Understandng Resolution:

Resolution: the amount of values (or pixels) that you have per measurement.
  • Commonly, it is the amount of values per inch.

PPI: Pixels Per Inch. Used to describe the resolution of a digital file.

DPI: Dots Per Inch. Used to describe the resolution of digital output.
  • DPI works similar to film grain with regards to enlargements. In traditional photography, as you enlarge an image to print size, you also enlarge the film grain. The film grain will effect the final look of the print, and you will see a dot pattern. In digital printing, as you enlarge the digital file to print, you need to have a higher resolution, or you will start to see a dot pattern in the print.

Interpolation: Set of algorithms applied when resizing an image.
  • Does not add or subtract detail, but rather randomly adds or subtracts pixels.

Grayscale: single channel holding a monochromatic range of values from white to black
  • In scanning, a grayscale 8 bit image means that you have one byte of information for each value scanned. This produces 256 tonal values total from 0 (black) to 255 (white).

RGB: 3 separate monochromatic channels combined (red, green, blue)
  • If you have 8 bits per channel, then you have a 24 bit scan. This gives you more information than the gray channel alone (even for a B&W negative).

Preparation:

1. When considering resolution, think about output size first. For Instance, you can make a photo quality 8"x10" ink jet print at a maximum of 300 DPI (a higher number will not have an advantage). This means that you need 2400 x 3000 pixels in your digital file. It will take a scan from a 35mm negative at 2400 PPI to reach this goal.
   • A 6 MPX digital camera is about 3032 x 2008 pixels.

2. How big should I make a scan?
   Scanning resolution depends on several factors including the size of what you are scanning, the quality of an image you need for your project, the output media of the project, and the size of output or print.

3. When you scan, consider the final purpose of your image.
   • For fine print use, use 300 dpi as your goal, but remember that high quality ink jet printers are capable of delivering photo quality prints between 150 dpi and 300 dpi.
   • You can use the *IMAGE SIZE* feature in photoshop as a resolution calculator. First, create a new document at the output size you desire and at the DPI you desire. For instance, create a new document for size 8"x10" at 300 DPI. Next go to *IMAGE*, *IMAGE SIZE*. Look at the fields.

4. The size of a 35mm negative is about 1"x1.25". Now, *UNCLICK RESAMPLE IMAGE*. Type in the height of the 35mm negative, and Image Size will automatically adjust the Width and the Resolution. The Resolution it is giving you is the PPI which you should scan your negative at. In the case of a 35mm negative, this is telling you to scan in the negative at 2400 PPI to obtain the resolution needed for a 8"x10" print at 300 DPI.
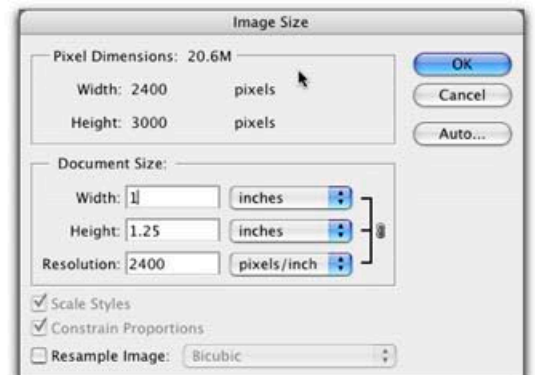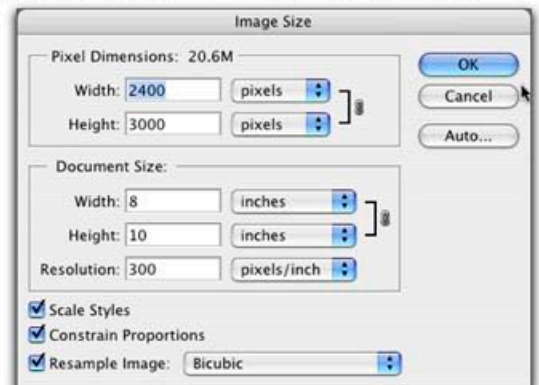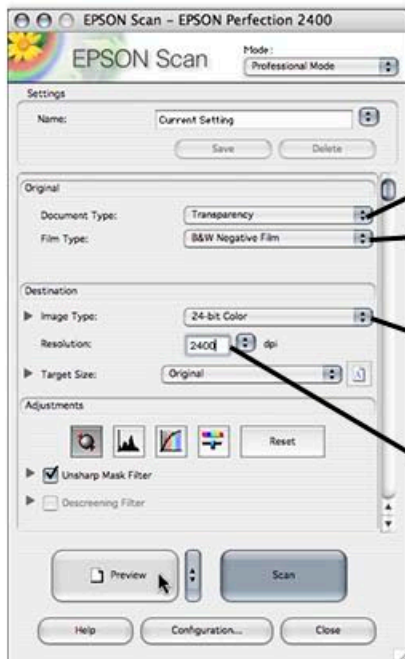
Resolution Standards And Sizing

Below are basic guidelines of what file size your Photoshop file needs to be (once flattened) in order to make a good quality print on a 720 or 1440 dpi or better printer using an 8 bit scan. This is just a guide.
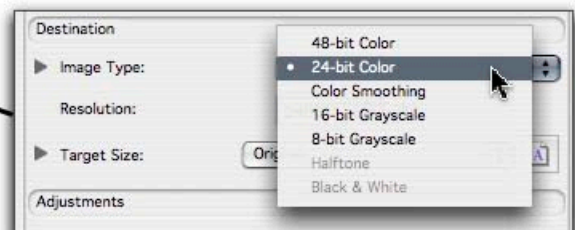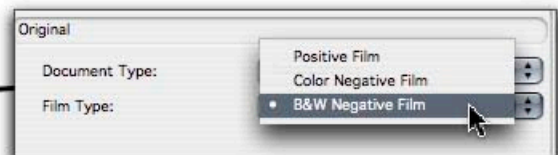
Guidelines for Scanning 35mm Film:

Print Size	DPI	Bit	Pixel Dimensions	Total Pixels	Scan at PPI
8 x10	300	8	2400x3000	7,200,000	2400
11x14	300	8	3300x4200	13,860,000	3300
16x20	300	8	4800x6000	28,800,000	4800

Procedure for Scanning Negatives - Epson Perfection Scanners

1. Make sure the computer and scanner are on.
2. Open the front top of the scanner (the lid).
3. Carefully slide the inside Lid cover attachment off.
4. Insert your negatives emulsion side up (text reversed) into the plastic negative holder and position the holder to that the arrows line up with the top right corner. Your negatives should be in the center of the scanner. Close the lid to the scanner.
5. Press the "start" button on the front of the Epson scanner. This will start the Epson Software.

6. The interface may vary slightly depending on the scanner. Make sure that your settings are the equivalent to:
   • Mode: Professional
   • Document Type: Transparency or Film (when working with film)
   • Film Type will vary. Pick the one appropriate to your film, either BW Negative, Color Negative, or Positive (Slides)
   • Image Type: 24 Bit Color is recommended. This will allow you to have an RGB file. This is recommended even with BW film. This also gives you 8 bits per channel which is fine for class work. You may want 16 bits per channel for higher quality.

7. Resolution should match the PPI you worked out in the preparation section on page 1. For example, an 8"x10" print from a 35mm negative at 300 DPI, you will enter 2400 in this box.
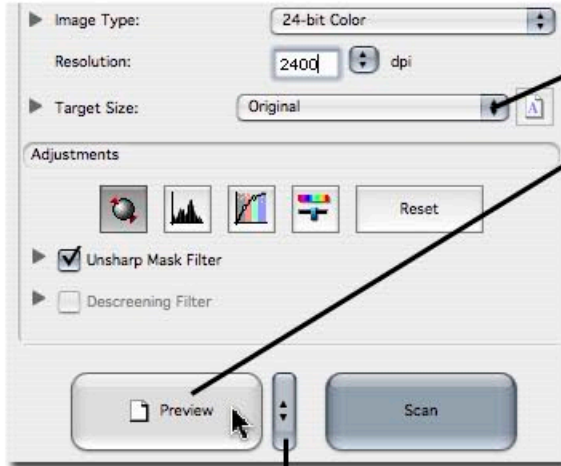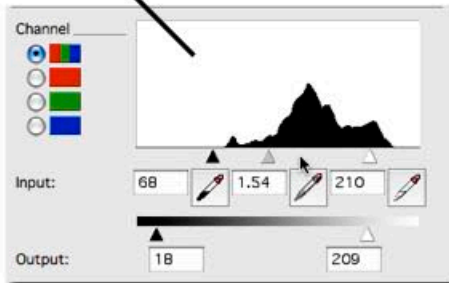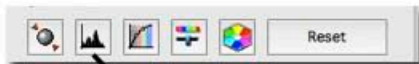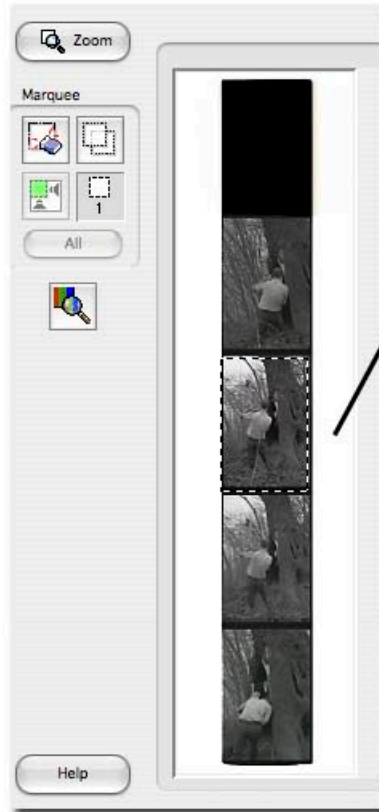
8. Target size is original. On some scanners, it may say SCALE. If it says SCALE, you want the scale to be 100%.

9. Click on the preview button.

Depending on the scanner, you may see an option for a thumbnail preview. It is recommend that you use the "strip preview as show below. On most scanners, you can swtich between thumbnail and strip preview with this button.
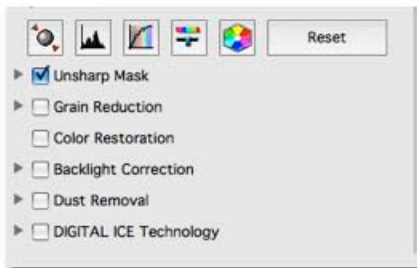
10. You will see a row of negatives. Drag the mouse to the negative you want to scan. Click, hold down, and drag the mouse to make a dotted line box around the negative. Everything inside the dotted line box will be scanned.
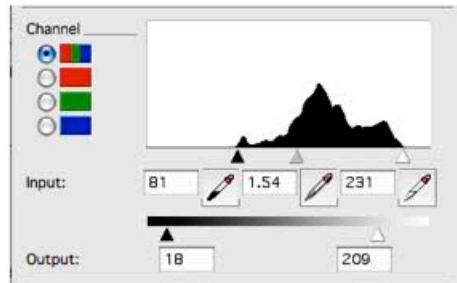
11. Check the histogram adjustment icon to see if you are recording all the desired tonal values. Move the black and white trinagles below the histogram to the ends of where tonal values appear.

Before

After

12. Look at the last set of options. Typically, you want to use Unsharp Mask. If you find wierd hallos on your image after scanning, then turn this option off.

13. If see a lot of film grain texture after scanning, then consider rescanning with the Grain Reduction feature.

14. Click on the scan button.

15. On the last menu, save your image as a .tif file to the desktop. Be sure to include your last name in the file name.