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# Scrapbooking Resolution

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## **Introduction and Aims**

Digital Scrapbooking, as it is known today with kits and digital elements, is still an Industry in its infancy. Many industries start with one thought in mind and quickly realize that this is not the way it has to be done. No difference in Digital Scrapbooking. In the beginning the designers used information they had available to them to determine the resolution needed to make the digital kits. These original designers went with the Industry Standard resolution that Professional Graphic Artists use. There is now a debate in the scrapbooking industry about the resolution a kit must be to provide high quality.

This article is intended to break some of the myths in the digital scrapbooking world regarding the needed resolution of kits. This article is not intended to cover every form of printing or graphic design as that would be more likely to be a book instead of an article.

There are many facets of the designing and printing process which I will not cover. But please know that these are for Professional Printing which 99.999% of scrappers will not use because of the cost.

## **Some Background in Graphic Design and Printing**

Since graphic design was one basis for resolution choice, let's begin by explaining why graphic designers use 300ppi for their designs.

Most graphic designers use 300ppi resolution for the professional graphics they design for print. You learn in the design world that you should, if at all possible, design knowing the output device for the project.

### **Why 300ppi?**

The type of printer they send their work to generally require images/documents to be 300ppi for print. Most of the time the graphic designer knows what the print output device is for the document/image they are creating and they create based on what the requirements are for that printer.

### **What type of printer do they use?**

Offset Printing Presses & Digital Printing Presses are the main two types of printers used for business and marketing materials.

## **Offset Printing Presses**

Offset Printing Presses are mainly used for long run printing:

Magazines, Booklets, Brochures, Flyers, Business Cards, Business Forms, Calendars, Catalogs, Envelopes, Flyers, Index Tabs, Labels, Letterhead, Manuals, Menus, Newsletters, Note Pads, Post Cards, Posters, Presentation Folders, and other various marketing materials.

Offset printing is the best quality of all of the printing procedures, but for small runs this choice tends to be expensive due to the set up fees required for washing the rollers from the previous job, removing old plates, filling the ink wells, attaching new plates and getting the press up to optimal speed and color. These initial set up fees are generally \$150-\$200. (this is a general price range. Prices will vary depending on amount of colors used).

There is also a minimum amount of identical prints required. These printers recommend documents/images to be 300ppi in CMYK color mode. Although there are circumstances where a lower resolution file is acceptable. From my research I found that not only is the resolution important but so is the file type. Offset printing companies prefer “lossless” file formats but will print a “lossy” file format. When a file is saved using the “lossy” format, aka JPEG, much of the file information is discarded in the save therefore causing the photo to lose some of the original crispness and detail. Their suggestion for printing JPEG images was to use the highest quality possible when saving these files.

After researching and discovering this information, I feel safe to say that NONE of the digital scrapbookers will be using an Offset Printing Press to print our layouts. The cost would be way too high.

### **Digital Printing Presses**

Digital Printing Presses are mainly used for short run printing such as Booklets, Brochures, Flyers, Business Cards, Business Forms, Calendars, Catalogs, Envelopes, Flyers, Index Tabs, Labels, Letterhead, Manuals, Menus, Newsletters, Note Pads, Post Cards, Posters, Presentation Folders, and other various marketing materials. This is a fairly new method of printing for the Industry. The one great thing about the Digital Printing Presses are that they don't have the set up fees normally associated with printing presses. This printer also uses the CMYK color mode and may have spot colors available at an additional charge. The benefit is found when you only need a few of one document printed. Once you reach the 500 mark then you are going into a long run printing package where it would be more cost effective to use the Offset Printing.

The digital printers I have found have had a minimum order so once again, the cost would be way too high for the digital scrapbooker to use this form of printing.

### **Scrapbooking Layouts and Printing**

#### **If Magazines require 300ppi than how can submit a layout made with a kit using 200ppi?**

Most scrapbookers would love for their layouts to be published in a magazine and yes the magazines do require the layouts to be 300ppi because they use the offset printers.

#### **However, have you ever seen a magazine for scrapbooking printed at 12x12?**

I haven't. The magazines I have seen are all 8.5x11.

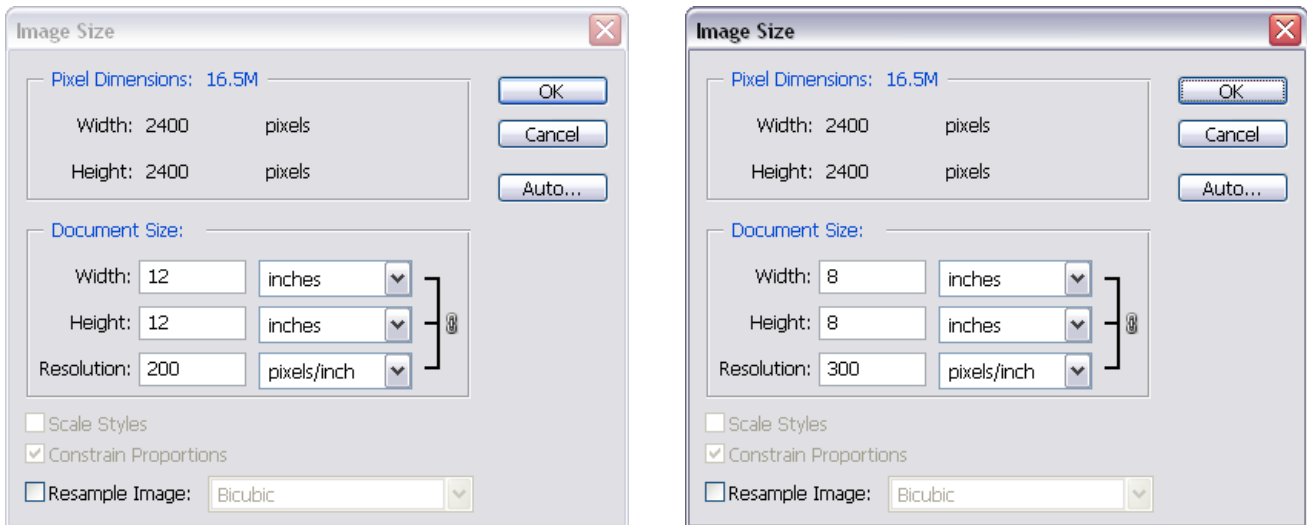
A 12x12 layout made at 200ppi is 2400 pixels by 2400 pixels. An 8x8 layout made at 300ppi is also 2400 pixels by 2400 pixels. I would dare to say that an 8x8 300ppi is the largest file the magazine would need since they don't print their magazine larger than 8.5x11.

#### **But how do I make my layout 8x8 300ppi if it is created with a kit made at 200ppi?**

Simple, you increase the ppi to 300ppi **without resampling**, your document will now be an 8x8 300ppi document which is what the magazines require. *(You could also change the width and height to 8 inches without resampling and this would cause the resolution to go to 300ppi, either way is fine)*

## **I thought increasing the pixels on a document was not recommended?**

It is not recommended to increase the pixels per inch of a document if it increases the pixel count - but using the above method of not resampling means you are not increasing the pixel count, that both documents are 2400x2400 in pixels, and only the size of the document has changed. Notice you did not add pixels.



In the figures above you will notice that the Pixel Dimensions are the same. The only change is in the document size. At 200ppi the document is 12x12 and at 300ppi the document is 8x8. Because you have reduced the size of the document you have increased the pixels per inch. Again...this is NOT increasing the pixel count so the image will not become pixelated.

## **Lets take a moment to recap:**

- We have learned that digital scrapbookers will not likely use the Offset printers nor the Digital Printers or printing our layouts because it is too expensive.
- We have learned that by reducing the size of our layout to 8x8 and NOT RESAMPLING, our layouts make the layouts large enough for publication in a magazine and meet the 300ppi requirement.
- We know that for these Printing Presses, all work must be either created in a CMYK color mode or converted to CMYK before sent to press. *(yes the magazines convert your layouts to CMYK before print.. this is why sometimes the colors seem different in the magazine than your original)*

## **Scrapbookers and Printing**

Now that we have looked into the type of printing digital scrapbookers **won't** be using, lets move on to the printers that will be use. The two types of printers most commonly used by the digital scrappers are Photo Labs and home inkjet printers.

## **An Aside**

Before we do this, can you remember when you bought your 3-5mp digital camera? Weren't you just amazed

at the print quality of the photos that came from your camera? I know I was. I started out small and printed an 8x10 photo..."Wow, this looks great. I love my new camera!" I know you have done this. I have read many posts in the forums regarding the cameras and or printers scrapbookers use. How we are all amazed at the quality of our prints whether we have printed them from home or at a lab. Come on...think back..did you brag too? I did and still do.

I love my camera and printer. I remember when I got my Nikon D75 (6.4mp) and my large format printer. Well I was not going to let it just sit there. I had to print a BIG photo, and I did. I took a beautiful photo of my daughter and then printed it out on the largest paper my printer would do...a 13x19.

The print was better than I had hoped for. Great colors, sharp detail every little freckle on Genny's nose was plain as day. I was just gushing about how my new camera and printer combined to do such fantastic prints. Have you felt this way?

Even if you don't have a large format printer. Did you take one of your photos into a lab and have a large photo printed? If you didn't you should. At this time...stop reading.

If you have a large format printer, take a photo, but make sure you have the camera on the highest settings, then print out a 13x19 photo. Remember that your paper choice is very important. I personally love the Epson Luster paper. If you do not have this available, that's fine, use a Professional Photo paper. Oh, and remember to adjust your print settings in your print dialog window to match the paper you have chosen. For those of you that don't have a large format printer. That is fine... go ahead and print out an 8x10 and see how it looks. After you have done this... continue reading. Oh...and look at it like you normally would. Don't put it right against your face with a magnifying glass. That is not how people are going to view your pages. Look at it at arms length with an open mind.

I hope you loved your print. I know I love everyone of mine!  
OK...back to work

## **Photo Labs**

There are 2 main types of photo labs: Professional Photo Lab and a Traditional Photo Lab

**What is the difference?**

### **Professional Photo Labs**

A **professional photo lab** is a quite a bit more expensive than traditional photo labs because of the type equipment, quality of papers and inks, technicians knowledge and use of color management among other things. Most Professional Photo labs require a membership and are intended for professional photographers.

In speaking to these type of labs, I was able to find out that for larger prints - such as 12x12 - they recommended even less than 200ppi. Basically if a photo had to be 300ppi to get a quality print then a lot of digital photographers would be out of business as their cameras are not capable of taking a photo to print at this resolution.

Another reason for the lower pixels needed for larger prints is because of the size of the print. When someone is looking at a 4x6 print they generally hold it 6" or more from their face. For a large format print - such as a 12x12 layout - a person could not properly see the entire layout holding it 6" away, therefore they hold it further away from them to view. This further viewing distance is one reason professional photographers can take photos and print them at 11x13 or 13x19 at a much lower resolution. *(a lot of professional photographers use 6.24mp cameras)*

### **Traditional Photo Labs**

The Traditional Photo Lab, such as Costco or Walmart (Tescoes or Jessops in the UK) is where digital scrapbookers who do not print from their own inkjet printer are most likely to have their 12x12 layouts printed.

These labs generally use a different printer than the professional labs and do not have the same array of papers or inks. Many of these labs do not offer color management or specialty services required of Professional photographers. *(some do offer color management)*

When we call our local photo lab and ask what resolution they print at, the response is usually 300ppi. And this is true, to some extent. They print up to 300ppi depending on the file you bring into them. *(some labs only tell you the largest print size..such as 8x10)*

### **An Interesting Example**

These labs usually have a chart of the Minimum Image Resolutions that they will print. I found the chart below for the Minimum Image Resolutions required from Costco. *(These measurements are taken directly from the Costco website... [http://www.costcophotocenter.com/helpphotoresolution/t\\_=0](http://www.costcophotocenter.com/helpphotoresolution/t_=0))*

Print Size/Product	Minimum image resolution required
4 x 6	640x426 pixels
5 x 7	1050x750 pixels
8 x 10	1280x1024 pixels
11 x 14 Enlargements	1600x1143 pixels
<b>12 x 18 Enlargements</b>	<b>1600x1066 pixels</b>

For a 12x12 layout you must purchase the 12x18 enlargement because of the width of the layout. According to their minimum image resolution required you must provide an image less than 89ppi. Would I advise printing this low? NO

But as you can see, 200ppi is a much higher resolution than their minimum required resolution for printing.

Earlier you read that these labs print up to 300ppi depending on the file you bring into them for printing. Keeping that statement in mind, refer to the picture you printed earlier. It is time for Photo pixel math. Are you ready for this? It isn't hard I promise.

## Pixels to Size

In order to print an 8x10 photo at a resolution of 300ppi you MUST have no less than a 7.2 mega pixel camera. Let me repeat... in order to print an 8x10 photo at a resolution of 300ppi you MUST have no less than a 7.2 mega pixel camera. For a 10x13 photo you MUST have an 11.7 MP camera to print out at 300ppi. How do I come up with this number? Here is the equation:

$$\mathbf{W(r) \times H(r)}$$

width (resolution) x height (resolution)

8x10 300ppi photo	10x13 300ppi photo
<b>8(300) x 10(300)</b> <b>2400 pixels x 3000 pixels</b> <b>7,200,000 pixels</b> <b>7.2 mega pixels</b>	<b>10(300) x 13(300)</b> <b>3000 pixels x 3900 pixels</b> <b>11,700,000 pixels</b> <b>11.7 mega pixels</b>

Most scrapbookers have a 5 mega pixel camera or less. Some scrapbookers do have the Professional SLR cameras but the majority of scrapbookers will have a nice point and shoot 5 MP camera.

As you can see by the chart above you cannot print an 8x10 photo at 300ppi with anything less than a 7.2MP camera. Even those fortunate scrapbookers with the CannonEOS 6.3 MP or the Nikon D70 6.24 MP cameras, even they do not have enough megapixels from their cameras to print the 8x10. The highest ppi you will have is 250. For a 10x13 the largest ppi you will have is 190ppi for the 5MP cameras.

8x10 250ppi photo	10x13 190ppi photo
<b>8(250) x 10(250)</b> <b>2000 pixels x 2500 pixels</b> <b>5,000,000 pixels</b> <b>5 mega pixels</b>	<b>10(190) x 13(190)</b> <b>1950 pixels x 2535 pixels</b> <b>4,943,250 pixels</b> <b>4.95 mega pixels</b>

One last table for now. **If you were to print a 12x12 layout at photo quality (*like what your camera could use*) How large of a camera would you need?**

12x12 200ppi	12x12 300ppi
<p><b>12(200) x 12(200)</b>  <b>2400 pixels x 2400 pixels</b>  <b>7,760,000 pixels</b>  <b>7.76 mega pixels</b></p>	<p><b>12(300) x 12(300)</b>  <b>3600 pixels x 3600 pixels</b>  <b>12,960,000 pixels</b>  <b>12.96 mega pixels</b></p>

I know with my Nikon D70 which is 6.24 MP I have printed an amazing 13x19 photo. (*you can do the math on the 13x19*) I also know of many Professional Photographers who have printed larger prints than that with amazing results using a 190ppi resolution.

**Time to recap...**

**Why do professional graphic artists use 300ppi?**

Because their output printing devices - the offset printer and the digital printer - recommend 300ppi.

**Will you ever need to produce your 12x12 scrapbook layouts for printing in an offset printer or digital printer?**

NO (*I don't think any of us are going to pay hundreds of dollars to have hundreds of the SAME layout printed or pay the \$50 minimum required for digital presses*)

**Will you ever need to print your layout at a Professional Photo Lab or Traditional Photo Lab?**

Yes, but remember that these labs recommend a much lower resolution for 12x12 or 12x18 prints. (*If they required 300ppi they COULD NOT print your photos at 8x10 with your 3-6.3 MP cameras image you send in to them*)

- Please stop and think about the prints you have made from your camera.
- Then think about the professional photographers who take photos with a 6.24 mp camera and blow them up to 13x19 or larger with no problem. These professionals are getting paid hundreds of dollars for their prints.
- The manager at the Professional Processing lab himself says that you do not need more than 200ppi for a large print.
- Remember if you printed a 12x12 photo from your camera at 300ppi, you MUST have a 12.96 mega pixel camera.

# *Inkjet Printers*

## *PPI and DPI*

First lets go over the difference in ppi and dpi:

**PPI** (*pixels per inch*) defines the digital image resolution. A pixel is a discrete, atomic *picture element*. It represents a single tone for a single point in the image at a vertical and horizontal coordinate.

**DPI** (*dots per inch*) is an output device resolution typically used to describe inkjet printers. The dots represent the smallest physical size of the ink drops on the paper.

**Multiple dots are needed to reproduce a single tone (color).** So, for each image pixel the RIP software has to calculate the placement and size of the ink drops in a grid layout. One pixel will contain multiple dots, thus causing the dpi of an image to be MUCH higher than the ppi.

This article will not go into deep detail about the mechanics of inkjet printing. It will however give a brief explanation.

When you look at your printers specs and see 2400x1200 dpi. Please understand that this is NOT referring to ppi. This means that this printer can print up to 2400x1200 dpi.

There are many factors which go into determining the actual “resolution” a printer can output, such as the number of ink dots placed in a cell, how many cells are there, are there any variable ink dots, etc...it would be much easier if the printer companies would just use ppi instead. It would be easier for the general public to understand this method, but printers don’t work solely based on pixels per inch.

The printer uses the RIP software to determine how many dots it will take to make the tones (colors) for each pixel in the printed image. Again, even though you have a document that is 300ppi the dpi will be MUCH higher depending on the amount of dots needed to make the color for each pixel and the paper you print on.

## *The Papers*

Earlier it was stated that there were many factors that determine the amount of dots per inch. The paper you choose can factor into this also. Although resolution and the quality of the image are very important factors - the paper you choose to print on will be a key factor in how your print quality turns out.

Each paper has different absorption rates. When ink is sprayed onto paper, it should stay in a tight, symmetrical dot. If the ink is absorbed too much into the paper the dot will begin to feather. This means that it will spread out in an irregular fashion to cover a slightly larger area than the printer expects it to. The result is a page that looks somewhat fuzzy, particularly at the edges of objects and text. You need to make sure you select the correct paper, ink and you also **MUST** select the proper paper in your print dialog box.

Every printer has a driver that uses software to help the printer determine the best way to print the image. The

paper you select tells the printer the absorption rate of the paper, thus changing the amount of dpi needed to print a quality image.

A typical Epson inkjet printer can print at a resolution of up to 720x720 dpi (not ppi) on standard paper. With coated paper, the resolution increases to 1440x720 dpi. How? The printer knows that the image will not feather and cause the dots to blur together, therefore it can shift the paper slightly and add a second row of dots for every normal row.

Your printer may print 300 ppi but is it really needed? This is the one area where I could not speak to the professional printer for information. OK...so I did ask him because they use inkjet printers for proofs and once again the professionals said that for a print that size 200ppi was all that was needed.

BUT for your scrapbook layout you are the printer, so I am asking you to look back on your photo you printed out earlier. How was the print? For those of you who have done the print before...Think about when you first got your camera and printer. How you raved over the quality of the print? Refer back to the resolution formulas given earlier. What was your resolution?

## Compression

### **What else determines how an image looks?**

The compression.

### **What is compression?**

There are two types “lossless” and “lossy”.

“Lossless” compression is a class of data compression algorithms that allows the exact original data to be reconstructed from the compressed data. This type of compression is found in your .png and most .tiff files (there are others also such as .zip)

“Lossy” compression is where you discard part of the file information to make a smaller file size. The more you compress an image the more detail is lost in color and clarity. The more an image is compressed the more you will notice the degrading, especially around the edges.

When using your camera, unless you shoot in RAW or TIFF, it is recommended to shoot in the highest available JPEG quality setting. Digital cameras usually have different JPEG quality settings, such as FINE, NORMAL, BASIC, etc. Please understand that some cameras will compress more than others, even at their highest JPEG quality setting.

This is also true for different graphic programs. They all have their own way of compressing jpeg images. If a designer does need to compress an image further for file size issues, then I highly recommend using a program with much better compression abilities. *(there are programs specifically for compression of files)* The old saying “Not all things are created equal” rings very true when it comes to compression algorithms.

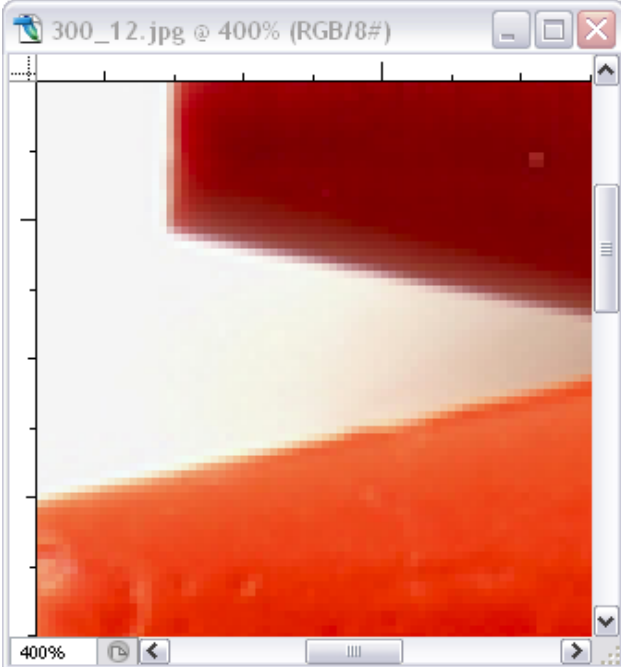
*\*\*Please do not think you, as a scrapbooker, will need to go buy compression software. This is more for the designers to give you the highest quality product.*

**Important:** Every time you save a jpeg image, the file size may remain the same but the quality of the image will degrade further. When working on your layout in several sessions, you should save the

intermediate layout in the editing program's native format (.psd , .psp, etc...) or in an uncompressed format such as TIFF. ONLY compress after all editing is done.

What does compression do to your images? The images below are increased views of the same photo saved at different levels of compression (*aka..quality in Photoshop*). You will see that the more you compress an image the more you degrade your image. You begin to see degrading at a low compression ( 8-9 *quality in Photoshop*)

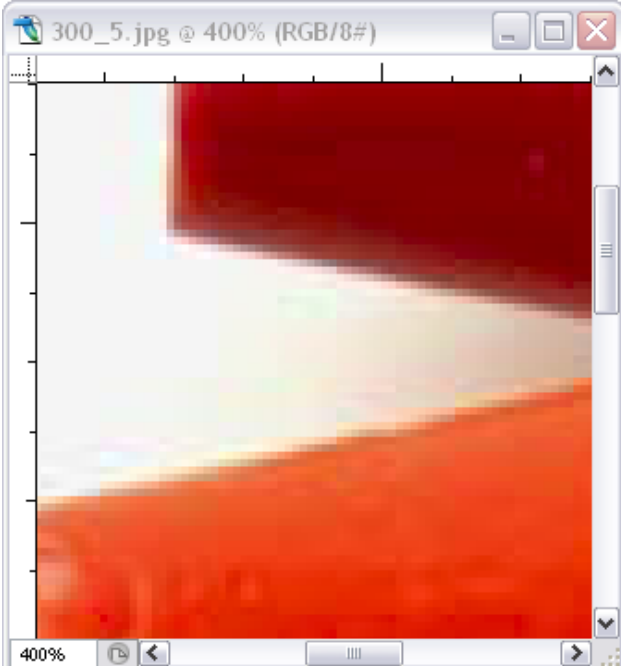
Saved at MAXIMUM quality (lowest compression)



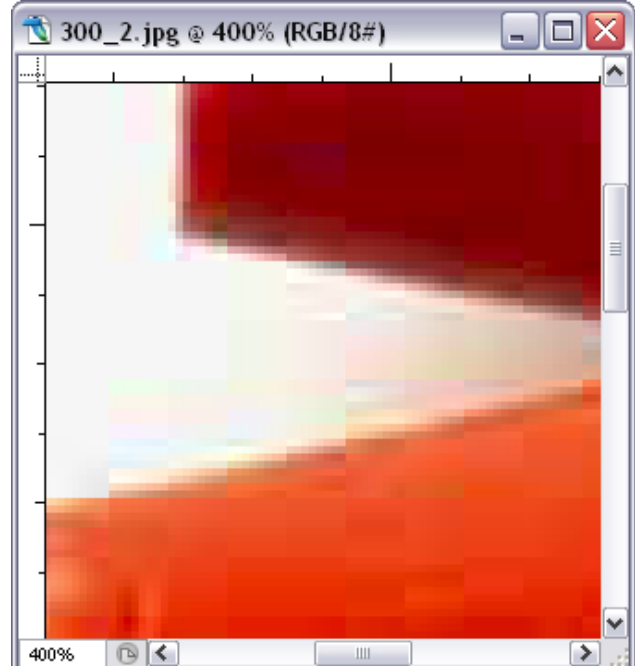
Saved at HIGH quality (low compression)



Saved at MEDIUM quality (medium compression)



Saved at LOW quality (high compression)



You will notice from the above photos that there is degrading to the image when saving at a low compression, but this degrading is minimal. As you compress more your image begins to degrade at an unacceptable rate. *(JPEG has a hard time with very sharp edges: a row of pure-black pixels adjacent to a row of pure-white pixels, the sharp edges tend to come out blurred unless you use a very high quality setting.)*

It is important for a designer to keep the compression as low as possible because we must remember that the consumers (digital scrapbookers) will be creating their layouts with the papers and then saving them again in a “lossy” compressed format (JPEG). Remember, when you save the layout the papers used will go through another compression and degrade more.

Please understand that this article is **not** saying that a designer who saves at a higher compression than others is not a good designer. They ARE good designers and DO QUALITY work. The purpose of discussing the compression was to inform you of other factors that do affect the outcome of a kit you purchase. Think of it like this. Most designers who design at 300ppi use a low compression *(some I have talked with stated they save at a quality of 8-9 in Photoshop and as you saw in the images above some degrading occurs)*. While others choose to design using 200ppi but save at the lowest compression *(Highest quality of 12 in Photoshop)*. There are some papers that are so massive in size *(even at 200ppi)* that they must be compressed a small amount to allow for faster downloads. Again, this is where a program with a better compression algorithm is preferred. The better the algorithm the less amount of degradation occurs.

## **Summary and Recommendations**

Now that we have gone through all the technical information pertaining to printing your layout, you must make the decision of scrapping at 200ppi or 300ppi. Try both out to see which seems to work best for you. This is your decision and your decision alone.

If you are going to have your layouts printed on an offset printing press *(\$500-\$700)* or digital printing press *(\$50 minimum... per identical print)* then you should use 300ppi... but who is going to pay hundreds of dollars to print a scrapbook layout?

As far as Photo labs go, Professional photographers get fantastic 13x19 prints from their 6.24 mp camera, which ends up being printed at LESS than 200ppi at their photo labs *(some even use their home inkjet printers with professional paper and archival inks)*.

Since you are not using the output printing devices professional graphic artists use for their print work, and since Professional Photographers print their photos using resolutions LESS than 200ppi with fantastic results, then why would you need more in your scrapbook papers? Consider this: a photograph has much more detail and contrast than a scrapbook paper file, so if photos print great at less than 200ppi then it is very safe to assume that a **properly saved** paper file will print well also. *(An improperly saved file will not print well no matter what the ppi is for the image)*.

## **Why do people scrap at 300ppi?**

1) A lot of scrapbookers are uninformed or misinformed about the resolution needed for a quality print for digital scrapbooking. Please be aware that it is understandable that many designers feel 300ppi is needed be-

cause of the Professional Graphic Design standards. The graphic design standards is the information they began with. BUT, as you have learned in this article, scrapbooking is not the same as professional graphic design. Scrapbook layouts are not going to be printed on the printing presses which require 300ppi. They are going to be printed at photo labs or on inkjet printers. Scrapbookers will need to think of the resolution photographers use instead of graphic designers. After all, these are photos. Photographers, and customers alike, are more than pleased with their large prints which are less than 200ppi. (*see resolution mega pixel charts*).

2) They scrap at 300ppi because that is the resolution of the kit they purchased. A lot of scrappers do not know there is a difference in kit resolutions, until they are told (*most of the time they are misinformed to think 200ppi is not a good quality and will not print as well, which has been proven to be false in this article*). There are also many scrapbookers who buy the 300ppi kits reduce the resolution to 200ppi to make it more manageable - to both save them money on ink and not slow down their computer as much.

3) Then there are the scrappers who have always done their digital scrapbooking at 300ppi and just choose to continue to do so. A lot of these scrappers admit they see no difference in the prints at the two different resolutions, they simply opt for the higher resolution. This is fine. This article is not intended to force anyone to scrap at 200ppi. Again, this is your scrapbook and you alone must make the decision as to which resolution you choose to scrap. This article is intended to inform you that you will have a quality print from either resolution you choose.

### **You Choose**

At this time you may be thinking that 200ppi is all the resolution you need, but what does this mean to you? Why switch? I will give you 2 great reasons. There are more but these two will be enough to make your decision.

1) lower resolution allows your graphic program to run smoother and faster. Have you ever gotten the message "Virtual Memory low"? I have. When working with 200ppi files, the lower resolution causes the file size to be smaller which takes less memory to run. This means that you use less RAM. The amount of RAM you have will determine whether Photoshop has to go into the scratch disc or not. Once Photoshop is having to use the scratch disc your program will slow down drastically. Generally a 300ppi file is **more** than twice the size in MB as a 200ppi file. Naturally, the larger the file the more memory it needs. You also need ram for the operating system, other programs, filters, history states and much more.

2) INK. Ink is not cheap. When you are printing your layouts at home you will use less ink for a lower resolution document which will save you money. BUT... remember that you may want to take the money you save on ink usage and put that money on QUALITY PAPER. This will make a world of difference in your prints.

This article is NOT telling you that you shouldn't buy kits made at 300ppi. By all means buy them, there are WONDERFUL kits out there. But, once you do, you can lower the resolution to save your computer a little and save yourself money on the ink.

Well that is the end of this scrapbook resolution article. I hope you learned much from the information provided. And remember, you do not have to switch from 300ppi to 200ppi, just keep in mind that it can be very feasible option for you if you do choose to switch. The decision is yours and yours alone.