

Printing

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Preparing Images for Printing

Often what you see on the screen is not what you get when you print an image. There are many complicated reasons for this, including the following.

Monitor Brightness Setting

If your monitor is too bright, you will tend to make your images too dark, and when you print them the prints will be too dark. This is further complicated by the fact that prints look very different depending on the viewing light. A print that looks fine in very bright light may look dark and muddy in dim light. To decrease your monitor's brightness, you need to use the controls on the monitor. Some monitor calibrators provide an aid in setting the monitor brightness. Darkening the monitor will make some images look worse on-screen, but you will avoid some unpleasant surprises when printing them.

Contrast Mismatch

Most monitors have a very high contrast ratio (the ratio between the brightness of the lightest white and the darkest black, typically at least 1000:1). Printers, on the other hand have a much lower contrast ratio, typically around 100:1. When viewing prints, the eye compensates for much of this difference, but only to a limited extent. Reducing the monitor brightness reduces the contrast since it darkens the lightest white.

Choose Your Paper

Printing papers are generally divided into two main categories: matte and glossy. Matte papers have a non-reflective surface that absorbs ink to some extent, while glossy papers have a shiny coating that causes the ink to sit up on the surface. The color gamut of a printer is generally wider and the blacks darker when printing on glossy paper, but the reflections from the surface can be annoying, and prints take longer to dry. Prints on matte paper are not shiny, but generally have weaker blacks and less saturation. There are also glossy papers with a slightly textured surface to reduce reflections. These commonly have names containing the word Luster or Semi-Gloss.

Some papers attempt to improve the contrast of prints by adding optical brightening agents (OBA). These are chemical compounds that absorb normally invisible ambient ultraviolet light and re-emit it as visible light. This in turn makes the paper white appear even whiter. The darkest black a printer can create, also called its DMax or maximum density, also varies considerably with the type of paper and black ink you are using. The higher the DMax, the darker the black.

Color Gamut Mismatch

Since the technology they use to create color is totally different, it is not surprising that the range of colors a monitor can produce differs from the range a printer can produce. Color management systems attempt to map the colors from the monitor color space to the printer color space using monitor and printer profiles, but there are limits to what they can accomplish.

As a general rule, monitors are better than printers at producing bright, saturated colors, especially pure red, green and blue. Printers, on the other hand, are usually better than monitors at reproducing dark, saturated colors, especially cyan, magenta and yellow. Thus, some of your monitor's colors will lie outside the printer's color gamut and will thus be unprintable. Conversely,

some of your printer's colors will lie outside the monitor's color gamut and will thus be undisplayable. In addition, some dark monitor blacks may be darker than the printer can produce.

While there is not much that can be done about undisplayable printer colors, there is a way to preview on-screen which colors in an image are unprintable. To do this, color management must be enabled, and you will need a copy of the printer profile for your printer that corresponds to the inks and paper you are printing with. These profiles are usually installed with the printer driver. Selecting this as your Proofing Profile in the Color Management dialog box makes it possible to get an idea how your image will look when you print it. In addition, you can turn the Gamut Alarm on or off. The Gamut Alarm displays those parts of your image that are outside the printer gamut as a solid color (you can choose the color in the Color Management dialog box). To enable proofing or the gamut alarm, use the Proofing tool bar at the top of the screen:

The first button turns proofing on and off and the second button turns the gamut alarm on and off. This tool bar is grayed out if color management is disabled or if you have not defined a proofing profile.

The Print Command

The File / Print command prints the current image. However, the first thing it does is to display the standard Windows Print dialog box. Use this dialog box to select the printer and settings such as the page size, orientation, resolution and number of copies.

If you need to change printer-specific settings, click the Preferences button to get to the Print Preferences dialog box specific to the printer you have selected.

When you are ready to proceed, click OK.

The Print Dialog Box

Once you finish with the Windows Print dialog box, Picture Window displays its Print dialog box:

Cropping the Image

Picture Window displays a cropping rectangle as an overlay on the image you are printing. Initially, the cropping rectangle covers the entire image, but you can resize or reposition it by dragging its corners, sides, or interior. Only the part of the image inside the cropping rectangle is printed. If you set Scale to custom (see below), the proportions of the cropping rectangle are constrained to match the custom image width and height you enter. Otherwise, the cropping rectangle proportions are unconstrained.

Page Preview

A page preview area occupies the right-hand side of the Print dialog box. The page preview is a scaled down representation of the output page as it will be printed so you can check the size, margins and orientation of the image. The darker gray area around the image represents the margins. The lighter gray represents parts of the page not covered by the image. This is for informational purposes only—these gray areas both print as paper white and not as gray.

You can adjust the size of the preview by resizing the Print dialog box.

Caption

If you enter caption text, it is printed in the upper left-hand corner of the page. This is intended for identification purposes only—to label an image with full control over the font, color, text placement, etc., use the Text or Layout Transformation prior to printing.

Paper Size

The size of the paper you selected in the Windows Print dialog box is displayed in the current units.

Scale

This setting lets you control how you want the image scaled.

to image dimensions

The image is printed at the size computed from its dpi setting and dimensions in pixels. If this size exceeds the available space between the margins, the image is automatically scaled to fit page.

one to one

The image is printed at the printer resolution, regardless of the dpi setting of the image. Using this option one pixel in the image equals one pixel in printer coordinates. If the resulting image size exceeds the available print area between the current margins, the image is automatically scaled to fit page.

Note that most inkjet printers have a driver resolution lower than the actual size of a printer dot since it takes a group of dots to represent a pixel – for example a 2880 dpi Epson printer might actually have a driver resolution of 720 dpi.

to fit page

The image is scaled as large as possible without altering its proportions to fit the space between the margins.

custom

This lets you enter the printed image width and height in the current units. If you enter a size too large for the available print area, the image is automatically reduced to fit the page. The proportions of the cropping rectangle are constrained to match the custom width and height you enter.

The image is always scaled by the same amount horizontally and vertically to avoid stretching it.

The location of the image on the page can be controlled by adjusting the margins and horizontal/vertical alignment. For example, to move the image to the right, increase the left margin and set Horizontal Alignment to Left.

Image Width/Height

The size of the image as it will appear on the page is displayed in the current units. If custom Scale is selected, you can enter values for the image width and height, and the proportions of the cropping rectangle are constrained to match the image size. Otherwise, these controls are grayed out, but still display the size of the image when printed.

Units

This setting (located just to the right of Image Width) lets you work in inches, millimeters, or centimeters.

Image dpi

This readout can be used to get some idea of print quality before printing the image. The dpi (dots per inch) setting displayed next to the Image Height is computed by dividing the width of the image (or the part of the image being printed) in pixels by the width of the image in inches on the paper.

If the resulting value falls below 150 dpi, at a normal viewing distance, the resulting print will likely start to look soft. Printing at resolutions beyond 300 dpi is likely to provide little improvement in perceived image sharpness.

Orientation

This control lets you print the image rotated 90 degrees to better match the paper size.

Normal

The image is sent to the printer unrotated.

Rotated

The image is rotated 90 degrees and printed on its side. This setting is useful for printing images that have landscape proportions on a page with a portrait orientation or vice versa.

Auto

The image is printed in whatever orientation yields the largest possible image size when combined with scale to fit page.

The Mirror Image checkbox lets you print the image reflected left to right—useful for certain types of printmaking.

Horizontal and Vertical Alignment

These settings let you control where the image is printed if it is smaller than the printable area (the available space between the left and right or top and bottom margins). Horizontal Alignment lets you line up the image with the left edge, the center, or the right edge of the printable area. Vertical alignment lets you line up the image with the top edge, the center, or the bottom edge of the printable area.

Margins

These four controls let you enter the Left, Right, Top, and Bottom margins in the current units. If you attempt to set any of the margins to values smaller than the minimum margins supported by the printer, they will revert automatically to the minimum legal values. You will also get an error if you set the margins so large that there is no room left for the image.

Clicking the Minimum button next to the left margin setting resets all four margins to their minimum legal values for the current printer.

Clicking the Equal button next to the right margin setting sets the right, top and bottom margins equal to the left margin.

Tiled Printing

The Tile controls let you print images larger than a single page by breaking them into sections called tiles. The final image is then assembled by trimming and mounting the tiles together into a single, large composite image. You can print very large using this method (up to 20 by 20 tiles), assuming you have the patience, the paper, and a reliable printer.

Input

Tiled 3 x 2 with overlap

The Horizontal Tile setting specifies how many pages wide to print and the Vertical Tile setting specifies how many pages tall to print. To print normally, leave these set at 1.

Guide lines are displayed on the page preview image to show the tile boundaries. Once you start printing, the image is automatically broken up into tiles and each one is printed on a separate page.

The overlap between tiles (in the current units) is controlled by the Overlap setting. With overlap set to zero, adjacent tiles will just fit together if they are trimmed perfectly at the edge of the image. Setting a larger overlap value leaves you some room for error when trimming the edges.

When printing a tiled image, you may need to reprint a subset of the pages if a printer error occurs. The Print Pages setting lets you specify a range of pages to print—pages outside this range are skipped.

Custom Profile and Rendering Intent

When printing an image with color management enabled, Custom Profile and Rendering Intent controls are displayed at the bottom of the Print dialog box.

If you select a custom profile Picture Window transforms your image from its native color space using the specified profile before sending it to the printer. This requires that you have a profile for your printer -- sometimes generic profiles are supplied with the printer driver or from the paper manufacturer. Or for the most accurate results you can use a color profiling program to create a custom profile for the printer, inks, and paper you are using. In this case you must disable any color management or color adjustment by the printer.

The Rendering Intent control lets you specify how colors are transformed from the original image color space to the printer color space:

Maintain Full Gamut

Expands or contracts the full image gamut to cover the full printer gamut. This is the normal setting for photographic images.

Preserve Saturation

Gives priority to matching saturation when searching for the printer colors that best match the corresponding image colors. This setting is intended for use with business graphics such as charts.

Preserve Identical Colors

Match printer colors as accurately as possible to the corresponding image colors. This setting is useful when an absolute match is required as in printing an image of a sweater in a catalog that needs to be as close as possible to the color of the actual sweater.

Preserve Identical Colors and White Point

Match printer colors as accurately as possible to the corresponding image colors while keeping white unchanged.

Preserve Identical Colors and Black Point

Match printer colors as accurately as possible to the corresponding image colors while keeping black unchanged.

Printing without Color Management

To print without using color management, convert your image to sRGB or AdobeRGB and set the Custom Profile to None. Then let the driver control color by selecting sRGB or AdobeRGB as the Mode (see below for an example using the Epson P800).

Printing with Color Management

There are two ways to print using color management. These differ as to how you set the Custom Profile at the bottom of Picture Window's Print dialog box:

And how you configure the printer driver (Epson P800 used as an example)

Let the printer driver do the work

In this scenario, you set Custom Profile to None and tell the printer driver to handle color management by selecting sRGB, Adobe RGB or ICM, if the image is in sRGB, Adobe RGB or some other color space. This usually works well if you are using inks and media supported by the printer manufacturer.

Use a printer profile

Use this scenario if you are using non-standard media or inks and you have a custom profile for your printer that was created for the inks and media you are using. Set the Custom Profile to the printer profile and tell the printer driver to print with No Color Adjustment.

Either of these two methods can produce good results, with the custom profile giving a little more control. Don't try to mix and match them however or you may get either no color management or color management applied twice.

Monitor/Printer curves

Monitor/Printer Curves let you make the print look more nearly like the image displayed on your monitor. The preview reflects any printer curves you may have selected, so you should see a change in the image when you select a set of curves.

Monitor/Printer Curves

Color management engines generally assume prints will be viewed under optimum conditions, namely strong illumination by an ideal light source. In the real world, bright enough illumination with the desired spectral properties can be hard to find, and prints viewed under non-ideal conditions may not match what you see on your monitor very well. The most common problem is moderate or subdued lighting which make prints look murky with considerable loss of shadow detail. Other problems such as prints looking too blue or too yellow can be caused by deviation of the illuminant color temperature from the white point to which your monitor is calibrated.

Picture Window's File / Monitor/Printer Curves command can help you get a better monitor to printer match by letting you alter the monitor display of a test image to look like a print of that image.

Monitor curves are simply a set of color curves applied to all images as they are displayed. To create a custom set of monitor curves, first print the test file Gray Wedge 15.tif that we supply:

Or you can use one of your own images so long as it has both shadow and highlight detail and enough mid-tones to fill out the entire tonal range.

Next, open the image in a window and select the File/Monitor/Printer Curves command from the main menu. This displays the Monitor/Printer Curves dialog box:

If the print looks darker than the screen, drag middle three control points downward to darken the image on the screen until it matches the print. Normally you will want to leave the black (leftmost) and white (rightmost) control points in their initial corner positions.

Once you get a good tonal range match, if there are residual color casts in any part of the tonal range, click on one of the white boxes below the curves and adjust the color for the corresponding part of the brightness range. For example, if the screen is yellower than the print, make the color more blue and vice versa.

When you save the monitor curves, corresponding inverse monitor curves are created saved as printer curves.

When you exit Monitor/Printer Curves, the screen display is returned to normal, but Picture Window can use the printer curves you created when you make prints. In the Print dialog box, select the printer curves you created.

If the monitor curves darkened the on-screen image, applying the corresponding printer curves will lighten the image by the same amount before printing and vice versa. The current monitor curves are saved and reloaded automatically from session to session so you only need to create them the first time. In addition, you can save or reload monitor curves manually and create a library of different curves for different printers or viewing conditions and switch between them.

Tiled Printing

Picture Window lets you print images across multiple sheets of paper by automatically splitting the image into tiles and printing each one on a separate page. The printed pages can then be trimmed and assembled to create a single, large print by taping them together or using some other type of mounting.

The easiest way to do tiled printing is to start by using the Resize transformation to set your image to the desired final dimensions. In the example below, the image was scaled to be 20 inches wide.

Next, start the Print command and Scale to image dimensions. Then increase the Horizontal and Vertical Tile settings until the entire image fits without being scaled as shown in the preview. As you increase the Tile settings, you are creating a large, virtual sheet of paper as reflected in the Paper Size displayed at the top of the dialog box. Once this virtual paper size exceeds the image dimensions plus whatever margins you have specified, you can proceed. The preview provides an overview of what parts of the image will be printed on each sheet of paper. In the example above, the image will be printed across 4 pages.

The Tile Overlap setting controls how much the edges of the tiles overlap. The default overlap of 1/8 inch provides a margin of error when trimming the tiles so there will be no gaps when you join them together.

You can print all the pages or just a subset in case something happened to one of them and you need to reprint it.

Tips

Printing crop marks

To add crop marks to an image, use the Crop Marks transformation before printing. Crop marks are a useful aid in trimming prints to exact dimensions.

Printing multiple images on a page

To create multi-image page layouts, first use the Layout Transformation to create a single image at the desired resolution and then print the composite image.

Printing images at a specific size

To print an image at a specific size, set the Scale to Custom and enter the desired image width into the Image Width control and then (after waiting for the preview to update) the desired image height into to Image Height control. Once you have entered the desired size, if the proportions of the print don't already match those of the image, adjust the cropping rectangle displayed over the window of the image you are printing to the part of the image you want to print.

Printing images at a specific location on the page

To position the printed image off-center on the page, adjust the left/right or top/bottom margins.

If your prints are too dark...

There are several causes of this problem:

Your monitor is too bright—using a monitor calibrator can help you set your monitor to a standard brightness level. Using a high monitor brightness setting makes on-screen images look more luminous, but printers cannot duplicate the contrast range of a high dynamic range monitor so prints will look dull by comparison.

You are viewing prints is too dim a light. The standard viewing light for prints is actually quite bright. Viewing prints in dimmer light makes them look muddy and obscures shadow detail.

The image is dark. Check the histogram and make sure it runs all the way to white or close to it.

If your prints are still consistently coming out too dark, consider creating a set of Monitor/Printer curves as described above.