The calibrated tint bar allows the appropriate calibration curve to be applied to it; the uncalibrated tint bar does not allow any calibration curve to be applied to it.

We suggest adding the calibration marks to all impositions. By doing this, you will not need to do a separate press, plate, or film run to measure your current response.

2

Getting Started

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Starting Harmony

In most workflows, you can start Harmony from the Windows Start menu.

To start Harmony using Windows 95 or Windows NT 4.0:

- From the **Start** menu, point to **Programs,** then point to **Harmony**, and select **Harmony**.

To start Harmony using Windows NT 3.51:

- From the **Harmony** program group, double-click the **Harmony** icon.

In some workflows, you can also start Harmony from your workstation software.

For more information, please see the Harmony reference documentation for your specific workflow.

Harmony Application Window

When you start Harmony, the application window displays. The application window is where all Harmony processing is done.

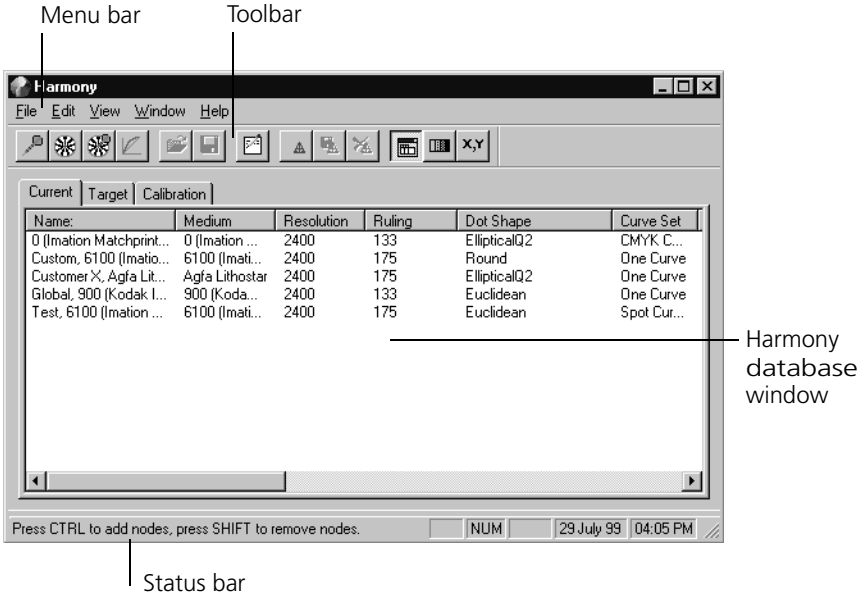


Figure 7: Harmony application window

Menu Bar

The menu bar is located in the top of the window. All menu commands are described in this manual in the context of the task in which you use them.

For an overview of the menus, see *Appendix A, Menus*.

Shortcut Menu

You can click your right mouse button on an item to display a shortcut menu that contains common commands you can use on the item. For example, by right-clicking a curve in the Harmony database window, you can open, copy, or delete that curve.

Toolbar

The toolbar is located at the top of the window, just below the menu bar. All of the tools in this bar are described in the context of the task in which you use them.

For an overview of all tools, see *Appendix B, Toolbar*.

Hiding and Displaying the Toolbar

If you don't want to use the toolbar, you can hide it from display.

To hide or show the toolbar:

- From the **View** menu, select **Toolbar**.

  If the toolbar was in view, it is now hidden, and the check mark next to **Toolbar** no longer displays.

  If the toolbar was hidden, it now displays, and a check mark appears next to **Toolbar**.

  Each time you select **Toolbar**, it is displayed or hidden.

Status Bar

The status bar is located at the bottom of the window. The status bar provides messages about the current action being performed.

Hiding and Displaying the Status Bar

If you don't want to use the status bar, you can hide it from display.

To hide or show the status bar:

- From the **View** menu, select **Status Bar**.

  If the status bar was in view, it is now hidden, and the check mark next to **Status Bar** no longer displays.

  If the status bar was hidden, it now displays, and a check mark appears next to **Status Bar**.

  Each time you select **Status Bar**, it is displayed or hidden.

Harmony Database Window

When you save a current, target, or calibration curve, it is stored in the Harmony database. The Harmony database window displays all of the curves saved in the opened Harmony database. It also displays the properties of each curve, and, for calibration curves, whether the curve is enabled for selection by the RIP.

For more information about the Harmony database, see the Harmony reference documentation for your specific workflow.

Hiding and Displaying the Harmony Database Window

If you don't want to see the Harmony database window, you can hide it from display.

To hide or show the Harmony database window:

➢ From the **View** menu, select **Curves Database**.

If the Harmony database window was in view, it is now hidden. The check mark next to the **Curves Database** menu command no longer displays, and the toolbar button is not selected.

If the Harmony database window was hidden, it now displays. A check mark appears next to the **Curves Database** menu commend, and the toolbar button is selected.

Types of Curves

There are three general types of Harmony curves:

- target curves
- current curves
- calibration curves
  - derived
  - transfer

All target, current, and calibration curves that you save in Harmony are stored in the Harmony database. However, only the calibration curves in the Harmony database are selected by the RIP and applied to files to produce the desired result. In other words, only calibration curves are used for tonal calibration in the print reproduction process.



Note: A calibration curve must be enabled to be selected by the RIP. For more detail, see the Harmony reference documentation for your specific workflow.

Target Curves

A target curve represents the tonal or dot gain characteristic of the printing that you want to match.

Spectrum

You can use your own targets and create target curves for them. Alternatively, you can import predefined target curves into the Harmony database from the **CreoTargets.hmy** or **ImationTargets.hmy** (for Spectrum proofs) files found in the **Harmony** folder. These curves are based on industry standards or qualified by CreoScitex and its partners.

Current Curves

A current curve represents the tonal value or dot gain characteristic of your current printing.

The number of current curves that you produce varies by the degree to which tonal reproduction is affected by printing variables. For example, you may have a different current curve for each press, and/or each kind of paper stock, and/or each type of plate used.

See *How Many Calibration Curves Do You Need?* on page 14.

Calibration Curves: Derived and Transfer

You can use two types of calibration curves in Harmony: derived and transfer.

Derived Calibration Curves

A derived calibration curve is the most common type of curve. It is derived from the target profile and current profile that you specify. Its curve represents the adjustment needed to the tint specified in the digital file so that your target is achieved on press. Though target and current curves are saved separately in the Harmony database, the link between them is maintained in the derived calibration curve saved in the Harmony database.

Transfer Calibration Curves

A transfer curve is a calibration curve that is not linked to a target and current curve. There are three ways to create transfer calibration curves:

- create a new transfer calibration curve

For more information, see *Creating Transfer Calibration Curves* on page 54.

- convert a derived calibration curve to a transfer calibration curve

  You usually convert a derived calibration curve so that you can adjust it independently of the target or current curve.

  For more information, see *Making Derived Curves Transfer Curves* on page 98.

- import a calibration curve from another calibration utility

  Imported calibration curves are transfer calibration curves because Harmony cannot determine how these curves were derived.

  For more information, see *Importing and Exporting Harmony Curves* on page 92 or the Harmony reference documentation for your specific workflow.

Curve Sets

A target, current, or calibration curve may be composed of a **One Curve** curve set, a four-curve **CMYK Curves** curve set, or a **Spot Curves** curve set. For target and current curves, the curve set is defined in the curve's properties when creating a new curve, and once defined cannot be changed. For a calibration curve, the only way to change the curve set is to first convert the derived calibration curve to a transfer calibration curve.

For more information, see *Changing Curve Sets of a Transfer Curve* on page 99.

One Curve Set

A **One Curve** curve set is measured from a single process color (C, M, Y, or K) to create one calibration curve that is applied to all color separations. With a **One Curve** curve set, you must specify the color you are measuring by selecting it from the **Measured Color** box when you set new target curve or current curve properties. See *Creating Target Curves* on page 45 and *Creating Current Curves* on page 47.

The black separation is typically measured to create a calibration curve for use with all colors. However, Harmony lets you choose another color as your measured color. If dot gain is atypical in the black printing unit, you may choose to measure another, preferably high-contrast, color, like magenta.

In almost all cases, a **One Curve** curve set will be sufficient for calibration.

CMYK Curves Set

A **CMYK Curves** curve set is measured from each separation—that is, each of C, M, Y, and K. A color-specific curve is used for each color separation. The black calibration curve is applied to all spot colors unless you build calibration curves for spot colors. See *Spot Curves Set*.

Color-specific curves are useful only when:

- correcting gray balance problems

  For more information, see *Importing and Exporting Harmony Curves* on page 92.

- the relative dot gain between press and proof varies from color to color—that is, one unit on your press prints heavier than the others

For more information about using color-specific curves, see *When to Use Color-Specific Curves* on page 13.

Spot Curves Set

A **Spot Curves** curve set is measured from a specific single color to create one calibration curve that is applied to that color separation only. With a **Spot Curves** curve set, you must specify the color you are measuring by typing the name in the **Spot Color** box when you set new target or current curve properties. You can define as many spot color curves as you like. The **Spot Curves** curve set is most appropriate for measuring duotone and tritone images.

Matching the Curve Sets

When a derived calibration curve is created, the curve sets of the selected target and current curves must match to ensure that the calibration calculations are accurate.

The following table shows possible matching curve set combinations.

Current Curve Set	Target Curve Set	Measured Color	Match Allowed	Resulting Calibration Curve
One Curve	One Curve	Same	Yes	One Curve
One Curve	One Curve	Different	No	N/A
One Curve	CMYK Curves	1	Yes	One Curve
One Curve	Spot Curves	N/A	No	N/A
CMYK Curves	One Curve	2	Yes	One Curve
CMYK Curves	CMYK Curves	N/A	Yes	CMYK Curves
CMYK Curves	Spot Curves	N/A	No	N/A
Spot Curves	One Curve	N/A	Yes[3]	Spot Curves[4]
Spot Curves	CMYK Curves	5	Yes[3]	Spot Curves[4]
Spot Curves	Spot Curves	Same	Yes	Spot Curves
Spot Curves	Spot Curves	Different	Yes[3]	Spot Curves[4]

1 The current curve's measured color is matched with the target curve's C, M, Y, or K curve profile.

2 The target curve's measured color is matched with the current curve's C, M, Y, or K curve profile.

3 A warning appears before the calibration curve is created.

4 Same spot color as the current curve's spot color.

5 You must choose a C, M, Y, or K curve profile from the target curve and match it with the current curve.

Curve Naming

Harmony automatically assigns a name to each current and calibration curve. The name is based on the attribute information you type or select for that curve. For target curves, you must assign a name to each curve you create. The curve name displays in the curve window title bar when the curve is saved.

For more information about naming curves, refer to the Harmony reference documentation for your specific workflow.

Curve Window

There are four types of curve windows:

- current
- target
- derived calibration
- transfer calibration

You can have multiple curve windows open at the same time.

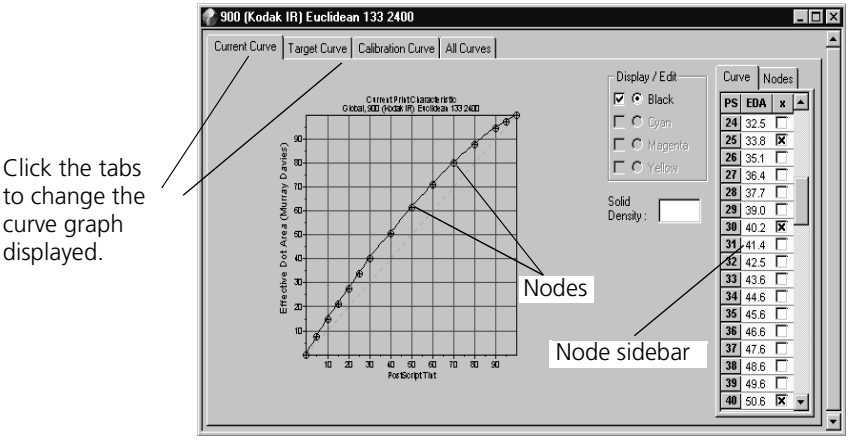


Figure 8: Calibration Curve window

A derived calibration curve window also lets you view the current and target curves linked to the calibration curve. Click the **Current Curve, Target Curve,** or **Calibration Curve** tabs to display the corresponding curve

graph. Click the **All Curves** tab if you want to display all three curves—that is, the target, current, and calibration curves—together on the curve graph. For more information about curves, see *Types of Curves* on page 25.

Most of the curve window features described below are available for all types of curves. If a feature is specific to a particular type of curve, it is noted.

Cursor Position

Cursor Position is a floating window that displays the position of the cursor on the graph. It helps you more accurately place or move the nodes on the graph.

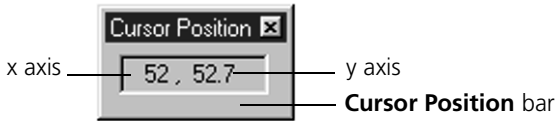


Figure 9: Cursor Position window

The numbered pair shown in the **Cursor Position** bar indicates the cursor position on the x and y axes, respectively. For example, a value of 18, 23.5 means that the point on the graph is at 18 units on the x axis and 23.5 units on the y axis.

Hiding and Displaying the Cursor Position Window

To hide or show the Cursor Position window:

➢ From the **View** menu, select **Cursor Position**.

If the cursor position was in view, it is now hidden, and the check mark next to **Cursor Position** no longer displays.

If the cursor position was hidden, it now displays, and a check mark appears next to **Cursor Position**.

Each time you select **Cursor Position**, it is displayed or hidden.

Graph x and y Values

x Axis

For all curves, the x value is the digital file tint that was requested. The x axis encompasses 0 through 100, in whole numbers only.

y Axis

For current and target curves, the y value is the tonal value that was measured on the output sample, called measured dot area (MDA). For proofs and press sheets, this means effective dot area (EDA); for film, this mean physical dot area (PDA).

For calibration curves, the y value is the calibrated tint value—that is, the value to which the tint specified in the digital file will be adjusted when the calibration curve is applied.

The y axis encompasses 0.0 through 100.0, increased in values of 0.1. For ease of mouse movement, you can set a decimal value as a snap-to measurement. If set, the node will jump to the next nearest decimal value you set when you move the node along the y axis using your mouse. See *Moving Nodes* on page 37.

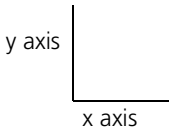


Figure 10: x and y axes of a graph

Node Sidebar

The node sidebar consists of two tabs: **Curve** and **Nodes**.

The **Curve** tab shows each node that you can add: 1 through 99. You can add or delete nodes by selecting or clearing the make active (**x**) check box. You can modify the y values by clicking in the **EDA** box and typing a new value.



Note: EDA (Effective dot area) displays as measured dot area (MDA) if the output type is plate, and displays as physical dot area (PDA) if the output type is film.

The **Nodes** tab shows all active nodes on the curve.

To move between active nodes:

➢ For both the **Curve** and **Nodes** tabs, press ENTER to move the cursor from one active node to the next.

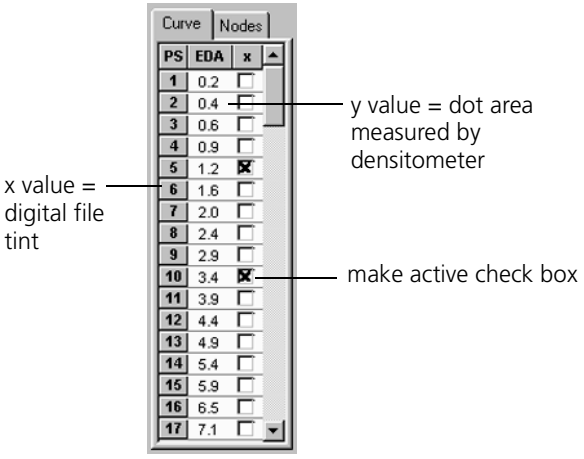


Figure 11: Node sidebar

Opening an Existing Curve

You can open any type of curve that exists in the Harmony database.

To open a curve using the menu bar:

1. From the Harmony database window, highlight the curve you want to open by clicking the curve row once.



Note: To select multiple curves within the same tab, hold down the CTRL key, and then click each curve you want to select.



2. From the **File** menu, select **Open Curve**.

To open a curve by double-clicking:

➢ From the Harmony database window, double-click on the curve you want to open.

To open a curve using the shortcut menu:

➢ From the Harmony database window, right-click to display the shortcut menu, and then select **Open Curve**.

Copying an Existing Curve

Harmony allows you to make copies of existing curves of any type. Copying curves can be useful for many reasons. For example, if you want to experiment with curve deviation or converting to a transfer calibration curve, you can make a copy of the derived curve to work on, while retaining the original curve.

To copy a curve using the menu bar:

1. From the Harmony database window, highlight the curve you want to open by clicking the curve row once.
2. From the **File** menu, select **Copy Curve**.

   A copy of the curve is created, and `Copy <n>` is appended to the curve name. For example, if you made a copy of a curve named `PlateLinear`, the copy would be called `PlateLinear Copy 2`.

   You can change the name of the copied curve in the curve's properties. See *Modifying Curve Properties* on page 89.

To copy a curve using the shortcut menu:

- From the Harmony database window, right-click to display the shortcut menu, and then select **Copy Curve**.

  A copy of the curve is created and `Copy <n>` is appended to the curve name. For example, if you made a copy of a curve named `PlateLinear`, the copy would be called `PlateLinear Copy 2`.

  You can change the name of the copied curve in the curve's properties. See *Modifying Curve Properties* on page 89.

Using the Curve Graphs

Target and current curves are created by entering nodes onto the curve graph. A node is composed of numbered pair values (x and y). A node set is composed of a series of nodes on the graph. The line that connects the nodes forms the profile of the curve.

You can add a node set when opening a new target or current curve, or you can enter the node set manually once the curve is open. You can also add and delete individual nodes on the curve graph.

Adding or Deleting Nodes

Adding a Node Set

You can add a node set to a target or current curve when you set the new curve's properties. This is useful for measuring tints because you don't have to add a series of nodes manually.

You can create your own set of nodes or use one of the default node sets in Harmony.



Note: You must add a default node set when you create a new curve. You cannot add a default node set by modify the curve properties of an existing curve.



Tip: If you are using a strip reader to measure tints, do not add a set of nodes to your curve. The strip reader automatically adds the nodes for you.

To add a node set:

1. In the New Current Curve Properties dialog box or New Target Curve Properties dialog box, click the **Data Entry** tab.

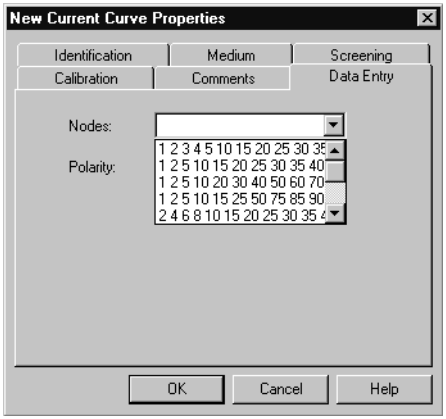


Figure 12: New Current Curve Properties dialog box (data entry tab)

2. From the **Nodes** list box, select a default node set.

   Or:

   To create your own node set, in the **Nodes** list box, type the node values you want to add to your graph. You must leave a space or type a comma between each value.

Adding or Deleting Individual Nodes

Once you have created a curve graph, you can add or delete individual nodes. This is useful if you want to smooth a curve.

For more detail, see *Smoothing Target or Current Curves* on page 73.

To add a node:

- With the curve window open, hold down the CTRL key, then click the mouse on the graph where you want to add the node.

  A solid black plus sign is appended to the cursor when you can add a node. A hollow plus sign indicates that the cursor isn't close enough to the curve.

  Or:

- Select the make active check box in the node sidebar. See Figure 11 on page 33 for an illustration of the node sidebar.

To delete a node:

- With the curve window open, press the SHIFT key and click the mouse on the node you want to delete.

  A solid black minus sign is appended to the cursor when you can delete a node. A hollow minus sign indicates that the cursor isn't close enough to the node.



Note: If you continue to hold down the SHIFT key, you can drag the cursor over multiple nodes to delete them. In this case, three solid black minus signs are appended to the cursor.

Or:

- Clear the make active check box in the node sidebar. See Figure 11 on page 33 for an illustration of the node sidebar.

Converting Nodes to a Linear Curve

If you have been creating a current or target curve and decide that you want to erase modifications made to the nodes, you can convert the curve back to its original linear state. The curve will retain any default nodes that were selected when you opened the curve.



Important: There is no undo for this action.

To convert all nodes to linear:

1. Make sure that the correct curve is currently active.
2. From the **Edit** menu, select **Convert to Linear Curve**.

   All nodes are removed from the curve and it displays as linear with the default nodes set for creating that current or target curve.

Moving Nodes

Once a node is on the graph, you can adjust the measured dot area by moving it to a new location on the y axis. Each time a node is moved, the entire curve is resampled based on the change made.



Note: Movement is constrained to the y axis only. If you want to change the x axis value, you must delete the node, and then create a new one using the new x axis value.

To move a node:

1. Position the cursor on the node.

   The indicator next to the cursor changes to a solid black double-arrow.

   Note: If the indicator is a hollow double-arrow, the cursor is not close enough to the node.

2. Click and hold the mouse while you move the node up or down the y axis, then release the mouse when you've reached the point on the y axis where you want to move the node.

   Note: If you are not getting accurate enough movement using the mouse, you may want to adjust the snap-to guide or use the node sidebar.

Setting the Snap-To Guide

The snap-to guide helps ensure the accuracy of movement along the y axis when you are using the mouse to move a node. The snap-to guide allows you to move the node to the next nearest decimal value that you set. For example, if the snap-to is set to 1.0 and you move the node from 50.0 to 50.5, the snap-to automatically jumps the node to 51.

To set the snap-to guide:

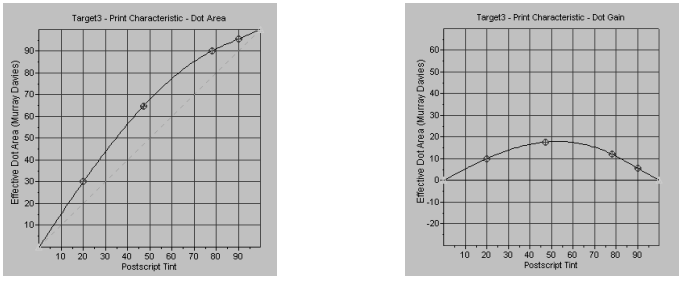
- From the **Edit** menu, point to **Snap Y To**, and then select the incremental value at which you want the node to move.

Viewing Curves

This section describes the different ways that Harmony lets you view curves on the desktop. You can select different views depending on your needs.

View Dot Area or Dot Gain

You can view the curve graphs as dot area or dot gain. The default view is dot area.



Dot area Dot gain

Figure 13: Dot area and dot gain curve graphs

To switch between the views:

1. From the **View** menu, point to **Graph Type**.
2. Select one of the following:
   - **Dot Gain** to show the amount of dot gain.

     Or:

   - **Dot Area** to show the effective dot area

   A check mark displays next to the active view.

Polarity

There are two ways to view a curve: positive mode or negative mode. Positive mode is the standard mode and the only mode available if you are calibrating to press sheet. It means that you are measuring the 0% tint as paper white (no ink) and the 100% tint as solid ink.

Negative mode is used only when:

- You are using negative film or negative plates.

  On negative film or plates, the 0% tint appears as the darkest tint, and the 100% tint appears as the lightest tint. Polyester plates are commonly used as negative plates.

  AND

- Your densitometer is not able to read the 0% tint as paper white because it is the darkest area of the film or plate.

If you are using negative mode, read the 100% tint when your densitometer asks for paper white and read the 0% tint when your densitometer asks for solid.

To set the polarity when opening a new curve:

1. In the **Identification** tab of the curve's Calibration Curve Properties dialog box, select either **Film** or **Plate** in the **Type** box.
2. In the **Data Entry** tab, select a value from the **Polarity** box.

To set the polarity when the curve is already open:

➢ From the **Edit** menu, point to **Polarity**, and then select either **Positive** or **Negative**.

A check mark displays next to the active polarity type.

Setting Up Your Densitometer

If you are using automatic densitometer input, you must set up the densitometer in Harmony before you can use it. You also need to connect the densitometer to a serial port on your computer.

For more information on connecting your densitometer, see *Connecting the Densitometer* on page 127.

Note: Much of the information that should be entered depends on the type of densitometer you are using. Consult your densitometer documentation to find out the best settings for your densitometer.

To set up your densitometer in Harmony:

1. From the **Edit** menu, select **Preferences**.

   The Preferences dialog box displays.

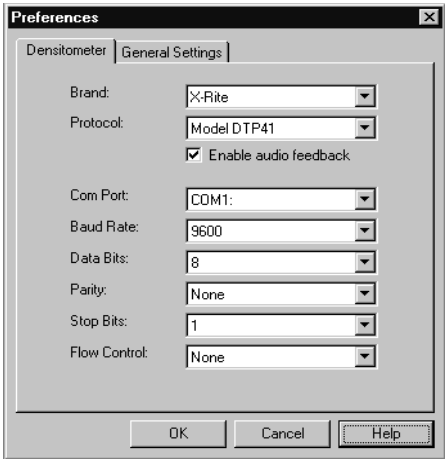


   Figure 14: Preferences dialog box

2. Select the brand of densitometer you are using from the **Brand** box.
3. Select the densitometer model you are using from the **Protocol** box.

   Note: The densitometer models available are automatically set based on the brand of densitometer you selected.

4. Select the **Enable audio feedback** check box if you want Harmony to provide sound cues when using the auto densitometer input feature.

   Note: Your computer must have a sound card and speakers to use the audio feedback feature.

5. Select a serial port from the **Com Port** box.
6. Select the appropriate settings for the remaining options.
7. Click **OK** to close the Preferences dialog box and save your settings.

3

Basic Steps for Creating Curves

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New Harmony Curves

You can create four new curves in Harmony:

- target curves
- current curves
- derived calibration curves
- transfer calibration curves

A target curve represents the tonal reproduction you would like to have. A current curve represents the tonal reproduction that you are currently achieving. A derived calibration curve, which Harmony derives from the target and current profiles you define, represents the amount Harmony needs to compensate for the tint value specified in the digital file to achieve the target on your final output.

A transfer calibration curve can also be created from target and current curve profiles, or you can define the transfer calibration curve profile yourself. Regardless of their origin, transfer calibration curves are not linked to a target and current curve profile.

Target and current curves are not the end products of Harmony—that is, they are never selected by the RIP to calibrate the file; only calibration curves are selected when the file is RIPed.



Note: A calibration curve must be enabled in order to be selected by the RIP. For more information, see the Harmony reference documentation for your specific workflow.

In most cases, you will want to create derived calibration curves to apply to your output. To create a derived calibration curve, you first need to create a target curve and current curve. You then link the target and current curves, and Harmony produces the calibration curve.

Figure 25 on page 53 illustrates the steps for creating a derived calibration curve.

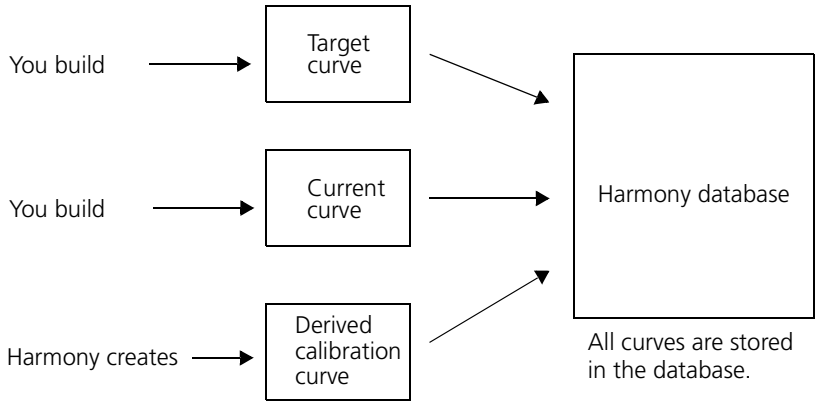


Figure 15: New curves in Harmony

Creating Target Curves

Spectrum

A target curve is a graph that maps out the effective dot area or dot gain measured on the sample that represents your desired printing. You can create your own curve, or you can use one of the default target curves provided in the Harmony **CreoTargets.hmy** or **ImationTargets.hmy** files.

To create a target curve:

1. Decide which output type you want to calibrate: paper (press sheet or proof), plate, or film. You should calibrate the same output type as your final deliverable.

   See *Selecting Your Output Type* on page 60.

2. Select your target sample.

   See *Selecting Your Target Sample* on page 60.



Note: If you decide to use a predefined target curve from the **CreoTargets.hmy** or **ImationTargets.hmy** files instead of creating a target curve, you must first import the target curve into the Harmony database. See *Importing and Exporting Harmony Curves* on page 92 or the Harmony reference documentation for your specific workflow.

Before using any curve from the **CreoTargets.hmy** or **ImationTargets.hmy** files as a target, you must save it using a different name because the curves in these files are read-only. See *Saving Read-Only Target Curves* on page 76.



3. From the **File** menu, point to **New Curve**, and then select **Target**.

   The New Target Curve Properties dialog box displays.

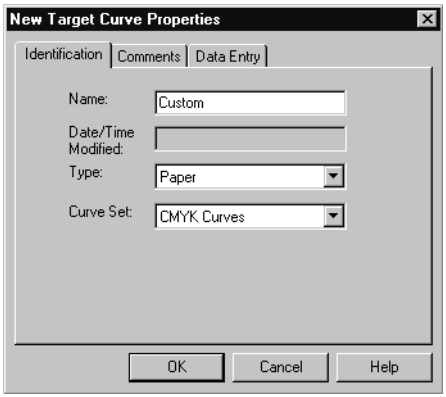


Figure 16: New Target Curve Properties dialog box

4. On each tab, select or type property information about the target curve.



Note: You don't need to fill in the **Name** box on the **Identification** tab, the box on the **Comments** tab, and the **Nodes** box on the **Data Entry** tab before you can open a new curve.

For details, see *Target Curve Properties* on page 78.

5. Click **OK**.

   The Target Curve window displays.

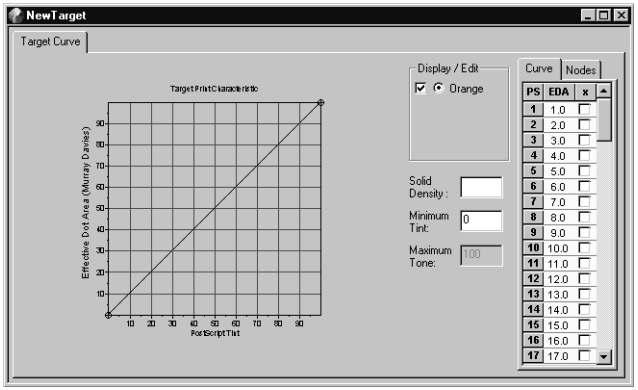


Figure 17: Target Curve window

6. Measure the tints on the target sample, and record the measurements in the new target curve.

   See *Measuring Tints* on page 63.

7. Smooth the curve.

   See *Smoothing Target or Current Curves* on page 73.

8. Save the curve.

   See *Saving Curves* on page 75.

Creating Current Curves

A current curve is a graph that maps out the effective dot area or dot gain measured on a sample of your current printing.

To create a current curve:

1. Select the output type—paper (press sheet or proof), plate, or film—that you are calibrating.

   See *Selecting Your Output Type* on page 60.



   Note: To create a calibration curve, the output type of the target and current curves must be the same. You should select the same output type as the target curve you plan to use. You must also ensure that the curve sets of your target and current curves are an acceptable match. For more detail, see *Matching the Curve Sets* on page 29.

2. Obtain a sample of your current output—that is, what you are currently producing.

   See *Obtaining Your Current Sample* on page 61.



3. From the **File** menu, point to **New Curve**, and then select **Current**.

   The New Current Curve Properties dialog box displays.

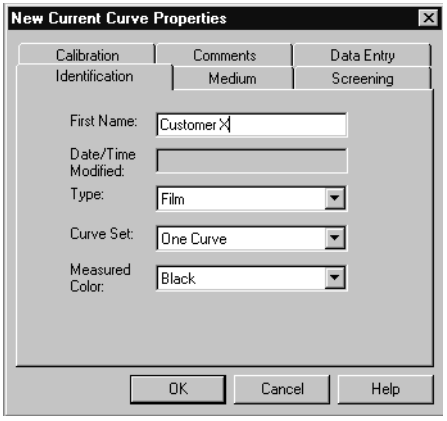


Figure 18: New Current Curve Properties dialog box

4. On each tab, select or type property information about the current curve.

Note: You don't need to fill in the **First Name** box on the **Identification** tab, the box on the **Comments** tab, and the **Nodes** box on the **Data Entry** tab before you can open a new curve. For details, see *Current Curve Properties* on page 80.

Delta

You can only select an option from the **Screening System** box on the **Screening** tab if you have Delta workflow.

5. Click **OK**.

The Current Curve window displays.

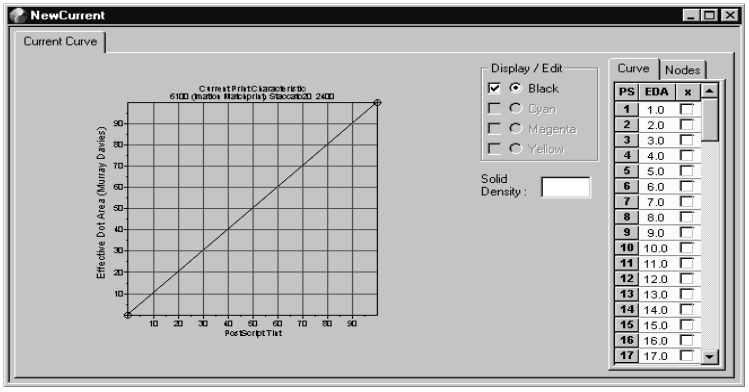


Figure 19: Current Curve window

6. Measure the tints on the current sample, and record the measurements in the new current curve.

   See *Measuring Tints* on page 63.

7. Smooth the curve.

   See *Smoothing Target or Current Curves* on page 73.

8. Save the curve.

   See *Saving Curves* on page 75.

Creating Derived Calibration Curves

Harmony creates a derived calibration curve by looking at the target curve and current curve, and then determining how much to adjust for the tint specified in the digital file so that printing will match your target, under the same operating conditions.

A derived calibration curve is created using existing target and current curves. The curves must use the same output type—paper, plate, or film—and if using a **One Curve** curve set, the measured color must be the same—black, cyan, magenta, or yellow.

To create a derived calibration curve:



1. From the **File** menu, point to **New Curve**, then point to **Calibration**, and select **Derived**.

   The New Calibration Curve dialog box displays.

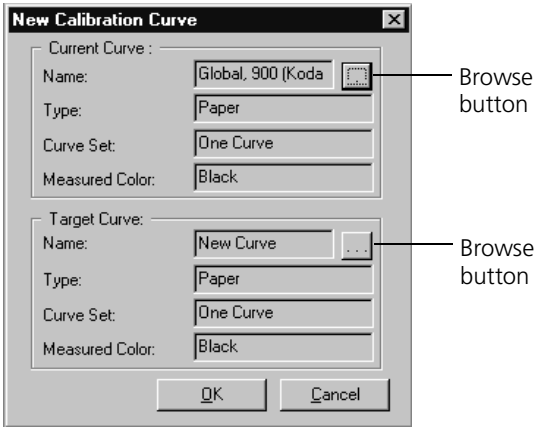


Figure 20: New Calibration Curve dialog box



2. Under **Current Curve**, click the **Browse** button.

   The Use Current Curve dialog box displays.

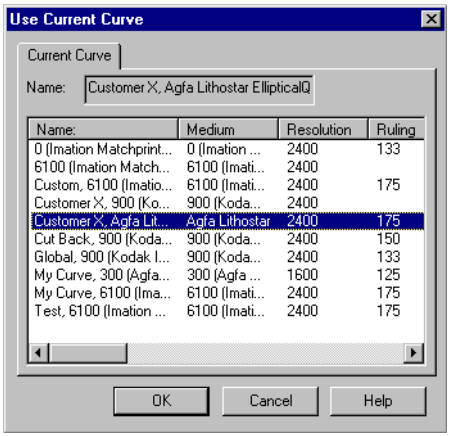


   Figure 21: Use Current Curve dialog box

3. Select the current curve in the list box you want to use, then click **OK**.

   Or:

   Double-click the current curve in the list box you want to use.

   The Use Current Curve dialog box closes, and the New Calibration Curve dialog box displays again.

   The **Name, Type**, and **Curve Set** boxes are filled in automatically with information from the current curve's properties. The screening and medium parameters are entered automatically in the derived calibration curve's properties.



   Note: If the selected current curve's curve set is **One Curve**, the measured color displays; or, if the selected current curve's curve set is **Spot Curves**, the spot color displays.



4. Under **Target Curve**, click the **Browse** button.

   The Use Target Curve dialog box displays.

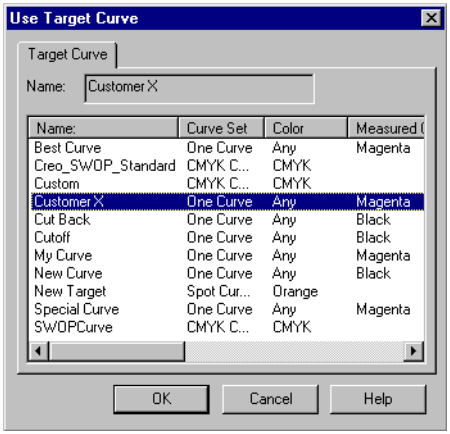


Figure 22: Use Target Curve dialog box

5. Select the target curve in the list box you want to use, and then click **OK**.

   Or:

   Double-click the target curve in the list box you want to use.

   The Use Target Curve dialog box closes, and the New Calibration Curve dialog box displays again.

   The **Name, Type**, and **Curve Set** boxes are filled in automatically with information from the target curve's properties.



Note: If the selected current curve's curve set is **One Curve**, the measured color displays; or, if the selected current curve's curve set is **Spot Curves**, the spot color displays.

6. Click **OK**.

   The Calibration Curve window displays.

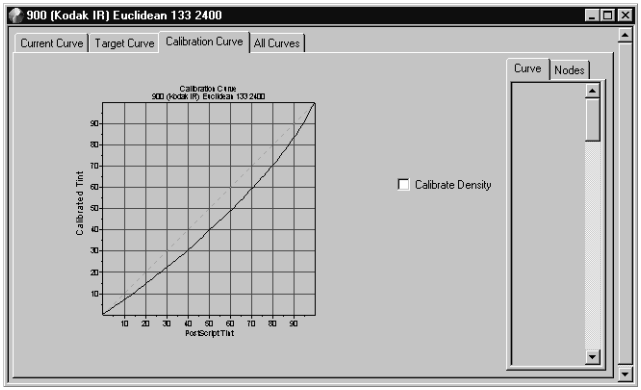


Figure 23: Calibration Curve window

If a warning message displays, the output type, curve set type, **One Curve** curve set measured colors, or **Spot Curves** curve set spot colors of the current and target curves do not match. To correct the problem, see *Matching the Curve Sets* on page 29.

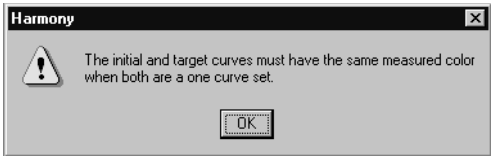


Figure 24: Harmony warning message

7. If the warning message displayed in the previous step prevents you from creating a calibration curve with your settings, reselect a target or current curve.

   In some cases, the warning message may let you create a calibration curve even though Harmony does not consider your settings compatible. If you don't want to create the calibration curve with these settings, reselect a target or current curve.

8. Inspect the resulting calibration curve for severe jumps, particularly in the deep shadows.

   If there are severe jumps, correct them by adjusting or deleting nodes in either the current or target curve. See *Smoothing Target or Current Curves* on page 73.

9. Save the curve. See *Saving Curves* on page 75.

Testing Derived Calibration Curves

If you are calibrating the **Paper** output type, we recommend that you try a calibrated press run after creating a derived calibration curve. If you do not achieve the desired result on press, you need to adjust either the target or current curve linked to the derived calibration curve. See Figure 25.

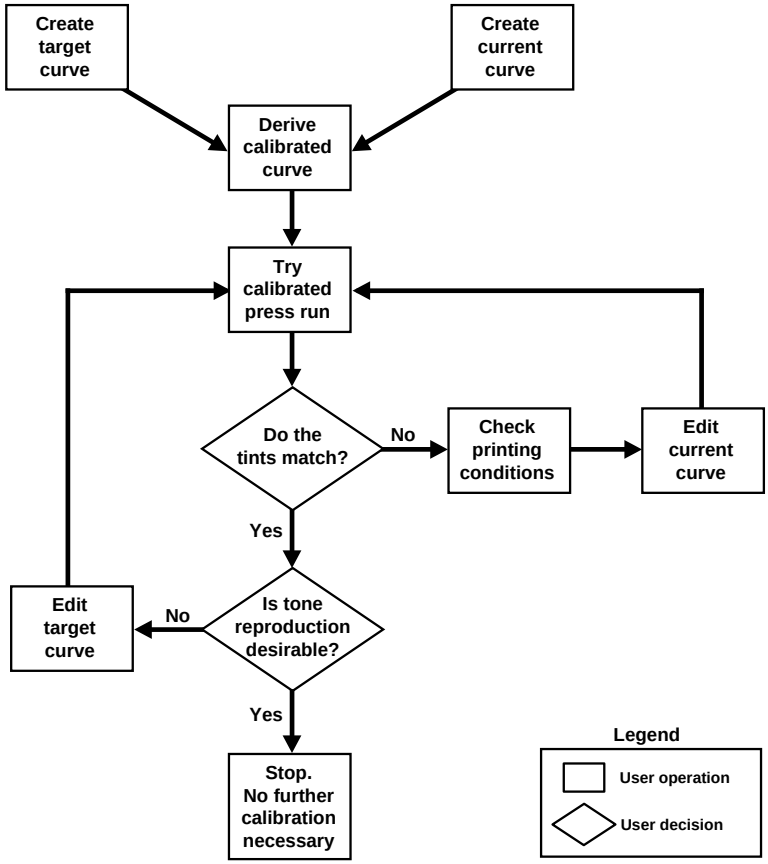


Figure 25: Creating and testing a derived calibration curve

Creating Transfer Calibration Curves

A transfer calibration curve is a graph that maps a calibrated tint onto the tint specified in the digital file you input to the RIP. Unlike a derived calibration curve, a transfer calibration curve is not linked to a current or target curve.

You can create a transfer calibration curve from a derived origin—that is, you select and match a target and current curve in the Harmony database—or you can create your own profile for a transfer calibration curve.



Note: If you create a transfer calibration curve from a derived origin, the current and target curves you select must use the same output type, and if using a **One Curve** curve set, the measured color must be the same—black, cyan, magenta or yellow.

To create a transfer calibration curve:



1. From the **File** menu, point to **New Curve**, then point to **Calibration**, and select **Transfer**.

   The New Transfer Curve dialog box displays.

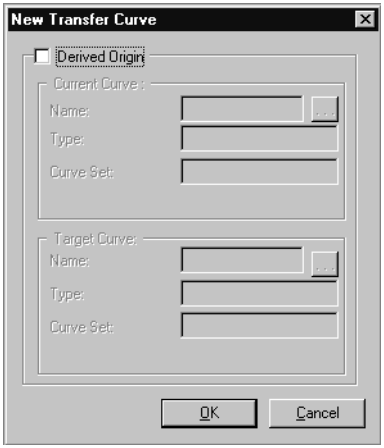


   Figure 26: New Transfer Curve dialog box

2. If you want to create a linear transfer curve, click **OK**; otherwise, go to the next step.

   Harmony creates the curve, and the Transfer Calibration Curve window displays.

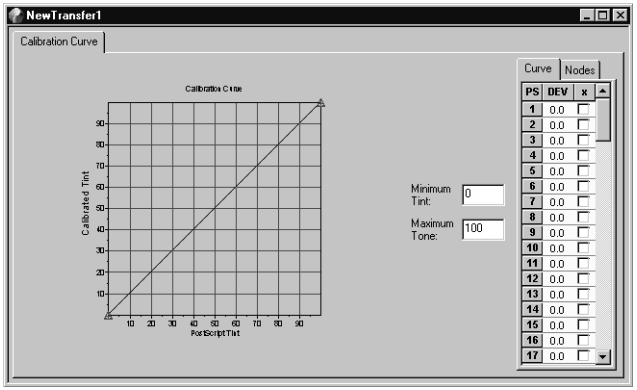


Figure 27: Transfer Calibration Curve window

3. If you want to you want create a transfer calibration curve from a derived origin, select the **Derived Origin** check box.

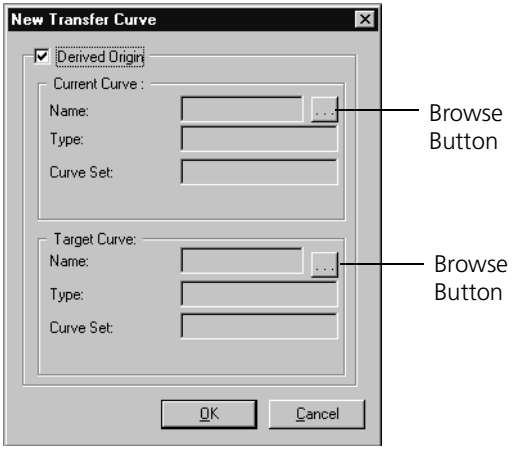


Figure 28: New Transfer Curve Dialog Box (Derived Origin)



4. Under **Current Curve**, click the **Browse** button.

   The Use Current Curve dialog box displays.

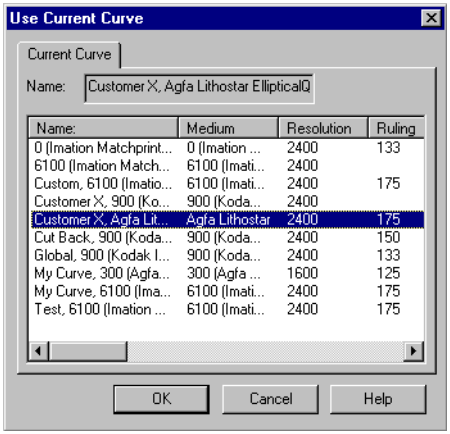


Figure 29: Use Current Curve dialog box

5. Select the current curve in the list box you want to use, and then click **OK**.

   Or:

   Double-click the current curve in the list box you want to use.

   The Use Current Curve dialog box closes, and the New Transfer Curve dialog box displays again.

   The **Name, Type**, and **Curve Set** boxes are filled in automatically with information from the current curve's properties. The screening and medium parameters are entered automatically in the transfer calibration curve's properties.



Note: If the selected current curve's curve set is **One Curve**, the measured color displays; or, if the selected current curve's curve set is **Spot Curves**, the spot color displays.



6. Under **Target Curve**, click the **Browse** button.

   The Use Target Curve dialog box displays.

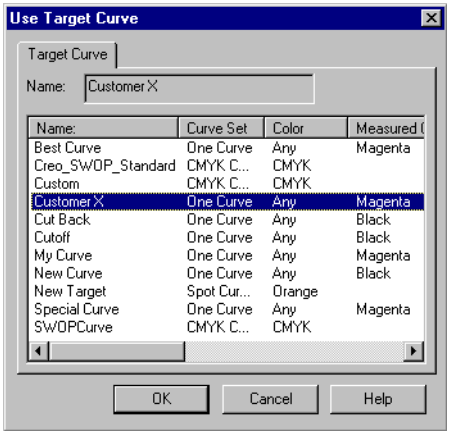


Figure 30: Use Target Curve dialog box

7. Select the target curve in the list box you want to use, and then click **OK**.

   Or:

   Double-click the target curve in the list box you want to use.

   The Use Target Curve dialog box closes, and the New Transfer Curve dialog box displays again.

   The **Name, Type**, and **Curve Set** boxes are filled in automatically with information from the target curve's properties.



Note: If the selected current curve's curve set is **One Curve**, the measured color displays; or, if the selected current curve's curve set is **Spot Curves**, the spot color displays.

8. Click **OK**.

   If a warning message displays, the output type, curve set type, **One Curve** curve set measured colors, or **Spot Curves** curve set spot colors of the current and target curves do not match.



Figure 31: Harmony warning message

To correct the problem, see *Matching the Curve Sets* on page 29.

9. If the warning message displayed in the previous step prevents you from creating the curve with your settings, reselect a target or current curve.

   In some cases, the warning message may allow you to create a calibration curve even though Harmony does not consider your settings compatible. If you don't want to create the calibration curve with these settings, reselect a target or current curve.

10. Inspect the resulting calibration curve for severe jumps, particularly in the deep shadows.

    If there are severe jumps, correct them by deviating the curve. See *Deviating Curves* on page 100.



Note: A transfer curve is always in deviation mode.

11. Save the curve.

    See *Saving Curves* on page 75.

4

Acquiring Target and Current Samples

ISelecting Your Output Type 60
Selecting Your Target Sample 60
Obtaining Your Current Sample 61
Measuring Tints 63
Taking Accurate Densitometer Readings 64
Smoothing Target or Current Curves 73
Saving Curves 75

Selecting Your Output Type

Before you acquire target and current samples and begin creating curves, you must determine what you are trying to calibrate and why. This will help you decide which output type to calibrate—film, plate, or paper (press sheet or proof).

For regular printing operations, we always recommend calibrating paper. Plate calibration is useful if you can't do press sheet calibration—that is, if you can't produce a press sheet or proof for your current sample. If you make film, you can use Harmony to ensure that the film you produce is linear (the dots on the film are the same size as the dots specified in the digital file).

For more detail, see *Choosing Which Output Type to Calibrate* on page 14.

Once you know which output type you are calibrating, you can:

- decide what your target will be, and, if necessary, get a sample
- get a current sample

Selecting Your Target Sample

A target sample represents the print reproduction you want to achieve. You can either use a predefined target curve supplied with Harmony or create your own target curve.

Using Predefined Targets

Spectrum

Harmony provides default target curves that represent industry-standard, acceptable dot gain. To use a predefined curve, you must import the curve from the **CreoTargets.hmy** or **ImationTargets.hmy** file.



For information on importing curves, see *Importing and Exporting Harmony Curves* on page 92 or refer to the Harmony reference documentation for your specific workflow.



Note: The curves in the **CreoTargets.hmy** and **ImationTargets.hmy** files are read-only. To use one of these curves, you must save it first using a different name.

Using Your Own Targets

If you want to use your own target curves, make sure each target sample you select has some kind of tint bar and gray balance pattern for measuring. Harmony provides tint bar and gray balance pattern files.

For paper (press sheet or proof) calibration, a standard target would be a proof, a previously produced press sheet, or an industry standard. In some cases, it could be a sample from your client.

For plate calibration, a standard target would be a well-calibrated plate.

For film calibration, a standard target would be a linear curve.

You may choose to have more than one target. For example, you may profile each type of proofer, as well as customer-supplied proofs. Alternatively, proofers can also be calibrated to match a standard—the same standard used for a press target.

Agreeing on a Target

Deciding on your target(s) is a very important step in the process because the sample defines what is desired and what the calibration curve will achieve on the final output.



Important: Make sure that everyone who has a say in print reproduction quality (for example—press operators, prepress operators, operations managers, quality assurance personnel) agrees with the chosen target. If they don't approve of or don't know about the target, they may not agree with the printing that is produced when the calibration curve is applied.

Obtaining Your Current Sample

To measure the amount of dot gain you are currently producing, you need to get a sample of each output device you are trying to calibrate. The sample should be as current as possible, and each sample must have some kind of tint bar and gray balance pattern for measuring. Harmony provides tint bar and gray balance pattern files.

Techniques for Ensuring Accurate Samples

The accuracy of your target and current samples depends on a number of factors. To ensure accurate samples, follow the recommendations for the factors listed.

Tint Bar or Other Test Marks

- When adding the tint bar or other test marks to your printing form, avoid the extremities of the form and orient the marks so that they run around the plate cylinder rather than across it.

Equipment

- Make sure the film or plate processor is in optimal condition—that is, it is clean, has good chemistry and appropriate temperatures, has proper speed settings, etc.
- Correct the laser exposure on the output device before imaging.

RIP

- Ensure correct screening settings are chosen. For more information, see your RIP documentation.
- Determine which calibration curve, if any, is being applied to the sample.

Output Media

- Use exactly the same media (press sheet, proof, film, or plate) you intend to use when the calibration curve is applied.

  For example if your deliverable is a press sheet, use the same paper stock that you will use when the calibration curve is applied.



Note: If you use different kinds of media, and each medium produces significantly different dot gain (tone value increase), you may want to create current samples for each.

Press (if your final deliverable is a press sheet)

- Obtain a sample that reflects the average operating point of your press.
- Run your press at its optimal point and use standard ink densities.

Measuring Tints

Once the target sample is selected and you obtain a current sample, you need to measure the tints on each sample using a densitometer. See *Measuring Device* on page 16.

Note: If you are measuring negative film or plates and your densitometer cannot read the 0% tint as paper white, you need to work in negative mode. See *Polarity* on page 39.

What the Densitometer Measures

The densitometer measures dot area on the output, which is the total amount of light absorbed by the tint. The curve created is composed of the relationship between the tint specified in the digital file and the dot area that you measured.

Each of these numbered pairs becomes one node on the curve graph, as illustrated in Figure 32.

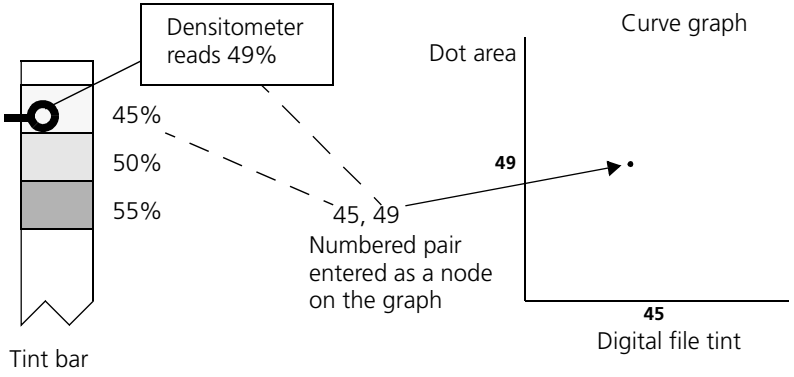


Figure 32: Relationship between readings and curves

If you are having trouble taking measurements, see *Taking Accurate Densitometer Readings*, or *Chapter 7, Troubleshooting*.

Taking Accurate Densitometer Readings

Use the following techniques to ensure your densitometer readings are accurate:

- Set your Yule-Nielson factor to 1. Do not adjust it while measuring.
- Use a quality test file.

  For example, use a UGRA scale, digital test image, RIT scale, etc. Quality tint bars are also provided with Harmony.
- Take all measurements from the same area of the output.

  For example, do not measure black from one part of the press sheet, and then take the rest of the measurements from another area of the press sheet.

  Take multiple measurements of the same tint and determine the average of all the measurements.
- For plates, take all measurements in the same plate grain direction.

Automatic Densitometer Input

If you have a densitometer or spectrophotometer with a serial cable, you can use the automatic densitometer input feature to record the readings when you measure tints.



Note: If your densitometer is not one of the preconfigured densitometers in the **Brand** and **Protocol** list boxes in the Preferences dialog box, see *Configuring Densitometers for Harmony* on page 129.

To use automatic densitometer input for a sample:

1. Make sure that you have a target or current curve open.

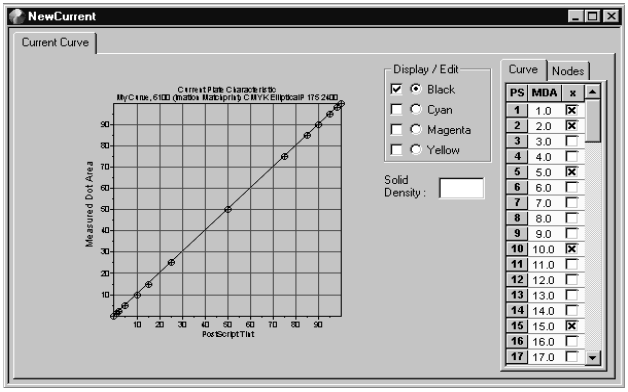


Figure 33: Current Curve window (no readings input)

2. If you didn't select default nodes when opening the curve, add nodes now.

See *Adding a Node Set* on page 35.

3. If you didn't configure your densitometer, set it up now.

See *Setting Up Your Densitometer* on page 40.



4. From the **View** menu, select **Densitometer Input**.

The Densitometer Input dialog box displays.

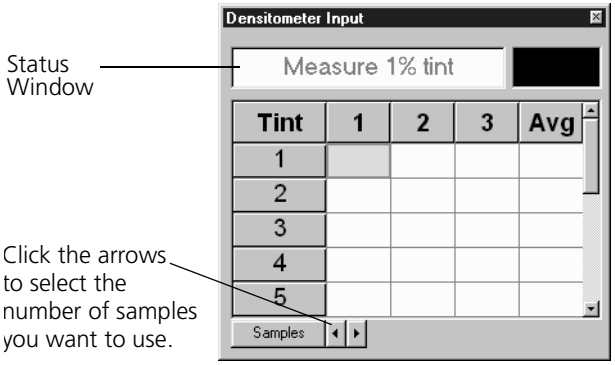


Figure 34: Densitometer Input dialog box

5. With your densitometer, measure a 0% tint or paper white on your tint bar.

If your densitometer supports paper white, the `Measure Paper` message displays and you can then measure paper white. Otherwise, go to the next step.

6. Harmony beeps once the paper measurement is detected.

   To set up Harmony to beep, select the **Enable audio feedback** check box on the Preferences dialog box when you set up your densitometer.

7. With your densitometer, measure a 100% tint or solid density on your tint bar.

   If your densitometer supports solid density, the `Measure Solid` message displays and you can then measure solid density. Otherwise, go to the next step.



Important: If you are using negative film or plates AND your densitometer will not read the 0% tint as white, you must read the 100% tint as white and the 0% tint as solid. See *Polarity* on page 39.

8. Select the number of samples you want to use for each tint by clicking the arrow buttons located next to the **Samples** button.



Note: You can measure up to five samples for each tint.

9. Start measuring the tints.

   The tint to measure displays in the status window.

   As you measure a tint, Harmony beeps and the highlight moves to the next sample, indicating where the next measurement will fall. Harmony also creates the profile of the curve in the curve window as you measure the tints.



Note: Right-click your mouse to move the highlight down the list of tints instead of moving right to the next sample for the tint.

   Harmony beeps twice when all of the samples for the tint have been measured and transfers the average measurement to the curve.

   Harmony beeps three times when all of the samples have been measured.

10. Close the Densitometer Input dialog box.

    The Target Curve window or Current Curve window displays.

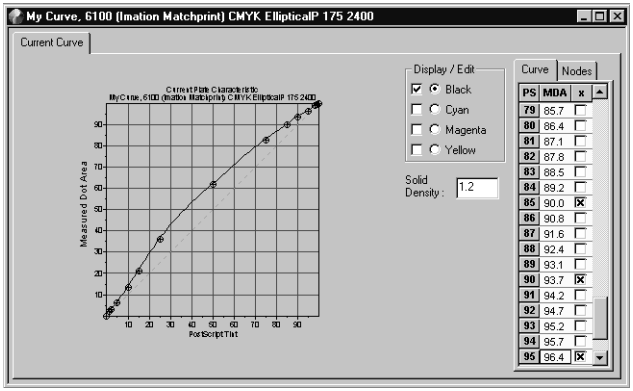


Figure 35: Current Curve window (readings input)

11. Smooth the curve, if necessary.

    See *Smoothing Target or Current Curves* on page 73.

12. Save the curve.

    See *Saving Curves* on page 75.

Strip Reader Input

If are using a strip reader to measure tints, you can use the automatic input feature to record the readings when you measure tints.

Before measuring tints, you must also specify the appropriate settings in the **strips.cfg** file in the **Harmony** folder. For more information, see *Appendix C, Setting Up Your Densitometer*.

To use automatic input for a strip reader:

1. Make sure that you have a target or current curve open.



Note: You don't have to define nodes because the nodes or samples are already defined by the strip.

2. If you didn't configure your strip reader, set it up now.

   See *Setting Up Your Densitometer* on page 40.



3. From the **View** menu, select **Densitometer Input**.

   The Strip Reader Input dialog box displays.

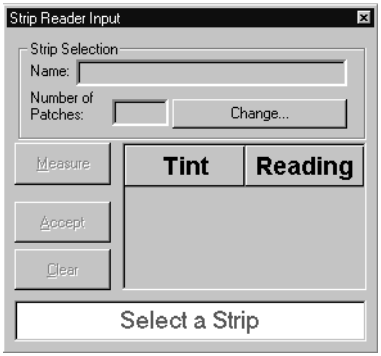


Figure 36: Strip Reader Input dialog box

4. Click **Change**.

   The Strip Selection dialog box displays.

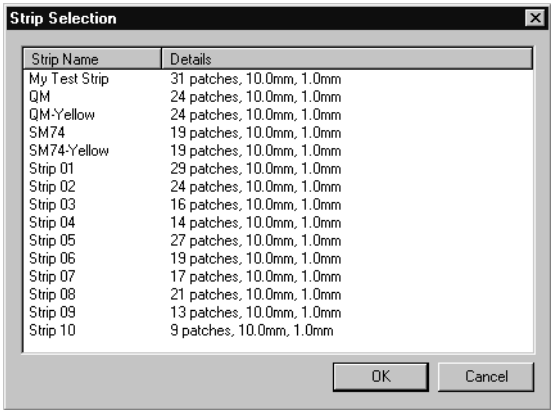


Figure 37: Strip Selection dialog box

5. Under **Strip Name**, select the strip you want to measure, and click **OK**.

   Or:

   Under **Strip Name**, double-click the name of the strip you want to measure.



Note: You specify the strip names in the **strips.cfg** file in the **Harmony** folder. For more information, see *Appendix C, Setting Up Your Densitometer*.

The Strip Selection dialog box closes and the Strip Reader Input dialog box displays again.

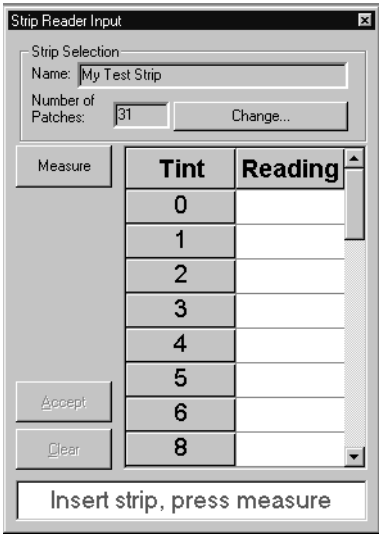


Figure 38: Strip Reader Input dialog box (strip selected)

The name of the strip and the number of test patches for that strip display in the **Name** and **Number of Patches** boxes. The tint values for the patches display in the **Tint** column.

6. Insert the strip into the strip reader.
7. Click the **Measure** button.

   The strip is measured and the result displays in the **Reading** column.



Note: If you're using an X-Rite DTP32 strip reader, click **Get Readings** after the strip has been read to display readings for the tint.

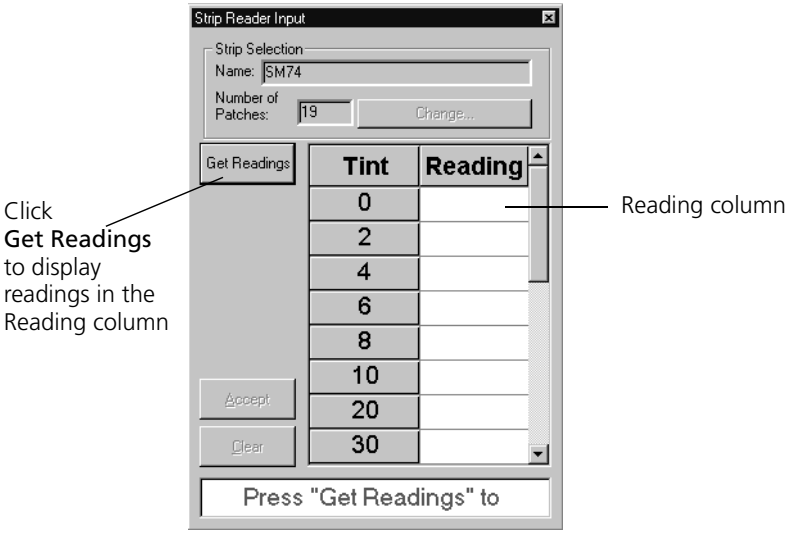


Figure 39: Strip Reader Input dialog box

8. Review the readings.
9. If the readings are appropriate, click the **Accept** button to transfer the measurements to the curve.

   Or:

   To remeasure, click the **Clear** button and measure the strip again.
10. Close the Strip Reader Input dialog box.

    The Target Curve window or Current Curve window displays.

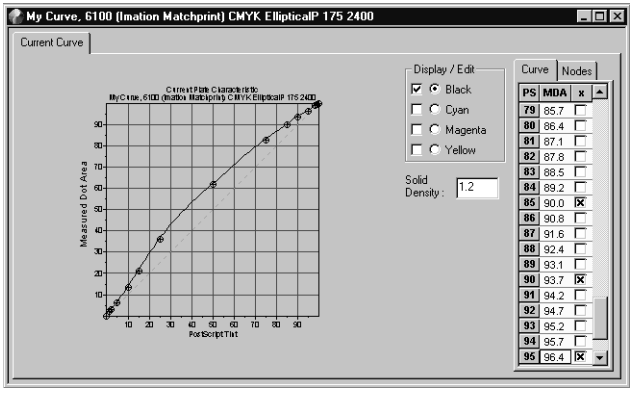


Figure 40: Current Curve window (readings input)

11. Smooth the curve, if necessary.

    See *Smoothing Target or Current Curves* on page 73.

12. Save the curve.

    See *Saving Curves* on page 75.

Manual Densitometer Input

If you are using manual input, you need to measure the tints and then input the tint values to Harmony.

To use manual densitometer input:

1. Make sure that you have a target or current curve open.

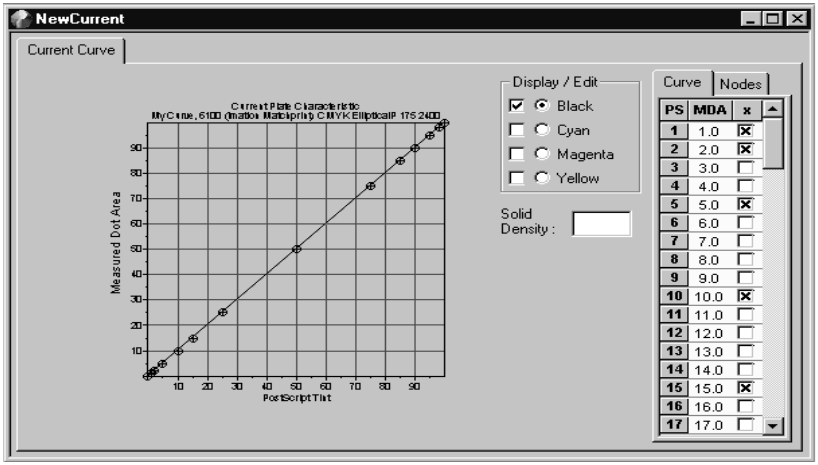


Figure 41: Current Curve window

2. If you didn't select default nodes when opening the curve, add nodes now.

   See *Adding a Node Set* on page 35.

3. With your densitometer, measure a 0% tint on the tint bar of your sample.

   Some densitometers call this paper white.



Important: If you are using negative film or negative plates AND your densitometer will not read the 0% tint as white (since it will be the darkest area of the film), you must read the 100% tint as paper white, and then read the 0% tint as solid. See *Polarity* on page 39.

4. Measure a 100% tint on your tint bar.

   Some densitometers call this solid.

5. Enter the solid value in the **Solid Density** box in the curve window.

6. Take measurements for all of the nodes listed on the curve.

7. For each measurement you take, write down the digital file tint value and the densitometer reading for the value—for example, 50,69.

Note: Taking multiple measurements of the same tint and using the average of all measurements may increase the accuracy of the measurement.

8. Type each value in the corresponding box in the node sidebar.

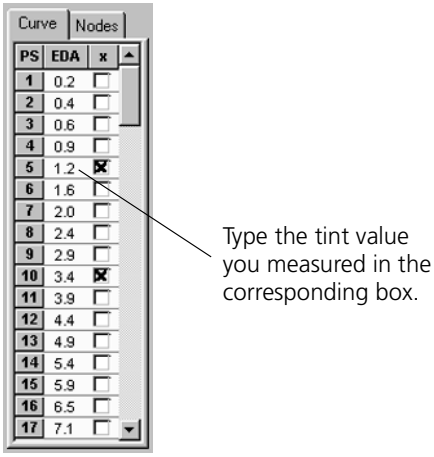


Figure 42: Node sidebar

Note: In both the **Curve** and **Node** tabs, using the ENTER key advances the cursor to the next active node.

Harmony creates the profile of the curve as you input the measurements.

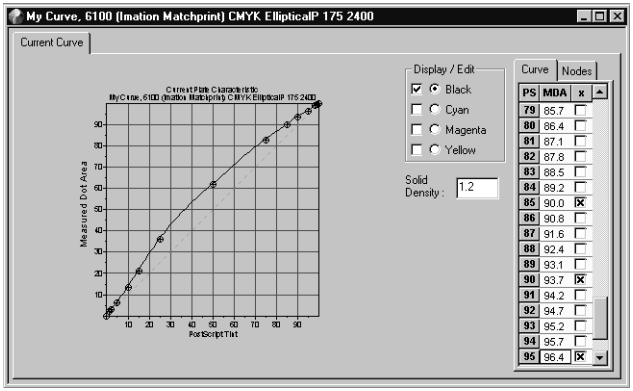


Figure 43: Current Curve window (readings input)

9. Smooth the curve, if necessary.

   See Figure 44 on page 74.

10. Save the curve.

    See *Saving Curves* on page 75.

Smoothing Target or Current Curves

When taking multiple measurements with a densitometer, there is always a slight margin for error. Possible reasons for error include human error or variation in the tint patch. Errors are indicated by slight raises or dips in a curve. Since a curve must be smooth for the output tints to change gradually and evenly, you must smooth the curve by adjusting or removing the nodes.

Note: Dot area curves are particularly sensitive in the shadow areas. In some cases, raises in the curve in the shadows may be due to plugging or drops in contrasts rather than a roundoff error caused by the densitometer.

To help you identify large discrepancies more quickly, the color of the graph line changes to red if the curve cannot be drawn smoothly through the nodes by Harmony.

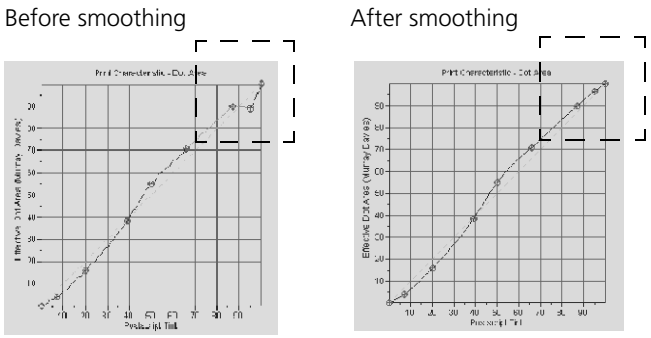


Figure 44: Smoothing a curve

To smooth a curve:

- Adjust the node so that the curve is smooth by measuring and replotting the tints in the area where the jag occurs.

  Or:

- Delete the nodes that are causing problems. See *Adding or Deleting Nodes* on page 35.

  Nodes can be deleted from problem areas as long as the shape of the resultant curve stays relative stable.

You may also want to try deviating the curve. See *Deviating Curves* on page 100.

Saving Curves

Once the dot area values are entered on the graph and the graph is smoothed, you should save the curve.

To save a curve:



1. From the **File** menu, select **Save Curve**.

   Or:

   Right-click to display the shortcut menu, then select **Save Curve**.



Note: If you are saving a target curve, the Save Target Curve dialog box displays if you haven't already named your curve or the curve name is being used by another curve.

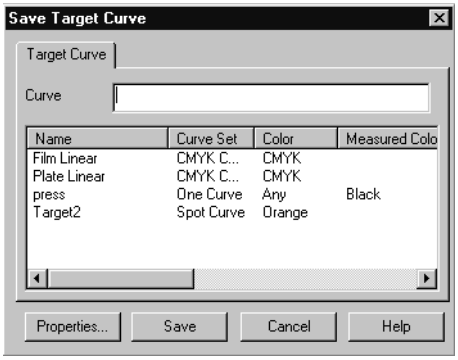


Figure 45: Save Target Curve dialog box

2. If you did not assign a name to the target curve when setting up the target curve properties, type the name in the **Curve** box.

   For target curves, assigning a name is required. For current or calibration curves, you do not need to provide a name. Harmony creates the curve's last name using the screening and medium property attributes.

   For more information, see the Harmony reference documentation for your specific workflow.

3. If you want to alter the properties, click the **Properties** button, and modify the properties for the curve. For more detail, see *Modifying Curve Properties* on page 89.

4. Click **OK**.

Saving Read-Only Target Curves

When you import a predefined target curve into the Harmony database from the **CreoTargets.hmy** or **ImationTargets.hmy** file that is supplied with Harmony, you must save the curve using a different name because the predefined curves are read-only

To save a curve using a different name:

1. Open the curve you want to save.
2. From the **File** menu, select **Save Curve As**.

   Or:

   Right-click the curve window to display the shortcut menu, and then select **Save Curve As**.

   The Save Target Curve As dialog box displays.

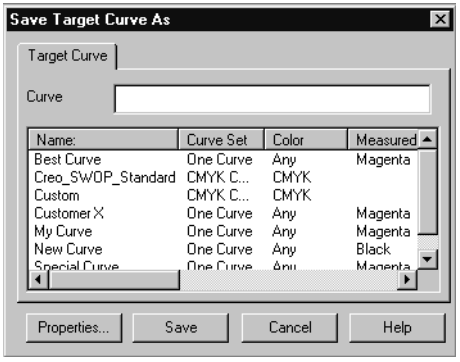


Figure 46: Save Target Curve As dialog box

3. In the **Curve** box, type a new name for the target curve.
4. Click **Save**.

   You can now use the target curve.

5

Setting Curve Properties

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Target Curve Properties 78
Current Curve Properties 80
Calibration Curve Properties 85
Modifying Curve Properties 89

What Are Curve Properties?

Properties are attributes of the curve that give context to the curve data. The properties let you manage the curves by entering information that explains the environment in which the data was taken. As well, the medium and screening properties of the calibration curve are used by the RIP to determine which calibration curve to select.

Target and current curve properties must be set before a new curve can be opened, because the properties determine which output type to calibrate and which type of curve set to use. Derived calibration curves inherit the properties of the current curve, but the attributes can be modified.

See *Modifying Curve Properties* on page 89.

Target Curve Properties

Before you can open a new target curve, you must set the properties for the curve because the properties determine:

- which output type to calibrate
- which measured colors display on the curve graph

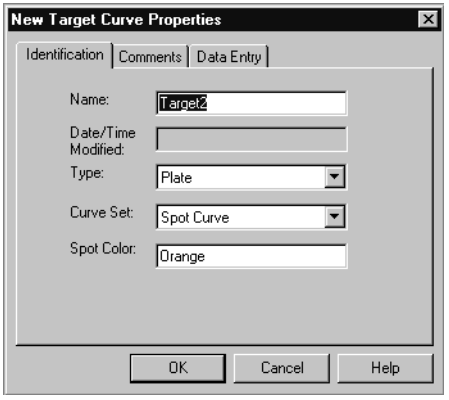


Figure 47: New Target Curve Properties dialog box

All of the attributes in the New Target Curve Properties dialog box except **Name** box on the **Identification** tab, the box on the **Comments** tab, and the **Nodes** box on the **Data Entry** tab, require entries before a new curve can be opened. Some of the required attributes can be changed when saving the curve.

Assigning a Name to a Target Curve

You must create a name for each target curve to uniquely identify it. Target curves do not have automatic naming applied to them.



See *Curve Naming* on page 30 or the Harmony reference documentation for your specific workflow.

To assign a name to a target curve:

1. Open the New Target Curve Properties dialog box.

   See *Creating Target Curves* on page 45.

2. On the **Identification** tab, type a name in the **Name** box.

   We recommend choosing a unique name that will help you identify the curve.

Setting Target Curve Attributes

Once you have assigned a name to the target curve, you need to set the curve's attributes.

To set the curve attributes for a target curve:

1. On the **Identification** tab, select an output type from the **Type** box.

   See *Choosing Which Output Type to Calibrate* on page 14.

   If you selected either **Plate** or **Film** in the **Type** box, in the **Data Entry** tab, select a mode in the **Polarity** box. See *Polarity* on page 39.

   Otherwise, skip this step.

2. In the **Curve Set** box, select:

   - **One Curve** if you want to use one curve for all separations. This is the recommended option. If you select this option, you must also select the appropriate color name from the **Measured Color** box. The most common colors to measure are black and magenta because they are high-contrast, easier to measure accurately, and easier to distinguish during visual comparisons.
   - **CMYK Curves** if you want to use one curve for each CMYK separation. This option is used for color proofing, but rarely for final printed images. It is not recommended for new users.

- **Spot Curves** if you want to use one curve per spot color. If you select this option, you must also type the appropriate color name in the **Spot Color** box.

For more detail on curve set options, see *Curve Sets* on page 27.

3. On the **Data Entry** tab, select the default node set that you want to display from the **Nodes** box.

   Or:

   To define your own node set, type node values in the **Nodes** box.



Important: If you are using a strip reader as your measuring device, do not select a node set. Your strip reader will automatically add nodes to the graph when you measure your sample tints.

Current Curve Properties

Before you can open a new current curve, you must set the properties for the curve. The properties determine:

- which output type to calibrate
- which measured colors display on the curve graph
- the automatic naming of the curve, also called last name
- the screening parameters and medium used to create the sample

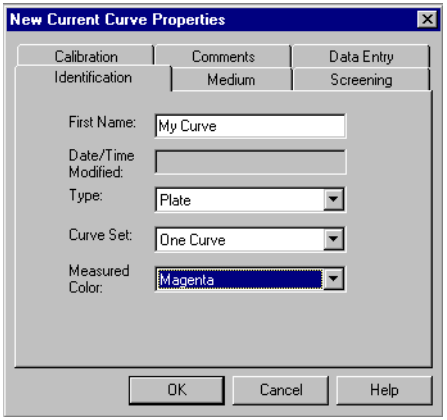


Figure 48: New Current Curve Properties dialog box



Note: All of the attributes except the **First Name** box on the **Identification** tab, the box on the **Comments**, tab, and the **Nodes** box on the **Data Entry** tab require entries before a new curve can be opened. Once a curve is open, the **Data Entry** tab does not display.

Delta

You can only select an option from the **Screening System** box on the **Screening** tab if you have Delta workflow.

Assigning a Name to a Current Curve

You don't need to assign a name to a current curve because current curves have a last name automatically applied to them, composed of their screening and medium attributes. However, you may want to assign a unique first name to the current curve to help you identify it.

For more detail about automatic curve naming, see the Harmony reference documentation for your specific workflow.

To assign a name to a current curve:

1. Open the New Current Curve Properties dialog box.

   See *Creating Current Curves* on page 47.

2. On the **Identification** tab, type a unique name that will help you identify the curve in the **First Name** box.

Setting Current Curve Attributes

Once you have assigned a name to the current curve, you need to set the curve's attributes.

To set the curve attributes for a current curve:

1. On the **Identification** tab, select an output type from the **Type** box.

   See *Choosing Which Output Type to Calibrate* on page 14.

2. If you selected **Plate** or **Film** in the **Type** box, on the **Data Entry** tab, select a mode in the **Polarity** box.

   Otherwise, skip this step.

   See *Polarity* on page 39.

3. In the **Curve Set** box, select:

   - **One Curve** if you want to use one curve for all separations. This is the recommended option. If you select this option, you must also select the appropriate color name from the **Measured Color** box. The most common colors to measure are black and magenta because they are high-contrast, easier to measure accurately, and easier to distinguish during visual comparisons.
   - **CMYK Curves** if you want to use one curve for each CMYK separation. This option is used for color proofing, but rarely for final printed images. It is not recommended for new users.
   - **Spot Curves** if you want to use one curve per spot color. If you select this option, you must also type the appropriate color name from the **Spot Color** box.

   For more detail on curve set options, see *Curve Sets* on page 27.

4. On the **Data Entry** tab, select the nodes that you want to display from the **Default Nodes** box.

   Or:

   To define your own node set, type the node values in the **Nodes** box.



Important: If you are using a strip reader as your measuring device, do not select a node set. Your strip reader will automatically add nodes to the graph when you measure your sample tints.

Setting a Current Curve's Medium and Screening

For a current curve, you need to specify the medium and screening properties you are using for your current sample.

To set medium and screening for a current curve:

1. On the **Medium** tab, select a medium from the **Medium** box.

   Or:

   Type a medium for your sample in the **Medium** box.

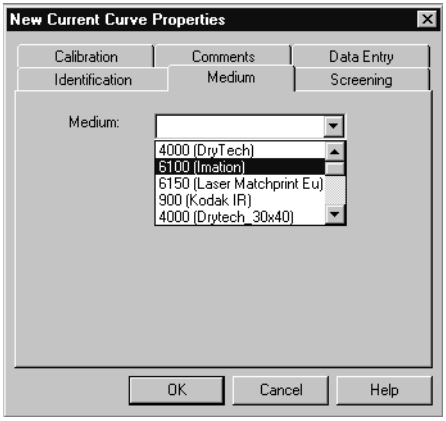


Figure 49: New Current Curve Properties dialog box (Medium tab)

iMPAct

If you have an iMPAct workflow with Platesetter Console or Trendsetter Console, you can select a medium or type a medium index or custom medium index number in the **Medium** box. You can only type numeric values; alpha and special characters are not allowed

Prinergy

If you have a Prinergy workflow, in the **Medium** box, you can only type a medium name or select a medium that you previously defined when creating curves.

Delta

If you have a Delta workflow you can only select a medium from the **Medium** list box; you cannot type the medium name.

For more detail, see the Harmony reference documentation for your specific workflow.

2. On the **Screening** tab, type or select the resolution for the current sample in the **Resolution** box.
3. In the **Dot Shape** box, type or select the dot shape for the current sample.
4. In the **Ruling** box, type or select the ruling for the current sample.

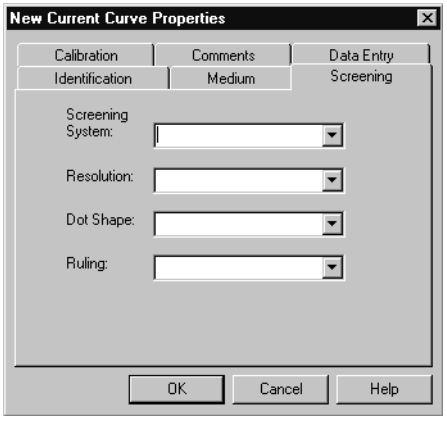


Figure 50: New Current Curve Properties dialog box (Screening tab)

Delta

The **Screening System** property is only available if you have a Delta workflow. For more detail, see the Harmony reference documentation for a Delta workflow.

Using Calibrated Data

If a calibration curve was applied to the current sample you are measuring, you need to enter that information in Harmony, because it will affect the shape of any calibration curve that uses this current curve.

To measure a sample that was calibrated:

1. In the **Calibration** tab, select the **Calibrated Current Curve** option.

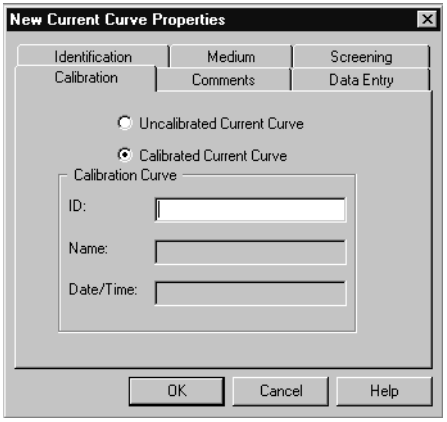


Figure 51: New Current Curve Properties dialog box (Calibration tab)

2. In the **ID** box, type the ID number of the calibration curve as it appears on the tint bar.



Note: To get the accurate revision of the calibration curve, you must enter the ID that is on the sample, not select an ID from the current Harmony database.

If Harmony cannot find the curve based on the ID number you enter, you cannot use the calibrated sample, because Harmony will not be able to trace the origins of the curve. This will result in an inaccurate curve.

For more information about curve ID numbering, see the Harmony reference documentation for your specific workflow.

Calibration Curve Properties

A calibration curve's screening and medium properties define when to use the curve. A derived calibration curve or transfer calibration curve of derived origin initially inherits the screening and medium properties of the current curve. However, you can modify the properties after you create the curve.



Note: A linear transfer calibration curve does not inherit properties because it is not derived from a current and target curve. You can assign and modify calibration curve properties after you create the curve.

To modify calibration curve properties:

1. Make sure the calibration curve is open.

   See *Opening an Existing Curve* on page 33.

2. From the **Edit** menu, select **Curve Properties**.

   Or:

   Right-click to display the short cut menu, and then select **Curve Properties**.

   The Calibration Curve Properties dialog box displays.

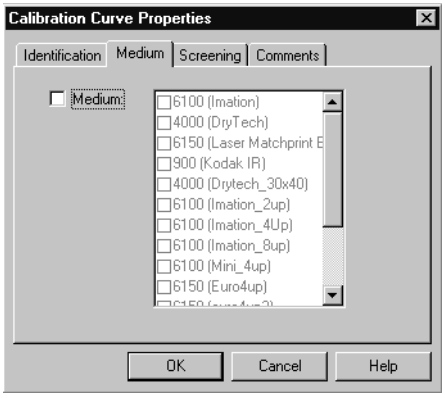


Figure 52: Calibration Curve Properties dialog box

You can now modify the calibration curve's properties.

See *Modifying Curve Properties* on page 89.

Assigning a Name to a Calibration Curve

You don't need to assign a name to a derived calibration curve or transfer calibration curve of derived origin since calibration curves have a last name automatically applied to them, composed of their screening and medium attributes. However, you may want to assign a unique first name to the calibration curve to help you identify it.

For more detail about automatic curve naming, see the Harmony reference documentation for your specific workflow.

To assign a name to a calibration curve:

1. Open the Calibration Curve Properties dialog box.

   See *Calibration Curve Properties* on page 85.

2. On the **Identification** tab, type a unique name for the curve in the **First Name** box.

Modifying a Calibration Curve's Medium and Screening

Initially, a derived calibration curve or transfer calibration curve of derived origin inherits the screening and medium properties from the current curve used to build the calibration curve. However, you can add additional attributes to any medium or screening property, except resolution, at any time.

You can also turn off a medium or screening property if you don't want the attributes of that property to limit the curve's use. For example, if you want the curve to be applicable for any medium, you can turn off the medium property by clearing the **Medium** check box on the **Medium** tab. See Figure 52 on page 86.

Adding Medium or Screening Attributes

To add medium or screening attributes:

1. On the **Medium** or **Screening** tab, make sure the property's limit use check box—that is, the check box beside the property—is selected. If you want to limit use of the curve to:
   - resolution, select the **Resolution** check box
   - dot shape, select the **Dot Shape** check box
   - line ruling, select the **Ruling** check box

   See Figure 53 on page 88 for an illustration.
2. Modify any of the following properties.



Note: For all properties, the attribute inherited from the current curve cannot be cleared; it must always be selected.

	Medium	To select the medium names that the curve can be used for, select the check box next to each medium name you want.
Delta	Screening System	Available only if you have a Delta workflow. For more detail, see your Harmony reference documentation for a Delta workflow.
	Resolution	This property is inherited from the current curve and cannot be changed.

Dot Shape	If you want to specify all dot shapes that the curve can be used for, select the **User Defined** option, and then select the check box next to each dot shape you want. If you want the curve to be used for any AM (halftone) dot, select the **All AM** option. If you want the curve to be used for any FM (stochastic) dot, select the **All FM** option.
Ruling	Set a line ruling range for the curve's use. The start of the range cannot be higher than the line ruling specified in the current curve's properties.

Note: If you don't see a medium that you want, click the **Add** button, then type the new medium in the box on the New Medium dialog box.

Prinergy

For more detail, see your Harmony reference documentation for a Prinergy workflow.

Turning Off a Property

To turn off a property:

- On the **Medium** or **Screening** tab, clear the limit use check box beside the property you want to turn off.

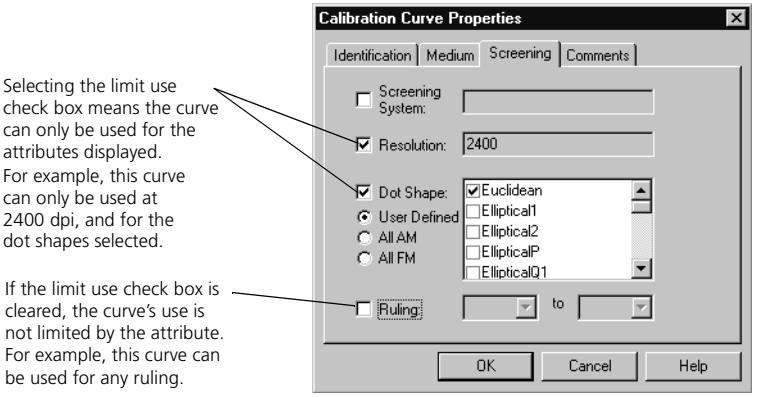


Figure 53: Turning calibration curve properties on and off

By clearing the check box, you are no longer limiting use of the curve for that property. For example, the calibration curve whose properties are shown in Figure 53 can be used for images with any ruling (lpi).

Modifying Curve Properties

After you have created a curve, you can modify the curve's properties if you want to change your settings. You can only modify the curve's properties when the curve is open. For all curves, the output type and curve set cannot be modified.

To modify curve properties:

1. If a derived calibration curve is open, select the tab of the curve whose properties you want to display. Otherwise, go to the next step.
2. From the **Edit** menu, select **Curve Properties**.

   Or:

   Right-click to display the shortcut menu, and then select **Curve Properties**.

   The Curve Properties dialog box for the type of curve you are modifying—that is, calibration, current, or target—displays.

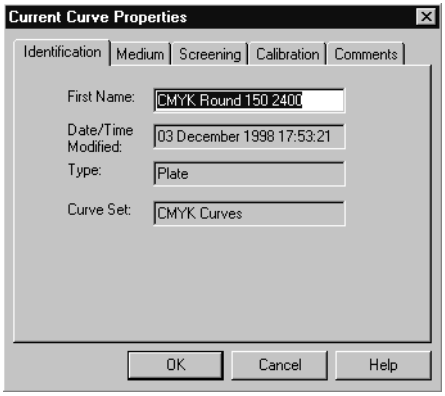


Figure 54: Current Curve Properties dialog box

3. On the property tabs, modify the properties as required.
4. Click **OK**.
5. Save the curve.

   The new settings are saved.

6

Advanced Curve Techniques

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Importing and Exporting Harmony Curves

The **Import Curves** and **Export Curves** options let you move individual or groups of curve files between computers.

For example, you need to distribute a target curve to other printing sites so that all sites are printing to the same target. This is important if you are a multi-site printing company that prints the same job at more than one location. The site distributing the target curve uses the **Export Curves** option, and the receiving site uses the **Import Curves** option.

Spectrum

You also use the **Import Curves** option if you want to import existing curves into the Harmony database. For example, if you want to use a predefined target curve in the **CreoTargets.hmy** file, or the **ImationTargets.hmy** file as a target, you must import the curve into the Harmony database before you can use it.

Exporting Curves

Use the **Export Curves** option if you want to move curves from the local Harmony database to another location.

To export Harmony curves:

1. From the **File** menu, select **Export Curves**.

   The Export Curves dialog box displays.

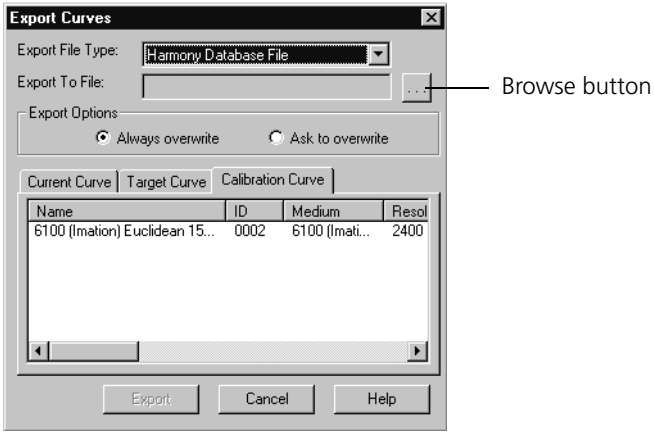


   Figure 55: Export Curves dialog box

2. From the **Export File Type** box, select **Harmony Database File**.



3. Beside the **Export To File** box, click the **Browse** button to find the location of the Harmony database file that you are exporting to.

   The Select Export File dialog box displays.

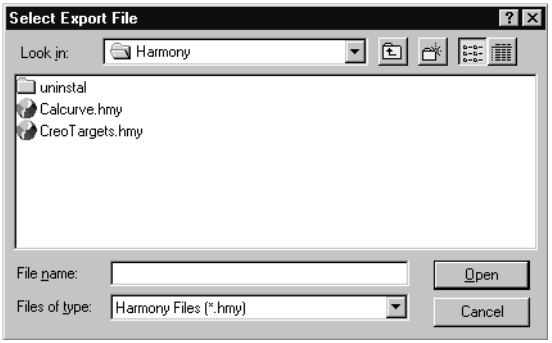


Figure 56: Select Export File dialog box

4. Find the correct drive and folder containing the Harmony database file that you are exporting the curve(s) to, and then select the database file from the list of files displayed.

   The name of the Harmony database file displays in the **File name** box.



Note: If you want to export a curve to a location that doesn't contain a Harmony database file, for example, to a floppy disk, you must type a name in the **File name** box. Harmony will create a database file with the extension .hmy in the location specified.

5. Click the **Open** button.

   The Select Export File dialog box closes, and the Export Curves dialog box displays again.

   The Harmony database file that you selected displays in the **Export To File** box.

6. On the **Current Curve**, **Target Curve**, and **Calibration Curve** tabs, select the curves that you want to export.

7. Under **Export Options**, select one of the following:

Always overwrite	The curves exported will automatically overwrite any curves of the same name that are found in the Harmony database file you are exporting to.
Ask to overwrite	You will be cautioned each time a curve of the same name exists in the Harmony database file you are exporting to. You have the option to overwrite or not overwrite.

8. Click the **Export** button.

   The curve is exported to the location you specified.

Importing Curves

Use the **Import Curves** option if you want to move existing curves from another location into the local Harmony database.

To import curves:

1. From the **File** menu, select **Import Curves**.

   The Import Curves dialog box displays.

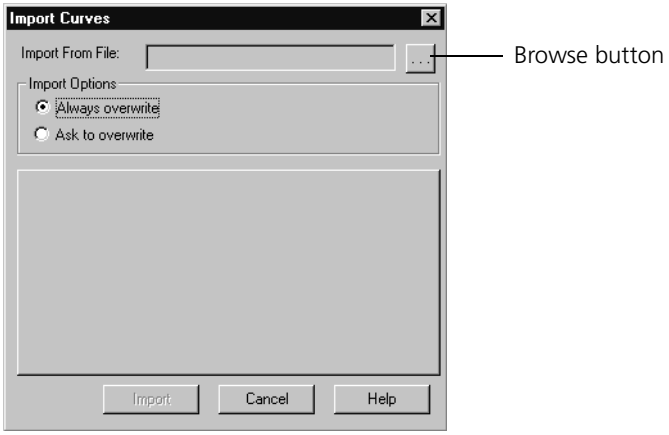


Figure 57: Import Curves dialog box

Note: When importing Allegro RIP 4.1 curves, the curves are converted to transfer calibration curves.



2. Beside the **Import From File** box, click the **Browse** button to find the location of the database file that you are importing from.

   The Select Import File dialog box displays.

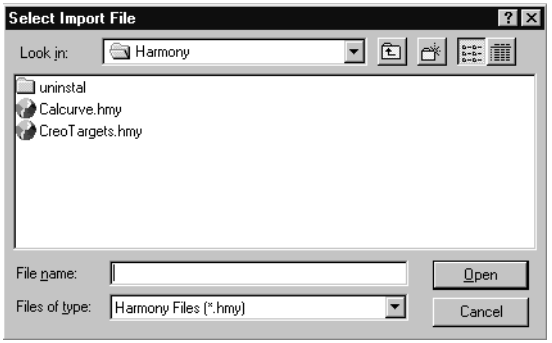


Figure 58: Select Import File dialog box

3. Find the correct drive and folder containing the database file that you are importing the curve(s) from, and then select the file from the list of files displayed.

   The name of the database file displays in the **File name** box.

4. Click the **Open** button.

   The Select Import File dialog box closes, and the Import Curves dialog box displays again.

   The database file that you selected displays in the **Import From File** box.

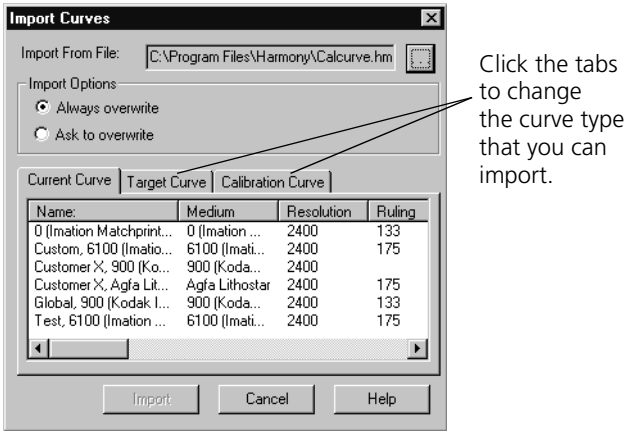


Figure 59: Import Curves dialog box (file selected)

5. On the **Current Curve**, **Target Curve**, and **Calibration Curve** tabs, select the curves that you want to import.
6. Under **Import Options**, select one of the following:

Always overwrite	The curves you import will automatically overwrite any curves of the same name that are found in the Harmony database you are importing to.
Ask to overwrite	You will be cautioned each time a curve in the database file you are importing from has the same name as a curve in the database you are importing to. You have the option to overwrite or not overwrite.

7. Click the **Import** button.



Note: Calibration curves added to a Harmony database using the **Import Curves** and **Export Curves** options are automatically disabled for selection by the RIP. For the RIP to use the curves, you must manually enable each curve.

The curve(s) you selected are imported to the Harmony database. For more detail, see the Harmony reference documenation for your specific workflow.

Adjusting for Gray Balance

Having gray balance means that the gray composed of a combination of C, M, and Y (typically 50C, 39M, and 39Y) will produce a neutral gray—that is, a gray that is not cold or warm, just neutral. Achieving gray balance also means that a tint composed of the combination of C, M, and Y will match the same tint composed of K only.

Before checking for gray balance, make sure that:

- The ink densities of your press are correct.
- You have acceptable registration.
- The calibration curve used to print the gray balance pattern is smooth.

- The color shift isn't caused by the dot shape used. For example, a Euclidean dot jumps at 50% because the dots join on all sides at that tint. This jump may affect the 50% CMY grays.

If your grays have a consistent color cast across the full tonal range, they can be correct on press. However, if a color cast occurs only in, for example, the quarter tones, then color-specific calibration curves must be used to correct the gray imbalance.



Important: Unlike calibration using target and current curves, fixing a gray balance problem is not deterministic. It takes careful judgement and may take several iterations to correct the problem.

To adjust the curves for gray balance:

1. Check for gray balance, ensuring that:
   - The three-color gray (C, M, and Y) produces a neutral hue in each tint range.
   - The three-color tint matches the K only tint. In other words, it isn't heavier or lighter.
2. Convert the derived calibration curve used to print the gray balance pattern to a transfer calibration curve.

   See *Making Derived Curves Transfer Curves* on page 98.
3. Convert the **One Curve** curve set to a **CMYK Curves** curve set.

   See *Changing Curve Sets of a Transfer Curve* on page 99.
4. Deviate the curve(s) as required to achieve balance.

   See *Deviating Curves* on page 100.

   For example, if your hue looks like it has too much cyan, deviate the cyan curve down slightly. Or, if the three-color 50% tint looks like the 45% tint composed of black only, either deviate the black curve down 5% or deviate the cyan, magenta, and yellow curves up 5%.

Making Derived Curves Transfer Curves

Converting a derived calibration curve to a transfer calibration curve removes the link between the calibration curve and the target and current curves it was derived from. You can edit a transfer curve in deviation mode.

Usually, you convert a derived curve to a transfer curve when you want to edit the calibration curve without affecting the data and accuracy of the target and current curves, because these curves may also be linked to other derived calibration curves.

Common reasons for converting curves are to adjust for gray balance or to experiment with altering the calibration curve without changing the data of the target or current curve.

To convert a derived curve to a transfer curve:

1. If you want to retain the derived curve, make a copy of the curve.

   See *Copying an Existing Curve* on page 34.

2. Open the derived calibration curve you want to convert.

   See *Copying an Existing Curve* on page 34.

   Note: If you copied the curve in the previous step, open the copy.

3. From the **Edit** menu, select **Convert to Transfer**.

   A warning message displays, explaining that the link to the target and current curves will be lost and asking if you want to continue.

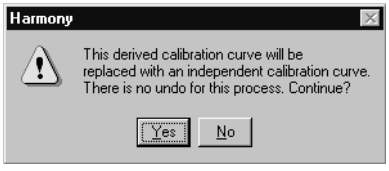


Figure 60: Harmony warning message

4. Click **Yes**.

   The curve is converted to a transfer calibration curve.

Changing Curve Sets of a Transfer Curve

You can change the curve set from **One Curve** to **CMYK Curves** for transfer calibration curves. The most common reason for changing the curve set is when you are adjusting for gray balance and need color-specific curves.

For more information about curves sets, see *Curve Sets* on page 27.

To change the curve set:

1. Open the transfer calibration curve.

   See *Opening an Existing Curve* on page 33.

2. From the **Edit** menu, select **Curve Properties**.

   Or:

   Right-click to display the shortcut menu, and then select **Curve Properties**.

   The Calibration Curve Properties dialog box displays.

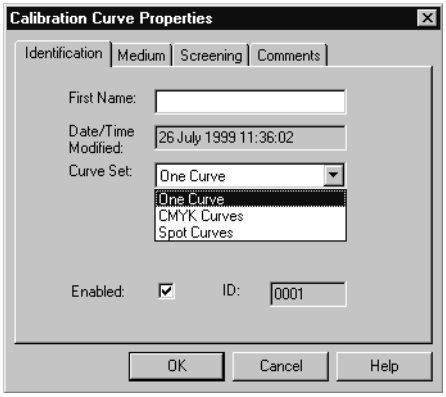


Figure 61: Calibration Curve Properties dialog box

3. On the **Identification** tab, in the **Curve Set** box, select **CMYK Curves**.

   Copies of the original transfer calibration curve are created for each of the other three colors so that you end up with identical cyan, magenta, yellow, and black curves.

Deviating Curves

Deviation mode lets you adjust the shape of an entire curve or a portion of the curve. Deviation can be applied to target, current, or transfer calibration curves.

Deviation is not automatically applied as you move the curve around so that you can experiment without permanently changing the curve. However, once you apply deviation to the curve, it cannot be undone.

Note: You can still revert to the last saved version of the curve by closing the curve window without saving. When you reopen the curve window, the curve is in the previous saved state.

Switching to Deviation Mode

To change the curve to deviation mode:

1. Open the curve.

   See *Opening an Existing Curve* on page 33.

2. For transfer calibration curves, the curve is always in deviation mode; skip to the next step.

   For target or current curves, from the **Edit** menu, select **Deviation Mode**.

   Or:

   Right-click to display the shortcut menu, then select **Deviation Mode**.

   Deviation end points display at the ends of the curve.

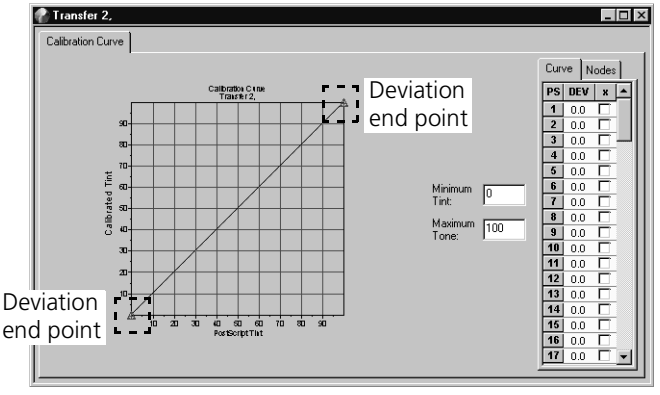


Figure 62: Transfer Calibration Curve window (deviation mode)

Deviating an Entire Curve

To deviate an entire curve:

1. Make sure the curve window is open.
2. Add a node.

   See *Adding or Deleting Nodes* on page 35.

   The node displays as a new deviation point.

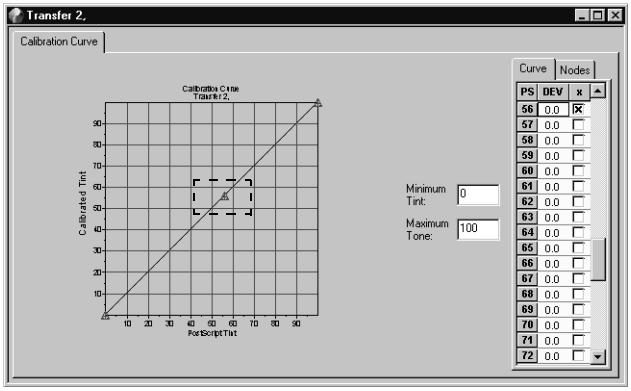


Figure 63: Transfer Calibration Curve window (deviation point)

3. Move the new node (deviation point) to adjust the curve.

   The node displays as a regular node, and the curve is adjusted.

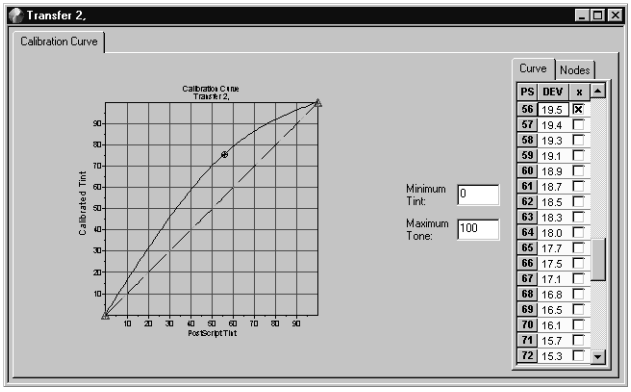


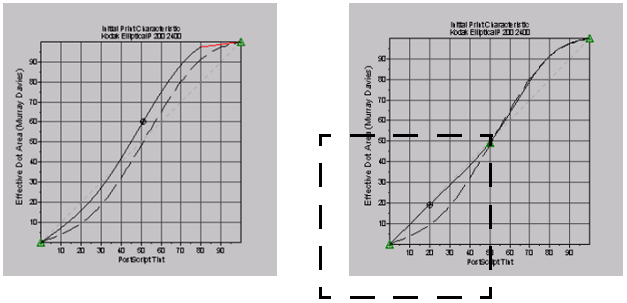
Figure 64: Transfer Calibration Curve window (deviated)

4. Repeat steps 1 and 2 as needed, until you achieve the desired curve shape.

5. To cancel the deviation(s), from the **Edit** menu, select **Cancel Deviation**.

   Or:

   To save the deviation(s), from the **Edit** menu, select **Apply Deviation**.



Deviating an entire curve Deviating part of a curve

Figure 65: Deviating a curve

Deviating Part of a Curve

The default end points for deviating a curve are at the ends of the curve. This lets you modify the entire curve. To modify only a part of the curve, you create new end points, and then add a node between them as the control point. When you move the control point node, only the part of the curve between the end points is adjusted.

To deviate part of a curve:

1. Make sure the curve window is open.
2. Add a node as a new end point at the end of the portion of the curve you want to deviate.

   See *Adding or Deleting Nodes* on page 35.

   The node displays as a new deviation end point.

   See Figure 66 on page 103.
3. Add another node as the other end point of the portion of the curve you want to deviate.

   Or:

   Use one of the two default end points at either end of the curve.

See Figure 66 on page 103.

4. Add a node between the two end points. This node is your control point.

   The node displays as a new deviation point. See Figure 66 on page 103.

5. Move the control point to adjust the portion of the curve between the end points.

   The node displays as a regular node, and the curve is adjusted.

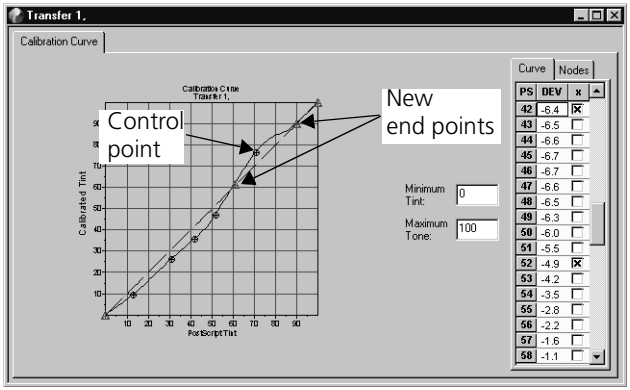


Figure 66: Transfer Calibration Curve window (partial deviation)

6. Repeat steps 1 through 5 as needed, until you achieve the desired curve shape.

7. To cancel the deviation(s), from the **Edit** menu, select **Cancel Deviation**.

   Or:

   To save the deviation(s), from the **Edit** menu, select **Apply Deviation**.

Saving Current Curves As Targets

Use this option if you want to make your current printing response—that is, the current curve—a target. Saving a current curve as a target curve is a shortcut that lets you create the target curve without remeasuring the sample you used to create the current curve. When you save a current curve as target, the current curve is retained in the Harmony database.

To save a current curve as a target:

1. Open the current curve you want to save as a target.

   See *Opening an Existing Curve* on page 33.

2. From the **File** menu, select **Save Curve As**.

   Or:

   Right-click to display the shortcut menu, and then select **Save Curve As**.

   The Save Current Curve As dialog box displays.

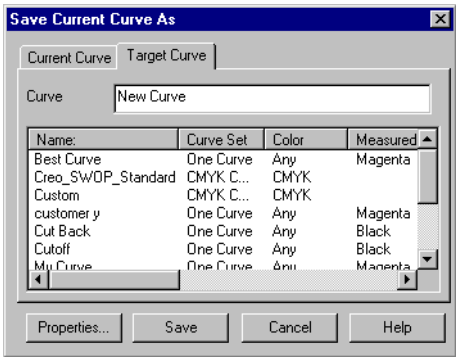


Figure 67: Save Current Curve As dialog box

3. Click the **Target Curve** tab.
4. In the **Curve** box, type a name for the target curve.
5. Click **Save**.

   The curve is saved as a target curve in the Harmony database.

Compensating for Undesirable High Density

The **Density Calibration** option lets you compensate for an output device that produces higher ink densities than you want by screening the solid tint values produced by that device. This means you can match the solid density of the target sample with the solid density of the current sample when you create derived calibration curves.

For example, density calibration is useful if you have a high-density proofing device and you want to reduce the density to match the lower densities produced on press. Density calibration lets you achieve a better match between proof and presswork.

You can calibrate density only if you select the **Paper** output type. For more information, see *Choosing Which Output Type to Calibrate* on page 14.



Note: Density calibration compromises the halftone integrity of your output.

You cannot achieve dot-for-dot representation. Therefore, screening effects, such as moiré, may not appear the same on final output.



Important: You can only calibrate density if your RIP can screen solid tints. For more information, refer to your RIP documentation.

To calibrate density:

1. Create the target curve and current curve that you want use to create the derived calibration curve with density calibration enabled.

   For more detail, see *Creating Target Curves* on page 45 and *Creating Current Curves* on page 47.

   Make sure you enter the solid density value— measured from your sample tint bar—in the **Solid Density** box on both the Target Curve and Current Curve windows.

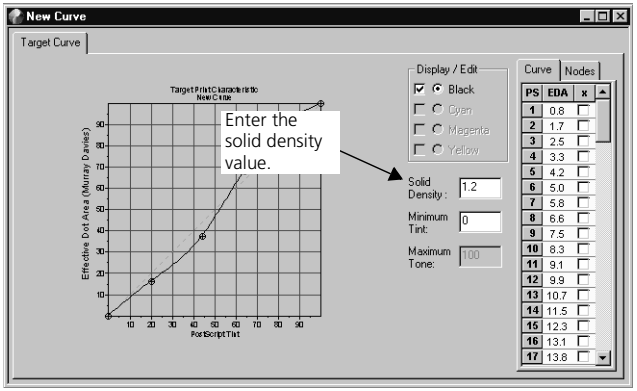


Figure 68: Target Curve window

For more information on measuring solid density, see *Measuring Tints* on page 63.

2. Create the derived calibration curve.

   For more detail, see *Creating Derived Calibration Curves* on page 49.

   The Calibration Curve window displays.

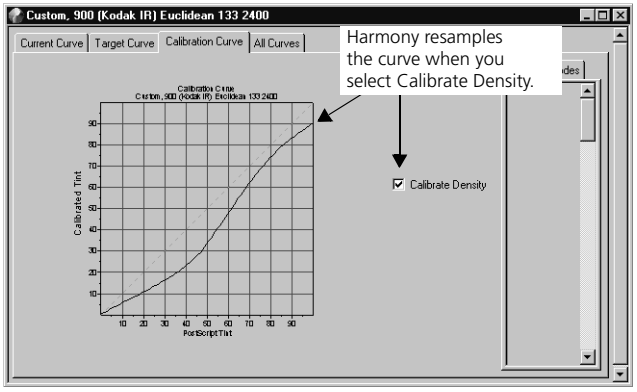


Figure 69: Calibration Curve window

3. Select the **Calibrate Density** check box to enable density calibration.

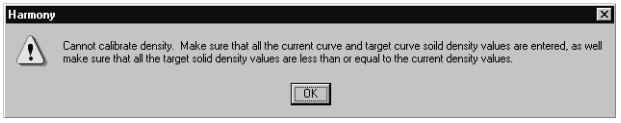


Figure 70: Harmony warning box

If a warning box displays, you did not enter solid density values in the **Solid Density** box on the Target Curve and Current Curve windows.

Or:

The target curve solid density value you entered is greater than or equal to the current curve solid density value.

4. If the warning box displays, click **OK**, and then enter or adjust values in the **Current Curve** and **Target Curve** tabs on the Calibration Curve window.
5. Save the curve.



Note: If density calibration is enabled, Harmony uses the Murray-Davies formula to resample the curve correctly; it does not simply scale the curve.

Adjusting for Peak Density Below Solid Values

In some situations, you may find that solid tints are less dense on the final output than screened tints. Harmony lets you "cut back" or eliminate these solids for target curves and transfer calibration curves.

For example, in flexography, solid tints on plate can actually produce lower densities on the final printed output than screened tints. On a flexographic plate, solid tint values carry less ink than screened values. This means a lower tint value can actually achieve a higher density on press. Harmony compensates for this by screening the solid tints.

Normally, you cut back your target and transfer calibration curve solid tints if your output deliverable is **Film** or **Plate**. See *Choosing Which Output Type to Calibrate* on page 14.



Note: Cutting back target and transfer calibration curve solid tints compromises the halftone integrity of your output.

You cannot achieve dot-for-dot representation. Therefore, screening effects, such as moiré, may not appear the same on final output.



Important: You can only cut back target or transfer calibration curve solid tints if your RIP can screen solid tints. For more information, refer to your RIP documentation.

To cut back solid tints:

1. Open the Target Curve or Transfer Calibration Curve window.
2. In the **Maximum Tone** box, type the maximum tone value you want, for example, 90.

   This means that all tint values greater than 90 will be eliminated from the curve.

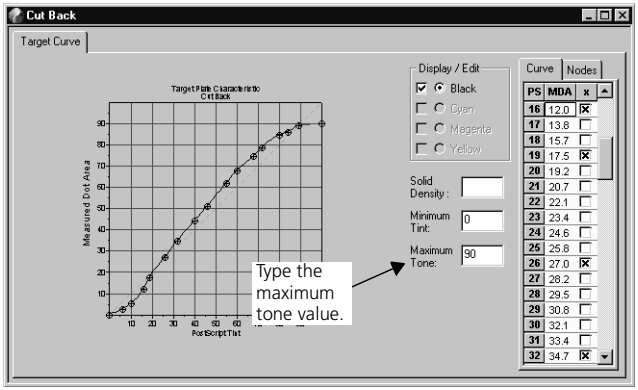


Figure 71: Target Curve window (solid cutback)

3. Save the curve.

If you create a derived calibration curve using a target curve that has the solids cut back, the derived calibration curve will inherit the maximum tone value of the target curve. For example, if you create a derived calibration curve using a target curve with a maximum tone of 90%, the derived calibration curve will also have a maximum tone value of 90%.

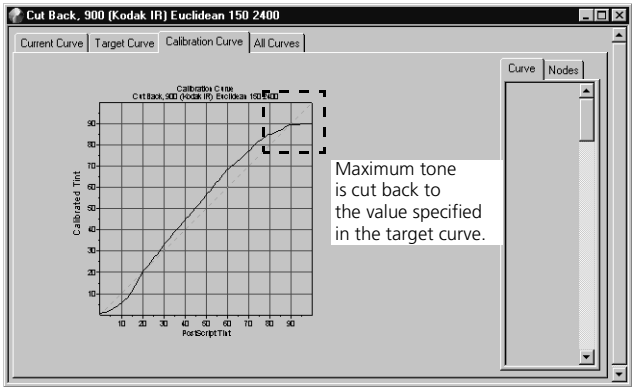


Figure 72: Calibration Curve window (solid cut back)

Eliminating Undesirable Highlight Tint Values

Harmony lets you "cut off " or eliminate undesirable tint values in the highlights of target and transfer calibration curves. You can use this feature for any output type—film, plate, or paper.

Cutting off the highlights is especially useful if you make film or plates for flexography. For example, you sell film to a customer who doesn't want dots smaller than a 5% dot on the film. Using the target and transfer curve cutoff feature, you can eliminate any dots below 5% on the film.

Eliminating highlights on a flexographic plate is desirable because smaller dots can actually produce higher densities than larger dots on the final printed output. Fine dots on a flexographic plate can bend during the printing process, rendering more ink on the paper than larger dots. These undesirable dots in highlight areas are called scum dots.

To cut off highlight tints:

1. Open the Target Curve or Transfer Calibration Curve window.
2. In the **Minimum Tint** box, type the minimum tint value you want, for example, `10`.

   This means that all tint values less than 10 will be eliminated from the curve.

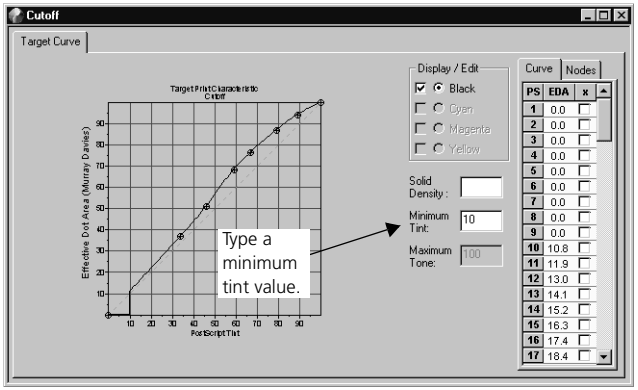


Figure 73: Target Curve window (highlight cut off)

3. Save the curve.

If you cut off the highlights of a target curve linked to a derived calibration curve, Harmony will automatically apply the cutoff to the derived calibration curve.

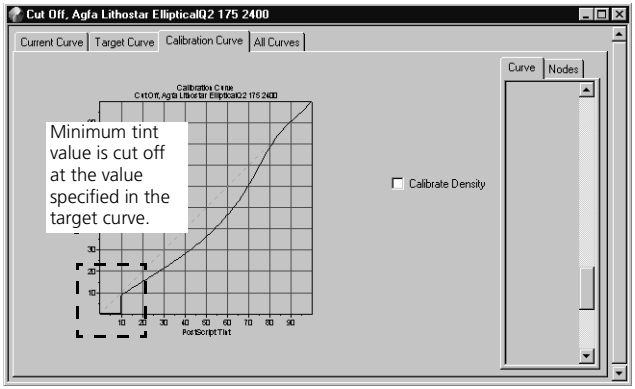


Figure 74: Calibration Curve window (highlight cut off)

7 Troubleshooting

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Viewing Printed Results 112
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Using Densitometers

This section contains troubleshooting information about densitometers.

Absolute density is read instead of dot area

When measuring heavy tints (> 85%), some densitometers switch from a dot area percentage reading to absolute density.

Solution:

Press the densitometer's 0 (zero) key while holding the densitometer down. If required, take the reading again.

Dot area > 100%

When measuring a tint that is less than the solid (100%) you defined, you get a reading that is greater than 100%.

Solution:

The absolute solid reading was probably taken in a different area of the press sheet than the tint bar. Redefine paper white and solid using the tint bar to take the measurements.

Viewing Printed Results

This section contains troubleshooting information for problems with the printed result.

Images don't seem to be calibrated

One or more images on the press sheet don't seem to have had the calibration curve applied to them.

Solution:

Check to see if the image is pre-screened. If it is, calibration was not be applied because the image has been previously RIPed by a different system.



See also the Harmony user documentation for your specific workflow.

If the image is not pre-screened, see *Output using calibrated curve isn't what was expected*.

Number of impressions is severely shortened

On press, the impressions are degraded after only a small number of impressions.

Solution:

Check the laser exposure value for your output device and set it to its optimal setting. Traditionally, an output device's exposure value can be decreased to lighten the tints. This method cannot be used for computer-to-plate technology. See *Chapter 1, Overview*.

Output using calibrated curve isn't what was expected

The calibrated curve isn't producing the output you expect.

Solution:

Measure the tints on the calibrated output. Do they match the target curve values?

If **yes**, you are meeting the target you specified, but that target is not really what you want. You need to select another target. See *Selecting Your Target Sample* on page 60.

If **no**, the current curve is probably not correct.

You should first remeasure the tints on the current curve to make sure that it is not a human or densitometer error. Is a measurement error found?

If **yes**, modify the current curve. See *Chapter 3, Basic Steps for Creating Curves*.

If **no**, the current sample used is probably not indicative of how your machinery (press, platesetter, or imagesetter) is performing. You should take another current sample. See *Creating Current Curves* on page 47.

Using the Harmony Graph

This section contains troubleshooting information about the Harmony graph.

Red line appears in all or sections of the graph

The line of the graph is red in parts or all of the graph. Possible reasons for the problem are:

- The graph needs to be smoothed. See *Smoothing Target or Current Curves* on page 73.

  Or:

- You are using the wrong view mode. See *Polarity* on page 39.

Can't move curve in deviation mode

In deviation mode, the curve of the graph can't be moved up or down even though deviation nodes were added. A possible reason for the problem is that there are no nodes on the graph. Nodes must be present on the graph before deviation can be applied to them. In other words, you cannot create a new curve without default nodes, and then immediately switch to deviation mode.

Can't create a calibration curve

If you create a derived calibration curve, or a transfer calibration curve of derived origin, you must ensure that the output type, curve set type, or measured colors (**One Curve** curve set only) of the target curve and current curve you select match. If your settings don't match, a Harmony warning message displays. Sometimes the warning message prevents you from creating the calibration curve. In this case, you must reselect a target or current curve.

For information about appropriate curve set settings, see *Matching the Curve Sets* on page 29.

For information about creating calibration curves, see *Creating Derived Calibration Curves* on page 49 and *Creating Transfer Calibration Curves* on page 54.

A

Menus

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File Menu

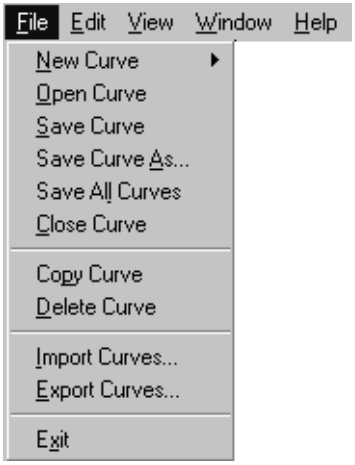


Figure 75: File menu

New Curve	Opens a new curve window.
Open Curve	Opens an existing curve.
Save Curve	Saves a curve. See *Saving Curves* on page 75.
Save Curve As	Saves changes made to a curve as a different curve.
Save All Curves	Saves all open curve windows.
Close Curve	Closes the open curve window.
Copy Curve	Makes a copy of a curve. See *Copying an Existing Curve* on page 34.
Delete Curve	Deletes the selected curve from the Harmony database. For more detail, see the Harmony reference documentation for your specific workflow.
Import Curves	Imports curves from another calibration utility or another Harmony database. See the Harmony documentation for your specific workflow.
Export Curves	Exports curves to another Harmony database. See the Harmony documentation for your specific workflow.
Exit	Exits Harmony.

Edit Menu

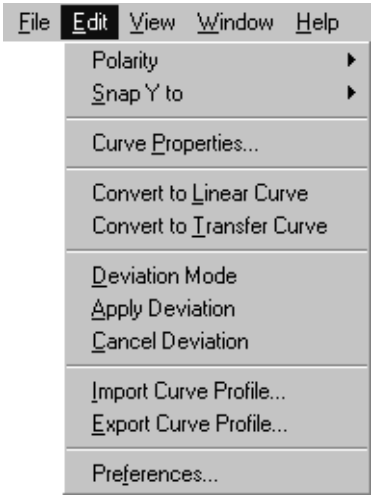


Figure 76: Edit menu

Polarity — Sets whether the curve displays in positive or negative mode. See *Polarity* on page 39.

Snap Y to — Sets the decimal value that the node should jump to when it is moved along the y axis. See *Setting the Snap-To Guide* on page 37.

Curve Properties — Opens the Calibration Curve Properties dialog box for the displayed curve. See *Calibration Curve Properties* on page 85.

Convert to Linear Curve — Removes all changes to nodes and changes the curve back to a 45° curve with no nodes. See *Converting Nodes to a Linear Curve* on page 36.

Convert to Transfer Curve — Converts a derived calibration curve to a transfer calibration curve. See *Making Derived Curves Transfer Curves* on page 98.

Deviation Mode — Switches the curve to deviation mode. See *Deviating Curves* on page 100.

Apply Deviation	Saves the deviation applied to a curve. See *Deviating Curves* on page 100.
Cancel Deviation	Cancels any deviations made since the last time the deviation was saved. See *Deviating Curves* on page 100.
Import Curve Profile	Imports a curve shape to a common file format. For more information, contact your service representative.
Export Curve Profile	Exports a curve shape to a common file format. For more information contact your service representative.
Preferences	Sets up your densitometer for automatic input. See *Setting Up Your Densitometer* on page 40.

View Menu

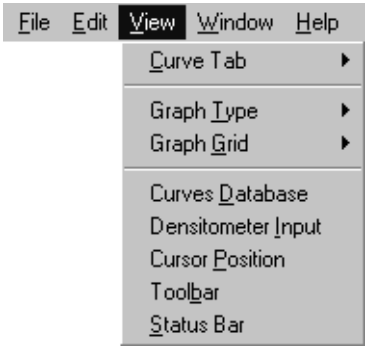


Figure 77: View menu

Curve Tab — For a derived calibration curve, use to switch the active tab among the **Current**, **Target**, **Calibration**, or **All Curves** tabs.

Graph Type — Switches between viewing the graph in dot gain or dot area mode. See *View Dot Area or Dot Gain* on page 38.

Graph Grid — Sets the increments at which graph gridlines are displayed: none, 1, 2, 5, or 10.

Curves Database — Display or hides the Curves Database window. See *Harmony Database Window* on page 24.

Densitometer Input — Displays the Densitometer Input dialog box. See *Taking Accurate Densitometer Readings* on page 64.

Cursor Position — Displays the position bar. See *Cursor Position* on page 31.

Toolbar — Displays the toolbar. See *Toolbar* on page 23.

Status Bar — Displays the status bar. See *Status Bar* on page 24.

Window Menu

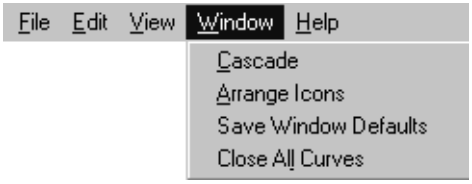


Figure 78: Window menu

Cascade	Arranges open windows in a cascade pattern.
Arrange Icons	Organizes any minimized icons.
Save Window Defaults	Saves any changes made to the size of the curve windows so that windows opened subsequently default to this size.
Close All Curves	Closes all open curve windows.

Shortcut Menus

You can use your right mouse button to click any item and see a shortcut menu. This menu contains common commands that you can use on the item you clicked. For example, by right-clicking a curve in the Harmony database window, you can open, copy, or delete it.

B

Toolbar



Creates a new current curve. See *Creating Current Curves* on page 47



Creates a new target curve. See *Creating Target Curves* on page 45.



Creates a new derived calibration curve. See *Creating Derived Calibration Curves* on page 49.



Creates a new transfer calibration curve. See *Creating Transfer Calibration Curves* on page 54.



Opens an existing curve. See *Opening an Existing Curve* on page 33.



Saves the curve(s). See *Saving Curves* on page 75.



Displays the Calibration Curve Properties dialog box. See *Calibration Curve Properties* on page 85.



Switches between normal curve entry and deviation mode. See *Deviating Curves* on page 100.



Applies the deviation—that is, saves the curve in the new deviated shape. There is no undo for this action.



Cancels any deviation done since the last time the deviation was applied.



Displays or hides the Harmony database window. See *Harmony Database Window* on page 24.



Use to automatically enter densitometer input to the curve. See *Measuring Tints* on page 63.



Displays or hides the Cursor Position window. See *Cursor Position* on page 31.

C

Setting Up Your Densitometer

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Connecting a Densitometer to Your Computer

This appendix provides step-by-step instructions for connecting a densitometer to the computer on which Harmony is running.

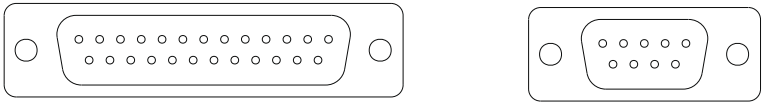
Note: These instructions work for Windows 95 or Windows NT running on Intel or Alpha computers. If you are running Harmony on a workstation with a RIP, be careful to choose the port that is not being used to communicate with the output device. If there are no free ports, install Harmony on another computer and export the calibration curve to the workstation. See *Exporting Curves* on page 92. Ideally, you should have this computer within comfortable range of the table where you are taking densitometer measurements.

Much of the information in this appendix depends on the type of measuring device you are using. For more information on setting up your densitometer, see your densitometer documentation.

Serial Ports

Serial ports, or COM ports, are the connectors on the back of your computer you use to attach a densitometer. Typically, a computer has two serial ports that are identical in appearance:

- COM1 refers to communication port 1
- COM2 refers to communication port 2



25-pin serial port 9-pin serial port

Figure 79: Serial ports

Note: These serial ports are also referred to as serial port 1 and serial port 2, or port 1 and port 2.

Extender Boards

If neither COM1 nor COM2 can be freed for attaching a densitometer, extra COM ports can be installed on an extender board in your computer. Extra COM ports will be called COM3, COM4, etc.

Note: This is more likely to be necessary if you are running your RIP as well as Harmony on the same computer. They work fine together on the same computer, provided you have the ports properly configured.

Connecting the Densitometer

Before connecting the densitometer to your computer, identify which port number you will use by locating an inscription around the serial port, for example, COM1 or COM2.

To connect the densitometer to your computer:

1. Connect the cable that comes with your densitometer to the port you will use.



Note: If the cable does not fit the COM port connector, contact your system administrator because your computer may have nonstandard COM connectors. In this case, your administrator should be able to provide an adapter.

2. Connect the other end of the cable to the densitometer.

Densitometer Data Interface Settings

Data interface settings specify the details for communicating with the computer to which the densitometer is attached. For more information on setting data interface settings, see your densitometer documentation.

Specify the following data interface settings for your densitometer.

Bits per second (or baud rate)	9600
Data bits	8
Parity	None
Stops bits	1
Flow control (or handshake)	None



Note: If your densitometer does not allow you to set all of the above settings, set only the ones that are available.

Make sure the densitometer is configured to send its measurement data to a computer. This is specific to the densitometer you use, but usually can be done using a simple menu option. For details on sending measurement data to a computer, see your densitometer documentation.

Testing the Connection

Now that you have set the communications details on the densitometer, you must configure the computer software to the same settings and test the connection.

The best way to test the connection involves using a terminal program that displays data transmitted over a COM port on the screen. Using a terminal program, you can test the connection by checking whether data is sent to the computer each time you take a measurement with the densitometer.

An example of a terminal program is Hyperterminal, available on Windows 95 or Windows NT as an accessory.

To test the connection:

1. Start the terminal program.

   If you are using Hyperterminal, create a named connection, but do not associate it with any modem.

2. Select the COM port that your densitometer is connected to.

3. Specify the COM port settings.

   Use the exact settings specified in *Densitometer Data Interface Settings* on page 127.

4. If you are using Hyperterminal, click the **Connect** button in the program's toolbar.

   Otherwise, skip this step.

5. Take a measurement with the densitometer.

   If the connection is good, you will see text displayed in the terminal program's window each time you take a measurement.

   If text does not display in the terminal program's window, see *Configuring Densitometers for Harmony* on page 129.

Configuring Densitometers for Harmony

If Harmony is not preconfigured for your densitometer, you need to specify the characteristics of your instrument in the **densitomers.cfg** file located in the **Harmony** folder.

Configure the **densitomers.cfg** file by adding the following fields with the appropriate information to the following line:

```
<Brand>|<Model>|<Cyan>|<Magenta>|<Yellow>|
<Black>|<Paper>|<Solid Cyan>|<SolidMagenta>|
<Solid Yellow>|<Solid Black>|
```

Note: For details on these fields, read the contents of the **densitomers.cfg** file.

For example, to configure an X-Rite 404 densitometer, enter:

```
X-Rite|Model404|DOTTC|DOTTM|DOTTY|DOTTV|
None|None|None|None|None|
```

Troubleshooting

This section describes problems you may encounter using a densitometer with Harmony. It also provides possible causes and solutions for these problems.

Densitometer

Problem:

If no data is transferred from your densitometer to Harmony, check the possible causes listed below, then follow the appropriate solution.

Cause	Solution
Faulty cable	Make sure the cable you use is in good working condition. If you used the cable successfully to connect to other devices on your computer, it is probably in good working condition. If you are unsure about the cable, ask your system administrator to test the cable or give you a new one.
Improperly connected cable	Make sure the cable connecting the computer to the densitometer is firmly connected at both ends.
Bad or improperly configured COM ports	If you are using a COM port on an extender board, check the board's documentation to make sure the extra ports have been configured properly. Test the port with other devices or ask your system administrator for help. If you determine that the COM port hardware is bad, you will need to replace it or try using another COM port that is working properly.

Cause	Solution
Improper data interface settings	Make sure the communication settings on the densitometer and the computer are identical. Review the settings on the densitometer and terminal program and confirm that they are set appropriately. For more information on data interface settings, see *Densitometer Data Interface Settings* on page 127.
Wrong COM port	If the ports on your computer are not physically marked or the back plane is inaccessible, try experimenting with your terminal program by selecting all the COM ports available, one at a time. Each time you change the COM port in the terminal program, run the connection test. If you are using an Alpha-based computer, you must restart the terminal program each time you select a new COM port.
Faulty densitometer	After your system administrator has verified that everything else is in working condition, contact the densitometer manufacturer as a last resort. (This problem is highly unlikely.)

Harmony

Problem:

If your densitometer works with a terminal but not with Harmony, check the possible causes listed below, and then follow the appropriate solution.

Cause	Solution
Wrong densitometer selected	Make sure the densitometer you are using is the same one you configured Harmony to use. To configure Harmony for a specific densitometer, select **Preferences** from the **Edit** menu. See *Setting Up Your Densitometer* on page 40.
Improper data interface settings	Review the settings (on the densitometer and in Harmony) and confirm that the settings are identical.
Dot area only	Ensure the densitometer you use is configured for dot area measurements. For more information on configuring dot area measurements, see your densitometer documentation.
Absolute density is read instead of dot area	When measuring heavy tints (> 85%), some densitometers switch from a dot area percentage reading to absolute density. To switch back to dot area reading, press the densitometer's 0 (zero) key while holding the densitometer down. If required, take the reading again.

Cause	Solution
Dot area > 100%	When measuring a tint that is less than the solid (100%) you defined, you get a reading that is greater than 100%. This may be the result of the absolute solid reading being taken in a different area of the press sheet than the tint bar. To work around this problem, redefine paper white and solid using the tint bar to take the measurements.

Glossary

amplitude modulation (AM) screening

See *halftone*.

calibrated data

A current sample that has had a calibration curve applied to it. If you use calibrated data, you need to enter this information in Harmony, because it affects the shape of any derived calibration curve that uses the current curve.

calibrated tint

The tint value that Harmony substitutes for the tint specified in the digital file to compensate for the current response. This lets you achieve the target on the final deliverable.

calibration

Setting equipment to produce desired results.

See *tonal calibration*.

calibration curve

The curve that graphically represents how much Harmony needs to compensate for tint values specified in the digital file when the file is RIPed so that the target is achieved on the final deliverable.

In Harmony there are two types of calibration curves: derived and transfer. Derived calibration curves are based on the target and current curves you build. You adjust the derived calibration curve only when you edit the target or current curve. Transfer calibration curves can be edited directly because the curves are not linked to a target or current curve.

See *derived calibration curve* and *transfer calibration curve*.

characteristic

A profile of the output.

CMYK

Cyan, magenta, yellow, black. Colors for process color print production.

A calibration curve may be created for any color or specifically for each process color. If process color-specific (CMYK) curves are used, then the black curve is applied to all spot colors, unless you define spot curves. If you define spot curves, spot colors are calibrated by those curves instead of the black curve.

color management

A process that aims to control the representation of colors across a variety of output devices so that the colors generated appear consistent. Color management is based on the coordination of three processes: device calibration, device characterization, and conversion from one color space to another.

color-specific curves

The four unique curves—one for each process color (C, M, Y, and K)—that are created when you use a **CMYK Curves** curve set in Harmony.

See *curve set*.

continuous tone image

An image that contains gradient tones.

current curve

A graphical representation comparing tint values specified in a digital file and the measured dot area on a sample produced under specific operating conditions. Current curves can be created from measured samples produced by a device when it is uncalibrated or calibrated.

curve

A graphical representation of a set of numbered pairs. For current and target curves, the numbered pair represents the tint specified in the digital file compared to the measured dot area or tonal values on the output.

For a calibration curve, the numbered pair represents the tint specified in the digital file compared to the adjusted, or calibrated, tint that will be substituted for the digital file tint during calibration.

curve set

The color separation(s) measured and used to build a calibration curve in Harmony. Harmony has three types of curve sets: **One Curve**, **CMYK Curves**, and **Spot Curves**.

densitometer

An instrument that uses a light-sensitive photoelectric eye to measure the density of images and colorants. Densitometers often include mathematical formulae that use density information to calculated other image characteristics, such as contrast and tonal values (effective dot area).

density

A measurement of the ability of light to pass through or reflect off a material.

Density is measured using a densitometer.

density range

See *tonality*.

derived calibration curve A calibration curve that Harmony derives from the target and current curve specified.

See *calibration curve*.

device In the context of Harmony, device refers to hardware or software that is used to process a job—for example, the Virtual Proofing System or a Trendsetter.

dmax See *maximum density*.

dot gain (loss) On halftone output, the absolute percentage change in the actual (physical dot gain) and perceived (optical dot gain) size of a halftone dot as it goes through the halftone reproduction process. For example, 5% dot gain means that 5/100 more light is being absorbed, regardless of the tint that is being measured. In other words, 5% dot gain on a 1% tint means an effective dot area of 6%; 5% dot gain on a 50% tint means an effective dot area of 55%.

Dot gain happens during various phases of the halftone reproduction process.

See *effective dot gain*, *optical dot gain*, *physical dot gain*, and *tone value increase*.

dot gain calibration See *tonal calibration*.

dot shape The geometric appearance of a halftone dot—for example, elliptical, round, or square.

dpi Dots per inch. A unit of measurement that signifies the number of laser dots that can be printed in an inch. The higher the number, the higher the resolution of the output device.

effective dot area (EDA) On halftone output, a measure of the percentage of light that is absorbed by a given tint and that represents the tonal value as perceived by our eyes. It is measured in absolute percentage, relative to the measured 0% and 100% tints. Effective dot area is measured with a densitometer, spectrophotometer, or any device that measures reflected or transmitted light. Dot meters measure physical dot area, and should never be used to measure effective dot area.

Effective dot area is also called *tonal value*.

effective dot gain

For halftone work, the difference between the tint specified in the digital file and the effective dot area on the output. It is the sum total of all dot gain in the halftone print reproduction process (both physical and optical dot gain). It is expressed as an absolute percentage that is added to the dot area or tonal value. For example, a 15% effective dot gain on 25%, 50%, and 75% tints results in 40%, 65%, and 90% tonal values.

See *tone value increase*.

file

A unit in which data is stored on a computer.

frequency-modulated (FM) screening

See *stochastic screening*.

gamut

The range of different colors that can be generated by a specific input device, output device, or ink set.

See *tonality*.

gray balance

The values for C, M, and Y that produce a neutral gray with no dominant hue.

halftone

The representation of text and visuals as dots within a grid. The grid, called a screen, is composed of halftone cells. Each halftone cell is composed of a group of laser dots which determine the size of the halftone dot. The greater the number of laser dots imaged within the cell, the darker the halftone dot. Halftone screening is also called amplitude modulation screening.

See *halftone screen*.

halftone screen

On halftone output, the grid that contains the dots of halftone cells.

See *halftone*.

highlight

The lightest or whitest parts of an image.

imposition

Electronic imposition is the process of positioning the page elements and whole pages in the file so that when the resulting press sheet is folded into a signature, cut, and bound, the pages are in the correct sequence.

lpi

Lines per inch. The number of lines per inch in a screen grid. Also known as screen ruling.

The greater the number of lines per inch, the sharper the image.

See *ruling*.

maximum density The density of a solid black patch is called the maximum density (or dmax).

measured dot area (MDA) The size of the dot on the medium as measured by the densitometer.

Murray-Davies dot area See *effective dot area (EDA)*.

Murray-Davies formula The equation that calculates the effective dot area on halftone output by comparing the light absorbing power of the tint to that of a solid.

For example, an effective dot area of 75% means the tint absorbs 75% of the light that solid ink would.

native application file A file that has been created using a page layout application, such as QuarkXPress.

node A numbered pair value (x and y) on a graph. In Harmony, target and current curves are created when you enter nodes on the curve graph.

See *node set*.

node set A series of nodes on the Harmony curve graph. The line that connects the nodes forms the profile of the curve.

You can specify a node set when you create a target or current curve. The curve window opens with the node set displayed on the curve graph.

See also *node*.

OPI Open Prepress Interface. A standard developed by Aldus which allows high-resolution image data to be merged into a PostScript file. This allows other programs that manipulate PostScript data at a larger component level, such as pages, to deal with smaller amounts of raw data.

optical dot area See *effective dot area (EDA)*.

optical dot gain The difference between the physical dot area and perceived effective dot area of a dot.

paper white 0% tint.

PDF Portable Document Format. Adobe System's PDF is a reliable file format for storing line art, images, and text (including all required fonts) for pages. PDF files do not contain device-specific settings such as imaging resolution or duplex options.

physical dot area (PDA)	The physical size of the dot on a medium. The size of the dot as seen by the human eye can be different from the physical dot area due to additional effects of optical dot gain.
physical dot gain	The net change in the physical size of dots during the print reproduction process, expressed as an absolute percentage of dot area. For example, a 2% physical dot gain at 25%, 50%, and 75% results in 27%, 52%, and 77% dot area, respectively. Physical dot gain only applies to halftone devices.
PostScript	A page description language developed by Adobe Systems. It is used to describe type and visual elements so that they can be output on devices with PostScript interpreters.
print characteristic	The graphical relationship between the tint values specified in a digital file, and the effective dot area or tonal values on a press sheet.
process control	In a manufacturing system, the way that products of the manufacturing process are kept within certain acceptable limits of variation.
raster	Digitized (bitmapped) images defined pixel by pixel in rows and columns. See also *RIP*.
reflection densitometer	A densitometer that measures optical density on paper or plate.The measurement is based on the amount of light that bounces off the medium back to the densitometer.
RGB	Red, green, and blue color model used by computer monitors to display color.
RIP	Raster image processor. Software and/or hardware that converts digital files into raster (bitmap) format for output on a given output device.
ruling	The number of lines per inch (lpi) on a halftone screen. See *lpi*.
sample	The output from which measurements are taken to create a current or target curve. The sample can be any output that contains a tint bar, such as a press sheet, proof, plate, film.

screen tint

An image element with an even shading produced by a halftone dot screen. Each screen is composed of rows of halftone cells. The size of the dot within the halftone cell determines the tint.

Dot size is referred to by the percentage of the cell that it takes up, for example, a halftone cell in which 50% of the cell is composed of laser dots is called a 50% halftone.

See *halftone*.

screening

The process used to convert a continuous tone image—for example, a photograph—into a halftone image. The halftone image is made up of dots within a grid. The dots merge and give the illusion of a continuous tone image.

See *halftone screen*.

scum dots

An undesirable film of ink that prints in highlight areas of the plate.

shadow

The darkest part of an image. On halftone output, shadows are represented by the largest halftone dots.

solid

100% tint. An area of the image that has no halftones; it is an unbroken film of ink.

spot color

An ink color that is not a process color (C, M, Y, or K). Spot colors are used primarily to render an accurate smooth tint, often with a color that lies outside the gamut of process color inks.

Harmony lets you create specific calibration curves for spot colors.

stochastic screening

A digital screening process that converts images into very small dots of equal size and variable spacing. Also called frequency-modulated (FM) screening.

target

An output sample that you use to match tonal reproduction.

target curve

A graphical representation of tints specified in the digital file and the measured dot area for your optimal or desired output.

Harmony comes with default target curves including industry standards for print, film, and plate output. You can also import predefined target curves from the **CreoTargets.hmy** and, if you have a Spectrum proofing device, the **ImationTargets.hmy** files.

tint

For Harmony, tint is the percentage value assigned to a dot.

See *screen tint*.

tint bar

Test marks included in an output sample. A tint bar consists of series of ink patches for tint values, ranging from a 0% tint to a 100% tint, on an individual color separation. The samples you use to create current and target curves must include tint bars so that you can accurately measure tints.

tonal calibration

Setting equipment to reproduce tonal values to specified values on your final output (for example, a proof, press sheet, or plate).

Harmony compensates for tonal value increase by adjusting the size of dots imaged on the plate, digital halftone proof, press sheet, or film. Harmony compares the difference between a target and a current sample and determines the adjustment needed to tint values specified in the file to achieve the target output.

tonal range

See *tonality*.

tonal reproduction

Perceived tint.

tonal value

The sum total of all absorbed light for a given tint, regardless of the reproduction technology (halftone or continuous tone).

tonality

The degree of lightness as perceived by our eyes. It is measurable with instruments that measure reflected and/or transmitted light. The depth of tonality in an original image or reproduction is the range of perceivable tones; this is also called the *density range*, *gamut*, or *tonal range*.

tone value increase

The difference between the tint specified in the digital file and the tonal values on the output. Tonal value increase is the sum total of all increases in tonal values that can happen at various stages of the print reproduction process.

See *effective dot gain*.

transfer calibration curve

A calibration curve that is not linked to a target and a current curve. A derived calibration curve may be converted to an transfer calibration curve. This is usually required only when you need to fine tune a curve without affecting current or target data.

See *transfer calibration curve*.

transmission densitometer

A densitometer that measures the optical density of film. The measurement is based on the amount of light transmitted through the film without being absorbed or scattered.

Yule-Nielson factor

An equation that alters the measurement of a densitometer to measure physical dot size rather than effective dot area. Often used with traditional plate densitometry.

Do not use the Yule-Nielson factor when calibrating with Harmony, even when calibrating to plate. If your densitometer has a Yule-Nielson rating level, leave it set to 1 and do not adjust it while taking measurements.

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