digitalphotography
the complete course

New York Institute of Photography

How To Use A Scanner

Unit Two
Lesson Seven

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Introduction.

Scanning is an art. We will teach you the basics, but it is up to you to practice. Take your time and learn how your equipment works. Start by reading the manual that came with your scanner. Important features are not always obvious to the new user. Feel free to take advantage of the automated features your scanner may offer, and when you are comfortable, move on to the more advanced controls. Familiarity will help you to scan faster and more accurately.

We'll be covering the more advanced techniques of scanning in Unit Three. In this Lesson we're going to begin by discussing resolution and then take you through a scan step-by-step. For now, it's time to think about what you want to scan and how that scan is going to be used.

Resolution: How Will Your Scan Be Used?

Before scanning, you must determine your image's end use. This is a crucial decision because it will affect what size, resolution and file type you will need to obtain in the scan. The most common mistake people make when scanning is underestimating the size or resolution settings necessary to satisfy the output size. So, before we show you exactly how to use your scanner, let's discuss size and resolution and how you can

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determine exactly what you'll need before you start scanning. Just like a digital camera, scanners have a maximum resolution (number of pixels per inch) that they can capture, usually expressed in width and height measurements such as 1200 x 2400 pixels-per-inch of the original. What exactly does this mean?

It means that in this example, the scanner can capture 1200 pixels per inch (ppi) across an image and 2400 pixels per inch down an image. That is the maximum amount of pixels that this scanner can capture from every inch of the original. The reality is that each time we scan, we may not always need to capture the maximum amount of pixels. There may be times when you'll want to scan to create 8" x 10" prints. Other times you may only need to make 4" x 5" prints, which require fewer pixels. Maybe you'll need to scan a print for a Web site, in which case you'll need to capture even fewer pixels. The point is that each of these specific uses requires images of different sizes (or resolutions).

So your first scanning decision is to determine how the image is going to be used and what resolution is necessary to satisfy that output requirement.

Common Resolutions for Different Uses.

By identifying the end-use of your scan, you can ensure that you will produce a file with the proper resolution to be supported by your output choice.

Understand that every output device may require a slightly different size resolution file to produce the best possible results. For instance, one inkjet printer model may require 300 pixels-per-inch (ppi) image files to produce good photographic prints while another may only require 250 ppi. Your equipment documentation should be helpful in determining what the optimum resolution is for that particular piece of equipment.

Here are some basic resolution ranges for a variety of different uses.

• Images destined for the Web or any on-screen display should be scanned at 72 to 100 ppi. Most people stick with 72 or 75 ppi since that is what the majority of monitors can display.

• Images destined for an inkjet printer should have a resolution of 200 to 300 ppi. Consult your printer's documentation for optimum resolution input. If you don't know your printer's optimum input, a good average resolution to use with your inkjet printer is 300 ppi.

• Images destined for newspaper reproduction should have a resolution of 170 to 300 ppi. Consult with the newspaper's graphics department for the resolution required for their printing presses.

• Images destined for magazine reproduction should have a resolution of from 266 to 350 ppi. Consult with the magazine's graphics department for the exact resolution preferred by that magazine.

As you can see, resolution is a variable which is device-dependent. It's up to you to determine the proper resolution for your uses. Once you find the right combination you will gradually begin to see your digital images improve.

Tip: Our advice when scanning for the Web is to scan at twice the resolution you think you need. If you'll need 72 ppi, scan at 144 ppi (or 150 ppi to make the math easier), then scale it down 50% in Photoshop or in some other digital imaging software. Our experience is that the initial higher resolution will give you a cleaner image on the Web with better color definition and also give you some flexibility in the final size. We'll be explaining more about scanning for the Web later on in your Course.

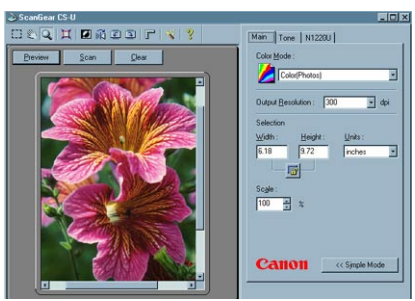
Once you've determined your output use, you will know the resolution you need. Figure out how to change the resolution setting on your particular scanner then make the necessary adjustments. Otherwise, you'll be scanning at the factory default resolution.

Choose An Input Size.

Some scanner software will also ask you the input size of your image. Other scanners will automatically adjust the input size after you have previewed and cropped your image. The input size is simply the size of the original that you are scanning.

Tip: On some scanners, you can change the measurement method used. So, if your scanner expresses size in pixels, you can change that to inches, millimeters or whatever form of measurement you are used to.

Let's look at some specific scanning situations and see how you might handle them.



Canon scanner software interface.

Create A Scan The Same Size As Your Original.

For instance, let's assume that you are scanning a 4" x 6" print on a flatbed scanner. You wish to produce a scan that will allow you to print out more 4" x 6" prints on your photo-quality inkjet printer. By determining your output method (an inkjet printer) you can also determine the proper resolution at which to scan your original.

Most inkjet printers require a minimum resolution of 300 ppi to create a photo-quality print. (A word of caution here, don't confuse a printer's dpi [dots per inch] specification with ppi [pixels per inch] necessary for output. You can read more about the difference between ppi and dpi in the Unit Two Study Hall.) If you are not sure what the best resolution for your printer is, 300 ppi is a good starting point. Some printers may require less than that to produce a good photo-quality printout. Depending on your scanner's software, you may simply be able to enter the output size of 4" x 6" and set the resolution to 300 ppi. Some scanners will refer to resolution as dpi, but in this case only, it means the same thing as ppi. Scanning a 4" x 6" print at 300 ppi will create an image that is 1200 pixels by 1800 pixels (4 inches x 300 ppi = 1200 pixels, 6 inches x 300 ppi = 1800 pixels) and a 2.1 MB file. Some scanner software may require you to enter

these measurements instead of simply putting in your output size and required resolution.

Create A Scan Larger Than Your Original.

In the example above, you have scanned a 4" x 6" print at a 1:1 ratio or 100%. That is, you scanned a 4" x 6" print to create an identically sized 4" x 6" scan.

But what if you wanted to scan a 4" x 6" print to create a larger print, like an 8" x 12"? Well, scanning a 4" x 6" print to an 8" x 12" print is a 1:2 ratio, or 200%. The print you want to make is twice as large as the print you are scanning. On some scanners, in particular film scanners, this measurement is called scale. Again, depending on your scanner's software, you may simply be able to enter input size of 4" x 6" and the output size of the 8" x 12" and set the resolution to 300 ppi. On other scanners, you may have to set the input as 4" x 6" and the scale to 200% and resolution to 300 ppi to create your target file.

To scan a 4" x 6" print to create an 8" x 12" print at 300 ppi, you would need to create a scan that is 2400 pixels by 3600 pixels (8" x 300 ppi = 2400 pixels, 12" x 300 ppi = 3600 pixels).

Create A Scan Smaller Than Your Original.

What if you want to take that 4" x 6" print and create a 2" x 3" image for a birthday card? In this case you are reducing the size by half, or scaling it to 50%. You may be able to enter the output size of 2" x 3" and set the resolution to 300 ppi on your scanner. But another way to do it is to set the size to 100% and set the resolution to 150 ppi, or half the resolution necessary for the printer. When your scan is completed you can re-distribute the pixels in an image editor like Photoshop. A 4" x 6" image at 150 ppi is the same as a 2" x 3" image at 300 ppi.

Let's see why.

4" x 150 ppi = 600 pixels
6" x 150 ppi = 900 pixels

2" x 300 ppi = 600 pixels
3" x 300 ppi = 900 pixels

In both examples, the pixels captured are exactly the same. We have simply adjusted how many of them are being used in the space of an inch.

Let's express this in a different way.

By making your scan resolution the same as the optimum resolution of your output device, the image size will not change.

For example:

Let's say you have an 8" x 10" print that you want to scan, retouch and then re-print on your color inkjet printer at the same size. Let's assume that your printer does its best work when you give it digital images with a resolution of 300 ppi.

By scanning your 8" x 10" print at 300 ppi, your digital image file size will be 8" x 10" at 300 ppi. Since the scanned resolution is the same as the optimum resolution for the printer the physical dimensions will go unchanged. If your printer only requires 250 ppi to produce the same results, then it would be better to scan the print at 250 ppi producing a smaller, more efficient file.

The 8" x 10" at 300 ppi image file can be expressed in a number of different ways without ever changing the amount of pixels actually captured by the scanner. The basic pixel dimension for this file is 2400 pixels x 3000 pixels.

Check the math and see:

8" x 10" at 300 ppi
(8" x 300 ppi = 2400 pixels and 10" x 300 ppi = 3000 pixels)

However the same number of pixels can be captured for this image at different resolutions. Check the math and see how the pixel dimensions in the examples below never change, despite the fact that the resolution of the image does. What this means is that this same 8" x 10" scan at 300 ppi can be resized for use in a multitude of purposes (albeit at different sizes) without having to re-scan the image.

16" x 20" at 150 ppi
(16" x 150 ppi = 2400 pixels, 20" x 150 ppi = 3000 pixels)

32" x 40" at 75 ppi
(32" x 75 ppi = 2400 pixels, 40" x 75 ppi = 3000 pixels)

4" x 5" at 600 ppi
(4" x 600 ppi = 2400 pixels, 5" x 600 ppi = 3000 pixels)

As you can see, the lower the resolution, the bigger the physical proportions. As the physical size doubles, the resolution is cut in half.

Scan For The Web.

Unlike the typical 300 ppi resolution requirements of photo-quality printers, Web images need much less resolution, because monitors typically display between 72 and 96 ppi. So, if you are scanning images for the Web, you might choose a resolution of 75 ppi. (Just a note here. We tend to round off the 72 ppi necessary for web images to make the math easier.) A 4" x 6" print scanned at 75 ppi would create an image that is 300 pixels by 450 pixels (4" x 75 ppi = 300, 6" x 75 ppi = 450). In the case of a Web image, this is a pretty large picture that could take up a major portion of the average monitor screen depending on the graphics capabilities of the computer showing the image. That's because Web images are typically designed to be viewed on a monitor set at 640 pixels by 480 pixels. The 300 x 450 pixel image created by scanning a 4" x 6" print at 75 ppi would take up roughly half the width of the screen. We'll be explaining how to size your images for the Web in later Units in your Course. The important thing to remember here is that if you are scanning your images for the Web, the final resolution on your Web image should be 72 or 75 ppi.

To learn more about scan resolution for the Web, visit the Unit Two Study Hall.

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How To Use A Film Scanner.

Film scanners typically offer higher resolutions than flatbed scanners. The reason for this has to do with the size of the original. While you may scan a 4" x 6" print to create an identical 4" x 6" scan (in other words, a scale of 1:1) you would almost never scan a slide or negative to create a 1:1 image. That's because the size of a 35mm slide or negative is approximately 1.5 inches. Scanning a slide at 1:1 would create a print that is approximately 1.5 inches by 1 inch, which is too small for virtually any use. A typical film scanner may offer a resolution of 2700 ppi, allowing you to scale your image up to almost 900%. This would give you a maximum

print size of 9 inches by 13.5 inches using a 2700 ppi scanner set at 300 ppi for inkjet output.

Making a Scan from a Slide or Negative.

Scanning a slide or a negative is somewhat more complex than scanning a print on a flatbed. This is due to a number of factors, including the necessity of scaling your image much more than if you were scanning a print, more complicated software, and the lower exposure latitude of slides. Slides and negatives each have different issues that you need to deal with when scanning them.

Negatives
Scanning from a negative will produce a better image than scanning from a print. That's because a negative can have almost ten times the amount of tonal information than a standard print. Therefore, you can get much more detail in a scan of a negative than you can from a scan of a print. There will be more highlights, more shades of gray, and more detail in the shadow areas. Furthermore, when you scan a negative, you don't need to worry about the problems in a print that may have been caused by your lab. After all, remember our adage: garbage in/garbage out. A bad print will result in a bad scan.

However, color negative film can be tricky to scan. While you can compare the colors of a scanned print or slide against the original, color negative film is inverted and has an orange cast making it impossible to judge the true color of the image.

What negatives make the best scans? In reality, a denser negative with more dark areas as opposed to more clear areas will scan better and show less grain. Because grain can be a problem, slower speed films like ISO 100 will scan better than higher speed films like ISO 800.

Slide Film
Slide film presents a different set of challenges than negative film. Slide films have a much narrower tonal range and are much more susceptible to bad exposure problems. Therefore, the best slides to scan are those that are properly exposed. It is best not to scan slides that have a lot of dark areas in the image. This will help you avoid the problem of "noise," which causes unsightly patterns to appear in the dark areas of your picture. On the other hand, since slides show a positive image, you can easily compare the colors of your slide against a scan.

All film, regardless of whether it is negative film or slide film, is manufactured to provide specific color balances. For instance, Fuji Velvia slide film has more saturated color than

most films, so it provides really vibrant greens and reds. Kodak's Ektachrome slide film has a different color balance and is known for its somewhat bluish cast. Other films are manufactured with a more even color balance making them ideal for scanning. Because of these differences in color balance, saturation, and contrast, film scanners come with a variety of controls that let you optimize the color based on the type of film that you are using. Some film scanner software will even have preset controls for a particular brand of film so you simply load the settings for the brand of film you are scanning. Many scanners will also let you save settings, so once you've set the controls the way you like, you can then save the setting and reload it whenever you plan on scanning that particular type of film. You can also fine tune the color later using Adobe Photoshop or another digital imaging program.

Let's take a minute to talk a bit about color management and how it relates to film scanners. We'll be covering color management in the next several Units of your Course. It is a large area of discussion involving how you can set up your computer system so that your monitor, your printer, your software and your scanner all produce exactly the same color, thus allowing you to accurately manipulate and correct images. For now, be aware that your film scanner is likely to require you to pick either a color space or a color profile when you set it up. It is important to follow the instructions that came with your scanner, since failing to set it up correctly can result in scans that appear too dark or too light. In addition, your scanner may allow you to turn off its automatic color management feature, which can be very useful in some situations when you cannot get a particular image to scan well.

Because of all these factors, film scanners tend to have higher dynamic ranges and provide more resolution capabilities than flatbed scanners and come with a more extensive series of scanning controls.

Scanning for Multiple Purposes.

Very often images can be multi-purposed in several different ways. You may want to be able to scan an image once and be able to use it on the Web, send it to your inkjet printer as an 8" x 10" and use it as a 4" x 6" in a printed document. If you don't know what you will use the image for and you don't want to have to scan the photo multiple times for each different use, then you should scan your image at the highest possible resolution and the largest size you think you may need. Later on in the digital darkroom, you can resize the master image downward and create several different files, one for each type of output you may need. This is typically less time-consuming than scanning the same image over and over again. Scanning an image larger than you need and sizing it down later is preferable to scanning an image too small and trying to enlarge it later. Typically, trying to enlarge a too small scan will result in blurry, out of focus, and degraded images. It may take longer to create a bigger file, but scanning at the highest resolution you think you might use will ensure that you have a scan that will meet your needs for many purposes.

Understanding resolution when scanning is the most important concept you will need to grasp. It can get very confusing, particularly because each scanner has its own software and its own way of measuring size and resolution. Some scanners will ask for output size in dimensions (for example 4" x 6"), some will ask for resolution (for example 300 ppi), some may even ask what size file you require (7 MB for example). Some may simply ask you to pick the output device (inkjet printer or e-mail) and not even tell you what size or resolution the final scan will be. Many scanners will allow you to input a number of these measurements.

Choose An Output Size.

This is the size that you need your final scan to be. Just like resolution, this is a crucial setting, since size and resolution both ultimately determine the quality of your scan. Some scanner software will ask you for exact measurements; other scanner software will ask you for this measurement as a scale setting. In other words, do you want this image to be 100% of the original (a 4" x 6" original to create a 4" x 6" scan) or larger, say 200% of the original (a 4" x 6" original to create an 8" x 12" scan). Some scanner software will show you both scale and output size. Just make sure that output size is the size that you want for your final scan.

Understanding how scaling works is crucial to getting a good scan. Will you be outputting your image at the same size as the original or will you be re-sizing your image? If you plan to change size, that is referred to as "scaling up" an image or "scaling it down."

Your scanning resolution will change depending on how this question is answered. As we've stated above, this is the second consideration you should make before you scan.

Remember, the resolution your output device requires will determine how an image can be used.

How can you easily figure out what resolution you need to give you a particular size image? One way to calculate the resolution you will need is by using what is called the "size-change factor method."

Size-Change Factor Method.

Scan resolution = desired resolution x size-change factor
The "size-change factor" is determined by dividing the original height into the desired height, and by dividing the original width into the desired width. The bigger number of the two is the size-change factor.

For instance, what if you want to take that 8" x 10" print and create a 4" x 5" image on a birthday card you're producing.

Four divided by 8 equals ½. Five divided by 10 equals ½ also. In this case the numbers are equal, so the size-change factor is ½.

Scan resolution = ½ x 300 ppi. Scan resolution = 150 ppi

By scanning the original 8" x 10" print at 150 ppi the resulting file will be 8" x 10" at 150 ppi, which is the same as 4" x 5" at 300 ppi.

Scanning in proportion to the original in terms of resolution and final size is important to accurate scanning.

In plain English, this means that if you need a 300 ppi file and the final print is to be one-half as wide as the original, then you can scan the original at 150 ppi. If it's to be one-third as wide, you can scan at 100 ppi. In each case, you'll end up with a final print that has an image resolution of 300 ppi.

If you intend to make a print that is larger than the image you're scanning, also scan in proportion. Only this time, increase the resolution. For example, if the final print is to be twice as wide as the original, the size-change factor is 2, so scan at 600 ppi. If it will be three times as wide, scan at 900 ppi. Again, you'll end up with 300 ppi in the final print.

Tip: If you would like to lower the resolution and maintain the physical dimensions, this can be done in Photoshop quite easily. It is known as downsampling. However if you would like to increase the resolution and maintain the physical proportions there are no guarantees. Upsampling relies on interpolation and image degradation will almost surely occur. When reducing the size of an image by more than one half, downsample in increments of 50%. A 50% reduction in Photoshop lets the program throw away every other pixel making for more accurate, smoother rendition than if you downsample all in one shot, where lots of pixels get tossed out at the same time.

Remember: An image that is considered to be low resolution for one use may be perfect for another use. Make sure your scan resolution meets your output resolution requirements.

Be sure to visit the Unit Two Study Hall to see some scanning case studies as well as some handy resolution charts that will help you to understand the concept of resolution and re-sizing.

Once you've determined how your image will be used and the proper resolution and physical size you'll need, it's time to start scanning.

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Scanning Step-by-Step.

Step 1: Installing Scanner Software.

Your scanner software is probably the most important part of your scanner package. This is the software that makes the scanner work. Without it, your scanner won't work at all. If you haven't already done so, follow the manufacturer's directions for your installing specific software. You'll only need to install this software once.

Step 2: Turning On Your Scanner.

It's important to turn your scanner on before you turn your computer on. Otherwise the computer may not recognize that the scanner is there, especially if your scanner has a SCSI card. Theoretically, if you have a USB-connected scanner, it can be plugged in at any time. If you are experiencing trouble with your USB scanner try turning it on first too.

Some scanners will also require a certain amount of time to warm up before they are ready to make a scan. Still others will require you to perform a calibration, which usually is a simple procedure requiring you to push a button while the scanner resets itself. Some scanners will also turn themselves

off after a certain amount of time, requiring you to wait while they warm up before you start scanning again. It is a good idea to read your scanner's manual to see what recommendations the manufacturer has. Failure to perform these functions if they are required can have an effect on the quality of the scan. For instance, you may notice that your scans are coming out with a particular color cast. This could be caused by not warming up or calibrating the scanner.

Step 3: Open Your Scanner Software.

Now you can start your scanner software. Typically this software will reside on your hard drive with all the other applications on your computer. Later on in Unit Three, we'll show you how you can open Photoshop first and then scan through it, but for now you can scan using just the software that came with your scanner.

Step 4: Orienting The Original.

Place the photo face down on the glass of the flatbed and close the cover. Make sure the print is oriented correctly on the glass. It's much faster to physically position the print correctly on the glass than it is to rotate an upside down or crooked image later in Photoshop or in the scanning software. Less time spent doing mechanical work means you can spend more time doing creative work. You also won't run the risk of crashing caused by needing large amounts of RAM to flip or rotate the image.

Step 5: Set Scan Type.

Make sure your scan type matches what you are scanning. The scan type refers to the format of your original. If you're scanning a print, the scan type is usually called "print" or "reflective" art. If you're scanning film, select "slide" or "transparency" or "negative". If you start scanning in the wrong mode you'll just waste valuable production time. Once your scanner knows what type of original you are using, it can make the necessary adjustments to the scan. For instance, if the scanner knows you are scanning a negative, it will automatically show you a positive image instead of the reversed negative.

Preview screen.

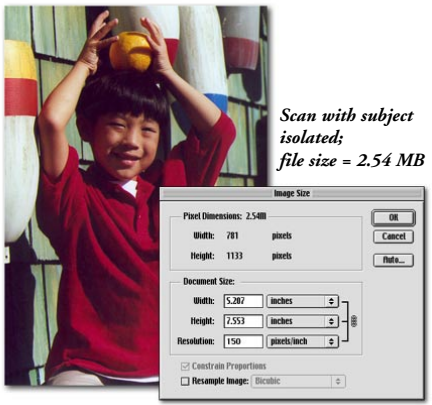
Step 6: Preview The Image.

A preview image of a scan is a small, low-resolution version of your scan that you can see immediately in your scanner's software. Previews give you the ability to make basic adjustments quickly and efficiently. You'll use the preview to make other changes too. If you don't like what you see, you can preview it again and see the results in just another few seconds. If these changes had to be made again and again on the full-size image, you would spend a lot of unnecessary time waiting while the computer processes each "full–size" edit.

So change the setting to alter the preview image as often as you like until you attain the "look" you want. Preview saves you time, and pinpoints exactly how and what you want scanned.

Step 7: Crop.

You can crop a scan at the preview stage as well. If you simply place an original on the glass and press the preview or scan button, the scanner will scan the entire surface of the flatbed including areas around your image. By cropping the image before you make a high-resolution scan you can save a lot of production time. Bloated file sizes slow down processing speed both at the scanning and the image editing stage.



Scan with subject isolated; file size = 2.54 MB

Scan with white border; file size = 5.1 MB

Scan with white border cropped; file size = 4.57 MB

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Keeping these files to a minimum makes the entire process more efficient. There's no use scanning the full image if you're going to use only part of it.

For example, say you have a print with a large white border around the actual image. There's no sense in scanning that area. If you do scan it, the scanner cannot "decide" that it's just a border. It will consider it as picture information, and give you a larger image file than if just the picture itself was scanned.

On some scanners, failing to crop around the picture can actually have a detrimental effect on your scan. This is because the contrast and exposure settings for the scan are based on the entire image preview. The scanner has no way of knowing that the image you want is not the entire surface of the flatbed unless you specifically choose the area of the original you want scanned. So, if you are not happy with the way your preview image looks, make sure that the cropping around the image is correct and you have not included some dark portions of the glass around the original.

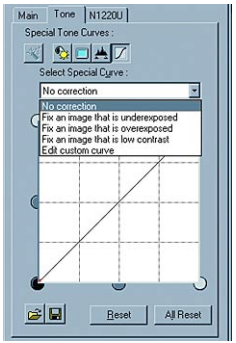
Most scanners will give you various manipulation controls that permit you to change things like cropping, orientation, size, color, and so on.

Step 8: Optimize Your Scan.

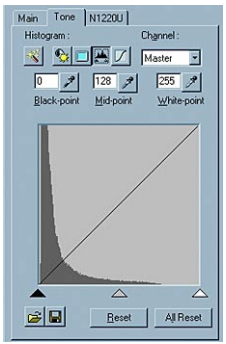
While different scanner models provide you with different options, here are some of the basic tools you will most likely find in your scanner software. Later on in your Course, we will show you how to optimize your scan in Adobe Photoshop and use that software's powerful features to adjust your scan. For now, your goal is to use the different options that your scanner software may have to obtain the best scan you can. Remember the adage from Unit One—"garbage in/garbage out"? The same thought applies to scanning. You will want to obtain the best scan you can using your scanner's software and then use the digital darkroom to further enhance the image. Don't expect your digital imaging software to make up for a bad scan.

Step 9: Adjust Brightness, Contrast and Saturation Controls.

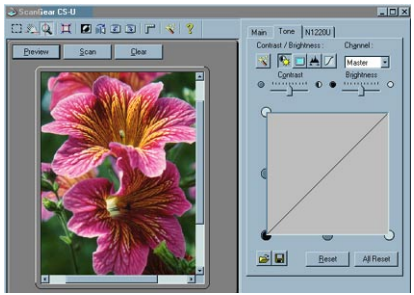
These functions allow basic quick fixes with slider bars that are clicked and dragged to increase and reduce these settings. Sometimes you can enter a number to change the value as well. Brightness and Contrast controls are designed to adjust tonal values. While these controls may be implemented differently in various software programs, they basically perform the same functions. Contrast works by spreading the tonal values of your



Pre-set values allow you to correct your scans automatically.



The Histogram maps the tonal levels of a scan.



Brightness/Contrast sliders.

image out from the lightest to the darkest pixel. Brightness works by moving the entire tonal range up or down. Saturation controls are designed to adjust color. A highly saturated color is considered to be "bright" or "strong". A weak or pastel color is considered to have low saturation *care* must be taken when using these controls because too much saturation can cause color to look unnatural. The only way to know how much is through testing. Start with low amounts and gradually increase them. Some advanced software may give you more complex controls including adjustable Curves and Levels dialog boxes.

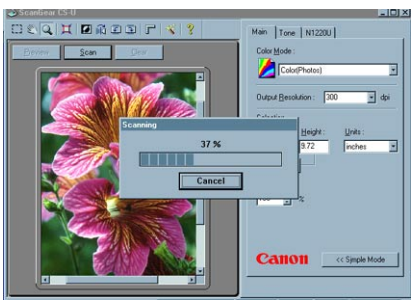
Every scanner handles these functions a little bit differently, so we are purposely being a bit vague about the actual process here. When we're all using Photoshop, we'll be able to give you the exact steps you need to take in the process of color correction and enhancement. By performing your optimization in Photoshop, we can guarantee that the results you'll get will be accurate and ultimately less harmful to your images.

For now, feel free to experiment with your scanner's controls to affect color, brightness and contrast and familiarize yourself with these various optimization tools.

Step 10: Other Scanner Tools.

Depending on your scanner and your software, you may have access to other tools to control your scan. For instance, some scanners will allow you to focus your image. This can be a

useful function particularly when scanning slides. Some scanners will allow you to set black and white points. This allows you to show the scanner the blackest part of your image and the lightest. The scanner can then determine the best overall exposure for that particular image. Other scanners feature options that can control the problems caused when you scan originals that have been screened, like those in printed materials like magazines. You should read your scanner's manual carefully and experiment with all of your scanner's tools until you understand what each of them does.



Scan in progress.

Step 11: The Final Scan.

Once you've previewed the image and used your scanner's tools to adjust the image to your liking, it's time to click the Scan button. Your scanner will perform the scan according to the requirements that you've set in the scanner's controls. You can usually choose a default digital imaging program to immediately open your image when your scan is done. That could be Photoshop or any software that will allow you to manage your digital file. Other scanner programs will simply save your image automatically after the scan. You will need to check your software carefully to see where your machine will put the completed scan as well as what type of format the image will be saved in. Some scanners will allow you to change the file format the image is saved in, others will not. We will be explaining file types in Lesson Eight.

Scanning Workflow.

There are many different ways to manage your images after they've been scanned. Here at NYI, we adhere to some fairly strict guidelines when it comes to digital image scanning and usage. There are two different methods we use to handle the large quantity of images that pass through our graphics department.

Method 1—Scan the original once at a high resolution, creating a master file, and archive this master image on a CD. All subsequent copies of the image will come from this master file. We then optimize each copy of the image for its specific use, creating several different files from the master, each at a different resolution or size from the original.

Method 2—Make all scans from the original art to ensure the highest quality. Optimize each scan for its particular usage. Both methods have advantages and disadvantages:

Method 1—Producing a scan at the maximum resolution will take longer to make as well as take up more room on the hard drive. However, this method means that the scanning process is only done once. Multiple images can then be created from the high-resolution master file and optimized very successfully with little visible degradation. Copies must only be made from the master file. Attempts to work with 3rd or 4th generation copies will only lead to image degradation and inferior quality.

Method 2—Every scan is going to be the perfect size and resolution for each specific use. By working with the original each time, we can be sure the file has not been corrupted or otherwise degraded with compression. The downside to this method is that the scanning process is time-consuming and labor-intensive. This method also assumes that the original is available for scanning every time you need it for another purpose.

Both methods are good for different reasons. The truth is that any method is valid if the output satisfies the needs of the photographer, accompanied by a comfortable, predictable workflow.

Remember you are doing this because you love it. Do what feels comfortable. Many people get confused with resolution issues because they are afraid of the math. Don't be confused. Start with the basic guidelines and feel free to improvise. If your printed images from your inkjet printer are jaggy at 200 ppi change the resolution to 250 and make another test. You have to find a combination that works for you and stick with it.

Everyone Works Differently.

Everyone works differently. Consider the simple act of reading a daily newspaper. Many people read the front page first to see the top story of the day. Others go directly to the sports page. Someone else might skip the daily news altogether and head right for the financial section to check the stock market. Although we approach the news from entirely different angles, when the day is done, we've all read the paper. Our needs are different, and, as a result, so is the way we gather information.

This is definitely the case when it comes to digital imaging workflow.

Consider three important facts:

1. We all have different needs when it comes to digital images.

2. Our digital equipment has different requirements as well.

3. The path we take to attain our output may be different.

People produce digital images for a multitude of purposes Web sites, newsletters, catalogs, ads, the list goes on and on. Each use has certain needs that must be met in order to produce acceptable results. If you examine the workflow of a person who produces images for a Web site and someone who produces images for a printed catalog, not only might their methods seem radically different, but they may not even understand what the other is talking about. While color-correcting an image may be considered a crucial element in the preparation of an image destined for a printed page, it simply does not hold the same sort of importance for the Web site designer. That's not to say that you don't have to worry about color balance on the Web, but in the end, you just won't be able to control how any one user will see your image because of disparate monitors. However, when an image gets printed, what you see is what everyone gets. There is no turning back, it's either right or it's wrong.

While a Web designer works with images at basically one resolution standard, 72 pixels-per-inch, the print designer must be aware of the optimum resolutions for a variety of different print needs. That's because different printing devices may need different resolutions to produce the best results.

If that's not enough, even when you have two people working on images that will be used the same way, there are different ways to achieve the exact same results. For example, there are many ways to convert a color digital image to black-and-white. Each method is valid as long as it satisfies the end product. If you are comfortable doing a task one way, stick with it. When you're ready, feel free to experiment and find the way that works best for you.

The bottom line here is there is no right or wrong way to do something if you achieve your intended results. Workflow in the digital environment is a very personal thing. Don't feel that you are doing something incorrectly because your method is different than someone else's. When it comes to digital editing, it's a craft that is so new, you may even find your own new way to do something. Experiment. Use good logic. And you will succeed.

Learning to See.

In order to be a great photographer, we must learn to see the world differently. Being a digital photographer puts an even greater responsibility on the artist. The digital photographer must also be the "digital lab". As a result, it is important to learn how to "see" our digital darkroom work just as a conventional lab technician would.

The ability to make a scan is only half the battle. The real challenge is to make a high-quality, accurate scan. A scan is basically a digital reproduction of an original print or piece of film. A good reproduction must be faithful to the original.

So, after you make a scan you should always ask yourself:

"How does my scan compare to the original art?"

You can determine the accuracy of a scan by digging a little deeper. Here are a few things to look for.

1. Highlight/shadow Detail.

A good print should have adequate detail in the highlight and shadow areas and the resulting scan of a good original should possess the same amount of detail.

2. Color Cast.

Look at color influences in the scan. Sometimes an overall cast will affect the entire print. Learning to see color is one of the most difficult aspects of color correction. That's because red sometimes looks like magenta, and blue sometimes looks like cyan. Make the wrong correction and you could get a color cast worse than what you started with. Only experience will teach you to see colors accurately. Be patient. These skills will come.

Fortunately, in the digital darkroom we have the luxury of testing corrections without having to commit to them. The ability to undo a correction that “doesn't quite work” makes the chance for success higher. Your Unit Two CD has two interactive demonstrations to help explain how color works in the digital environment. The Color Wheel demo is designed to show you the concept of complementary colors and how you can use them to correct for an overall color cast

Scan without color correction.

Scan with color correction. *©Chuck DeLaney*

in a digital image. In the Digital Primaries demo you can click and drag color sources to see how they mix and what they mean to you in your digital darkroom. Both are very important concepts that will be invaluable to you as a digital photographer. We strongly suggest you explore both of them.

3. Cropping.

Make sure you haven't inadvertently cropped any important part of your scan by accident. You don't want to waste time working with an image that you can't use.

4. Cleanliness.

Look closely for dust and dirt. You can always remove the unwanted dirt in Photoshop later, but this takes time and energy that can be eliminated by looking at your scanner plate and the original before you begin the scanning process.

Some scanners are coming bundled with proprietary technology which can help to remove dust, scratches and other imperfections in film and prints automatically.

Photograph scanned with dust.

Photograph scanned without dust. *©Chuck DeLaney*

5. Reversing film scans.

When you are scanning film it is important to be aware of how the film should be inserted into the scanner. Some scanners require the film to be inserted emulsion side up. Others work in reverse. If you insert the film backwards the scan will be backwards too. Faces will look different, and any printed words in the image will reproduce backwards too. In the graphics industry, this is known as “flopping” the film. Again, you can correct this problem in Photoshop, but why not do it right the first time?

6. Bad originals.

Your scan will only be as good as the original you use. An original with little highlight or shadow detail is a good indication of a bad original, regardless of whether it's a print or a piece of film. Look for an original with a good deal of detail as well as good tonal range.

Remember to ask yourself these questions every time you make a scan. Identifying a problem will give you the opportunity to correct it earlier in the process, and as a result make the whole process a lot easier. Remember to remember.

Some Basic Scanning Tips.

1. Make sure your original is clean. It's easier to clean a slide or print with a brush or compressed air before your scan. Often overlooked, it makes more sense to start with a clean original.

2. Make sure your scanner surface is clean. Your scanner will come with recommendations on how to clean the glass.

3. Make sure your print is straight and oriented correctly on the glass. It is fairly easy to rotate a print in Photoshop, but it takes less time to be aware of the orientation when you position it on the glass.

4. Good work habits will reduce your scanning time as well as valuable time spent fixing scans in Photoshop. Your work will be cleaner and you can use the time you've saved to be more creative.

5. If you're not happy with your first attempt, feel free to discard the scan and try again. It's that simple. You don't have to commit until you're satisfied with the results. The only cost is time and as a student you should allot a certain amount of time to experimentation. It's the best way to learn.

In your Unit Two Study Hall you'll find additional information including some case studies on scanning. We'll show you how we scan a slide and how we scan a basic print here at NYI. In Unit Three, when we've got the level playing field of Adobe Photoshop, we'll take scanning further and show you step-by-step how to correct your scans. Just remember, scanning is an art form that takes time to learn. We've shown you the basics, but now you need to learn by doing. It's only after you've become familiar with how your scanner works and have made lots of scans that you'll start to develop the finer techniques in the craft of scanning.

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