

# TECHNICAL STUFF

## Preface

Before you run away, I just want to point out that it is not necessary to read the following. You can skip ahead to the scanning instructions, it's up to you. I've included a brief description of terms for any of those that may be interested. It is by no means comprehensive, but might clear away some of the fog.

## JARGON

Often you will see restorers using words like resolution, compression, dpi and pixels. The following is a simple definition and explanation of those terms so hopefully you won't run for cover the next time you see them.

### DPI

DPI stands for "dots per inch"

It is common for people to speak of dpi when referring to photos, but this is not strictly correct as the term dpi really relates to the number of ink dots a printer is capable of printing, per linear inch. The higher the number of dots, the better the quality of the printed copy. You probably have an ink jet printer yourself that has a specific ability to print so many dots per inch.

Scanners are the same, they take scans of your image at varying dots per inch depending upon the settings you select and of course, it's capabilities.

Consequently, a photo scanned at say 300 dpi, means that there are 300 dots per linear inch contained in that image.

CAZZA'S TIP NO 1: When buying a printer check the number of dpi it prints, obviously the higher the dpi, the better the quality print you will get, but be wary, they will use a lot more toner! (Slight digression here, sorry!).

## **PPI**

### **PPI stands for “pixels per inch”**

Every image you look at on your PC, Laptop, digital camera, TV etc is made up of thousands of tiny pixels (short for picture elements) that in simplistic terms, are “dots” of red, green or blue (shown as RGB in photo editing software), that blend together to make the images and colours that you are viewing.

The more pixels per linear inch you have, the better the quality of the photo.

## **PIXEL RESOLUTION**

No, not the kind that you break two days after New Year!! To keep it simple, although again not strictly the correct usage of the term, resolution is widely used to describe the quality of the image or the number of pixels an image contains.

The resolution of an image is calculated by referring to the number of pixels in the photo and is usually expressed as a sum e.g. 640 x 480. This means there are 640 columns of pixels (height of your image expressed in terms of pixels) by 480 rows of pixels (width of your image expressed in terms of pixels). Therefore the resolution of the photo is  $640 \times 480 = 307,200$  pixels.

Obviously, the more pixels there are in an image, the higher the resolution and consequently, the higher the overall quality of the image.

**CAZZA’S TIP NO 2: Getting a bit more technical here, but just as an example, if you divide 307,200 (the number we got above when we worked out the number of pixels in the image) by 1 million you get 0.3 megapixels. When looking at digital cameras, you will see that they are capable of taking images at so many megapixels, now that you know this refers to the resolution or number of pixels, this will give you an indication of the quality of the camera. Goes without saying that a camera with a higher megapixel rating, will of course, take higher quality photo.**

## **JPEG COMPRESSION**

The reason we prefer scans to be at a minimum of 300 dpi, is because of the file format or type of file that we are using. Most photos posted on this board are scanned using .jpeg/.jpg, (pronounced jaypeg) format, mainly due to the fact that each photo must be limited to 500kb in size for attachment to a posting. (Useless information: JPEG stands for Joint Photographic Experts Group, who are the people that invented it...told you it was useless information).

This is the best format to use to create small files suitable for emailing or web pages, but it comes at a price. Each and every time a .jpeg file is edited and saved, the file is compressed using what is known as Lossy compression which literally means when the image is saved, quality is lost and cannot be retrieved. Lossy compression works to make files smaller by altering the coloured pixels (dots) by blending the pixels together, thereby reducing the number of pixels in an image and consequently reducing the size of the image.

The consequences of this type of compression are:

- detail is lost
- sharpness on edges is lost
- parts of the image can appear blurry or smudged
- your photo can have the appearance of large blocks of colours where the pixels have been merged
- colour changes occur

You might wonder why .jpeg files are used at all, the answer is simple, this format creates smaller files that take up less room on your hard drive, camera memory card etc and is the best way to email images or include on a web page. Plus as mentioned previously, we can only post photos up to 500kb in size on Roots.

**So as you can imagine, a photo scanned at 100 dpi, then emailed, posted, downloaded, edited, saved (possibly a number of times) and then re posted, a great deal of quality is lost. Providing us with a scan of a photo at say, 600 dpi gives us a lot more pixels to play with to extract, repair and sharpen, plus more detail is preserved when the image is finally re-posted.**

**CAZZA'S TIP NO. 3: If you have photos that you wish to scan that don't require restoring, emailing or loading to a website (and you have the storage space on your PC), then the best format to use when scanning photos is .TIF. Files scanned in .TIF format use compression that is Lossless, which means exactly that, no quality is lost.**

## **QUICK SUMMARY OF SCANNING DO'S AND DON'TS**

- **Do set your scanner software to scan at 300dpi or 600 dpi**
- **Do scan your image in colour mode even if it is a black and white image**
- **Don't simply make a picture bigger if requested to enlarge it – re scan it - we need to increase the number of pixels not the dimensions of the image**
- **Don't be afraid to post photos that are less than 300dpi if you have no alternative– we will still do our best**
- **Don't be afraid to ask questions or seek help from one of the restorers, we are more than happy to oblige**

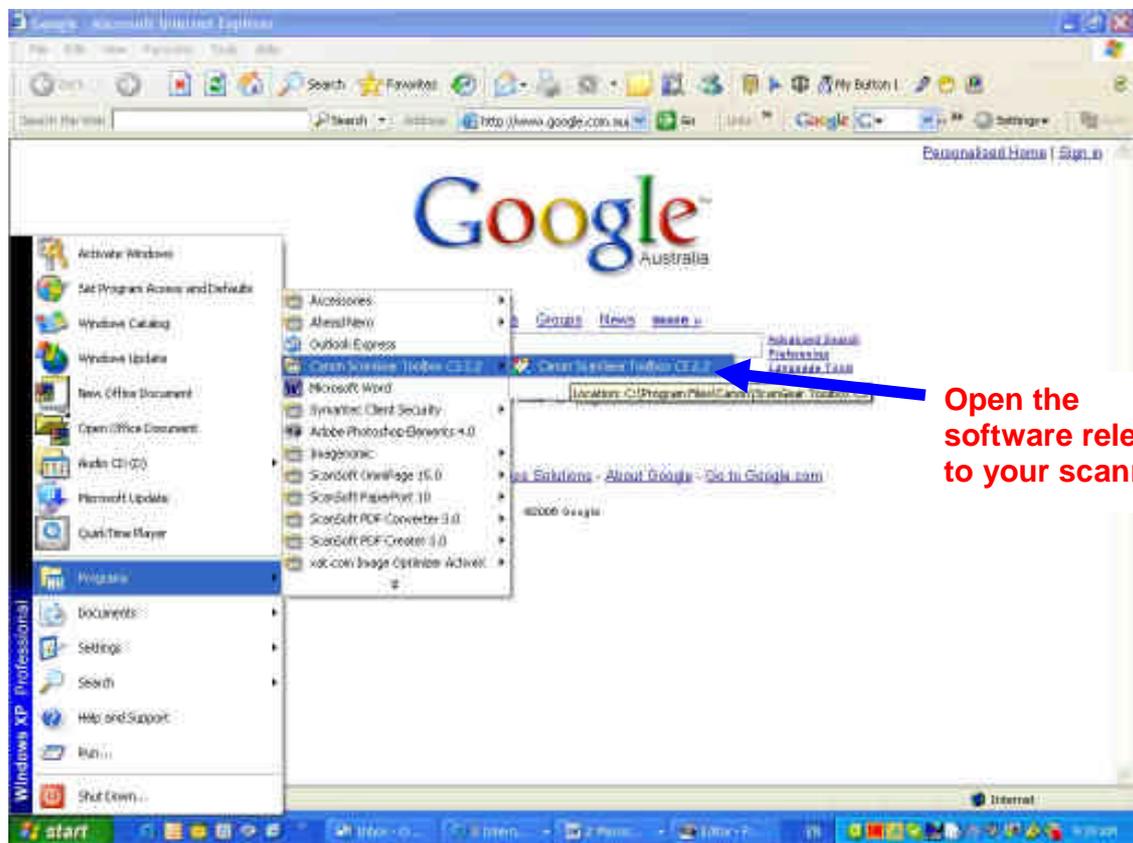
**Following is a step by step guide to scanning.**

While all scanner software is different, the concepts are the same as the following. You may have to dig around a little in your software to find the equivalent options as those described below, but they are there!

## STEP ONE

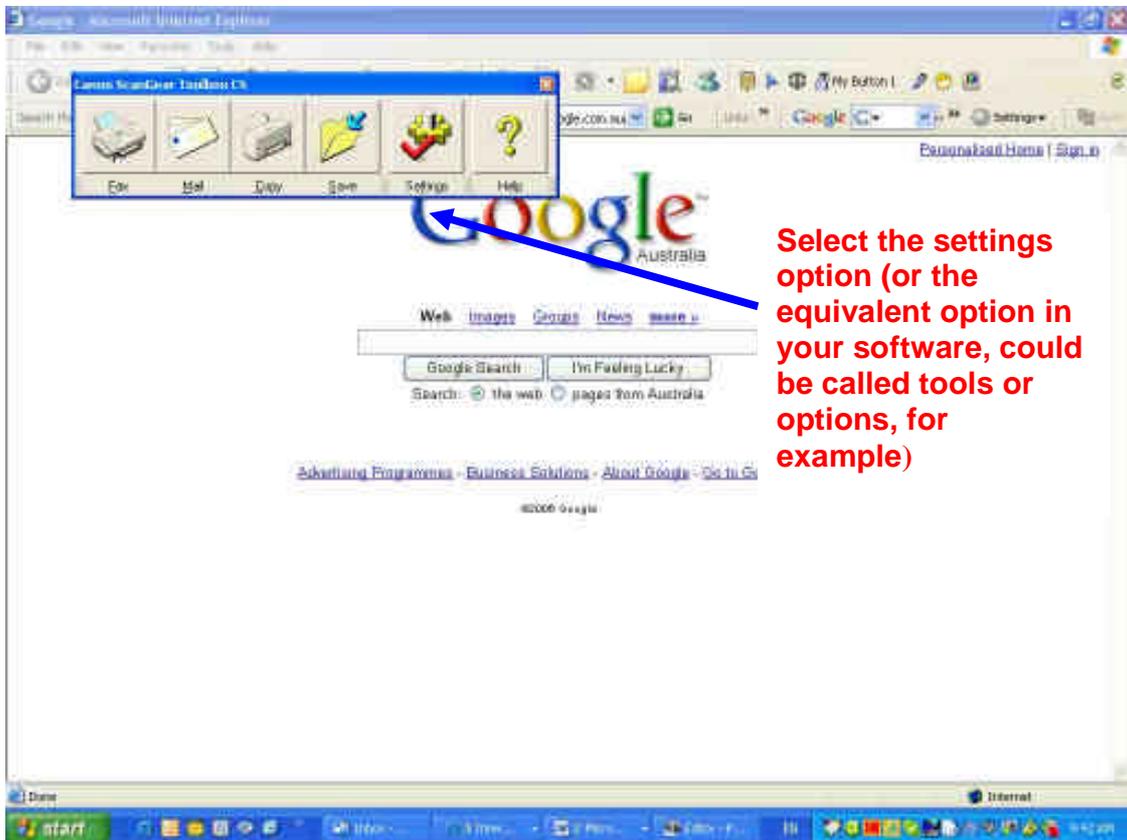
Place the photo to be scanned on the scanner (obvious I know, but would hate everyone to go through all this and then realize they'd forgotten something!!) 😊

Open your scanner software, usually found under programs. My scanner is a Canon:



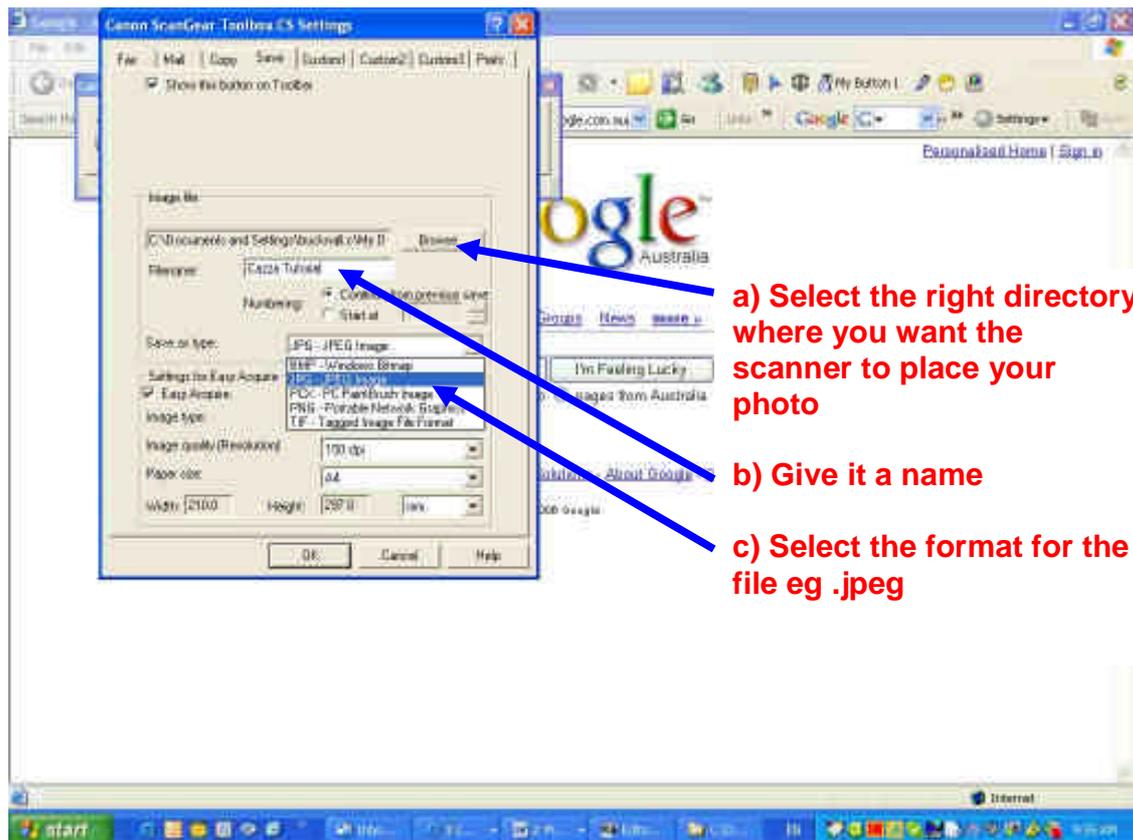
## STEP TWO

Find the tab or button that allows you to change your scanner settings



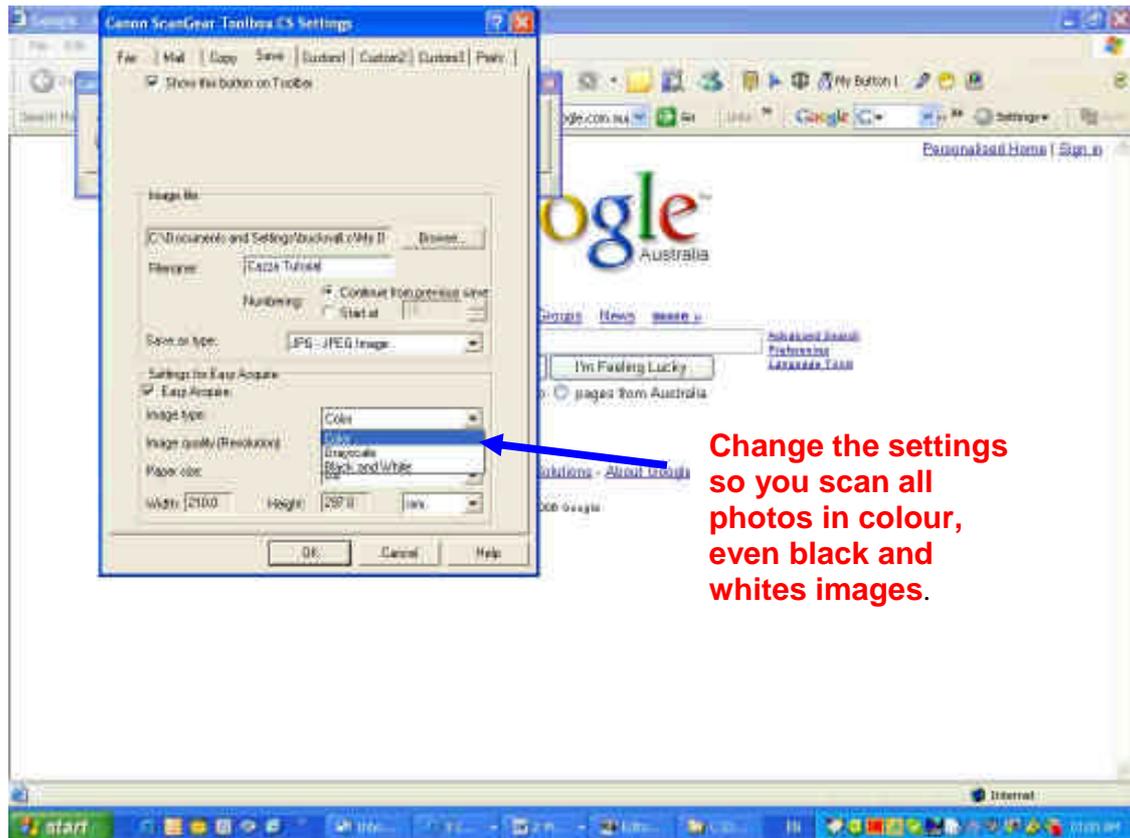
### STEP 3

Select the directory where you want the photo to be saved to and give it a name. Then locate the option that allows you to specify what type of file you want the file saved as, ie what format, in this case .jpeg



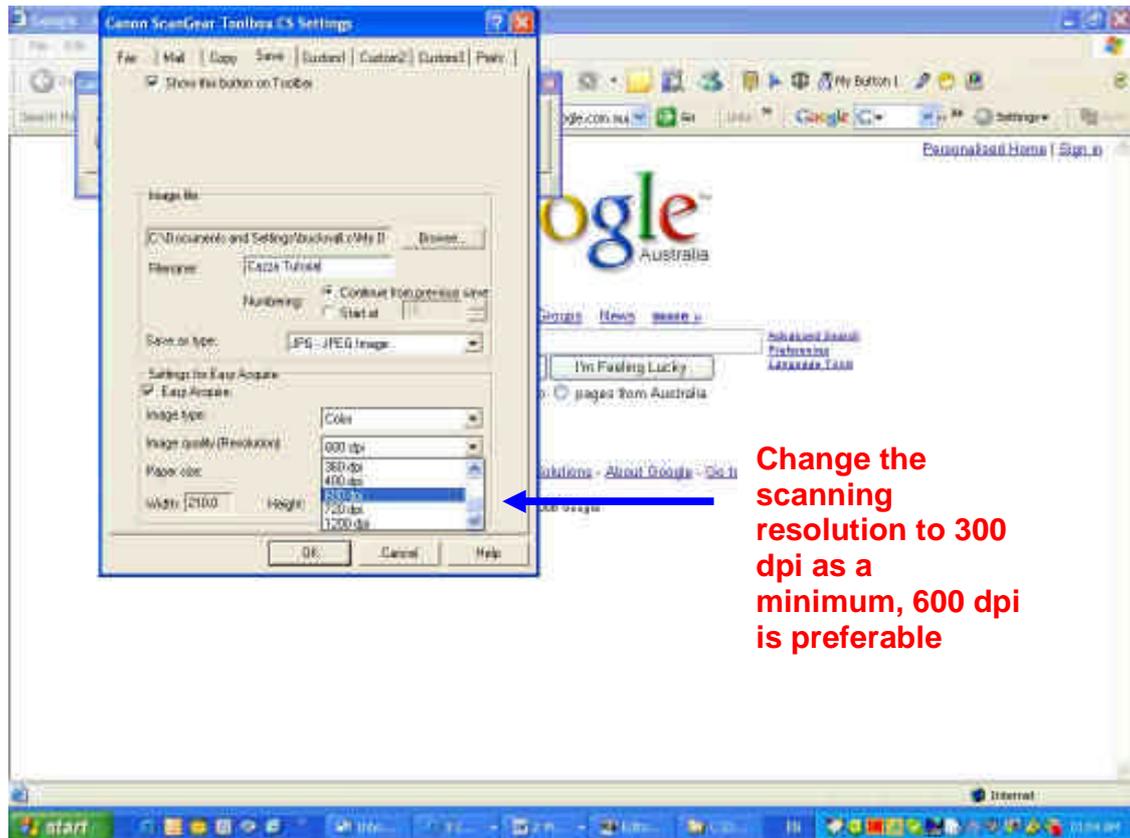
## STEP 4

Select the option to scan in colour, regardless of whether your image is colour or black and white. You will get a better scan as the scanner will interpret the grey tonings as colour and try to pick up more detail, than simply scanning in black and white mode.



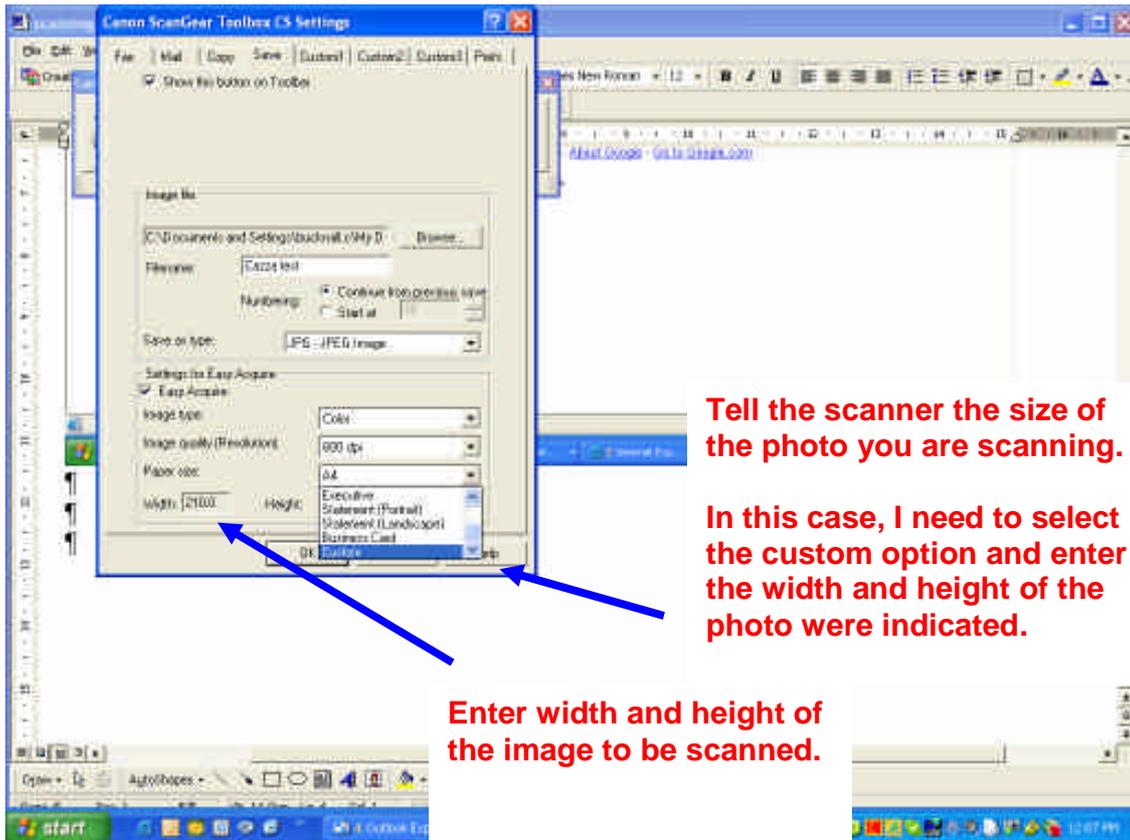
## STEP 5

Here we go folks, this is it! This is where you select the RESOLUTION or select the number of dots per inch (dpi) you want the image scanned at! Selecting 300 dpi should be the minimum, 600 dpi is preferable for photo restoration work.



## STEP 6

Tell the scanner what size the document/photo is that you are scanning. This is quite important, because if you leave the scanner setting at the default setting of A4, and your photo is only a 10 x 4, you will end up scanning the photo as well as the lid of the scanner!!! This creates a lot of white empty space on your scanned image that unnecessarily increases the size of the file and means it has to be cropped away.



The screenshot shows the 'Canon ScanGear Toolbox CS Settings' dialog box. The 'Image size' section is highlighted with a blue arrow pointing to the 'Width' field, which contains the value '21000'. Another blue arrow points to the 'Height' dropdown menu, which is set to 'Executive Statement (Portrait)'. A third blue arrow points to the 'Custom' option in the 'Image size' dropdown menu. The 'Image quality' is set to '600 dpi' and 'Paper size' is 'A4'. The 'Save as type' is 'JPEG Image'.

**Tell the scanner the size of the photo you are scanning.**

**In this case, I need to select the custom option and enter the width and height of the photo were indicated.**

**Enter width and height of the image to be scanned.**

**Hit the OKAY button and away goes your scanner. THAT'S IT FOLKS!**

Once the scanner has done it's job, find the directory where you store your photos and inspect your handy work! There, that didn't hurt at all, did it!!

I can see you all sitting there feeling very chuffed that you have now got an excellent scan, then you notice that it's 3mb in size and I hear you say, thanks a bunch Cazza, now what do I do as I can only post 500kb on Rootschat!!?!?!? Well, the next step is to resize the photo. However, when we talk about resizing, we don't mean shrinking it down so instead of being 20" x 16" it's 10" x 4", or rescanning it at less than 300 dpi. We need to reduce the size of the image WITHOUT changing the resolution (ie quality).

## **RESIZING**

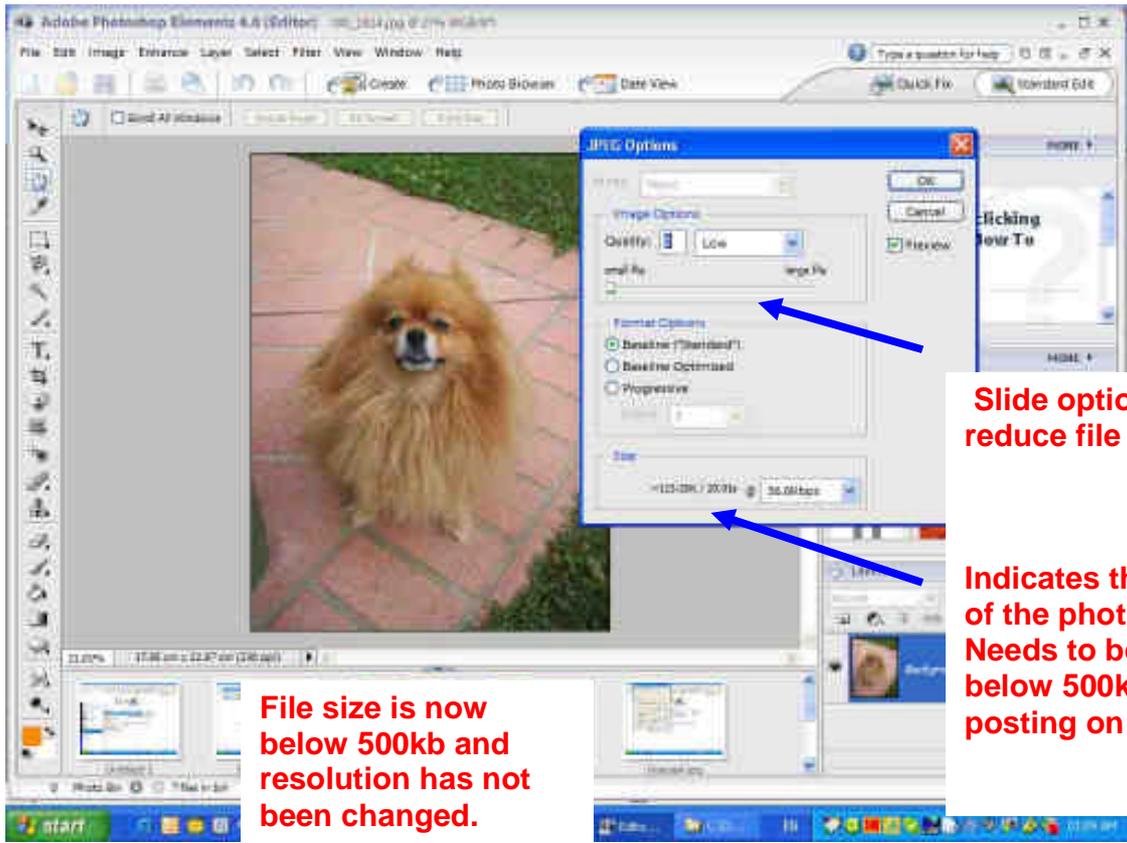
Now here's the hard part (sorry, we had to get there sooner or later). I can't give you precise instruction on how to do it as everyone has different software, the same as with scanning. All I can do is tell you how I do it using my software. Hopefully you also have photo restoration software or if not, some sort of camera software that came with your digital camera, or was included when you bought your PC, that allows you to resize photos without losing resolution. Have a dig around, in particular look under the save file options in any photo software you might have, but if all else fails, request someone on the board (eg a restorer) to do it for you by emailing them the photo and allowing them to post it on your behalf. You can buy specific software for this purpose but I guess it depends upon the amount of usage you would get from it and whether you feel it is worth spending the money.

### **STEP 1:**

**This is Adobe Photoshop Elements 4. I've opened up an image (meet Chester everyone) that was about 818kb, too large to post on Roots. So to reduce the size without losing the resolution, I simply select "save as" which opens a window allowing me to specify file size**

### **STEP 2**

**Slide the button to the left until the desired file size is obtained and then save. You end up with two copies of the file, you can either delete the larger one or keep it as a back up copy.**



**Slide option to reduce file size.**

**Indicates the size of the photo. Needs to be just below 500kb for posting on Roots.**

**File size is now below 500kb and resolution has not been changed.**

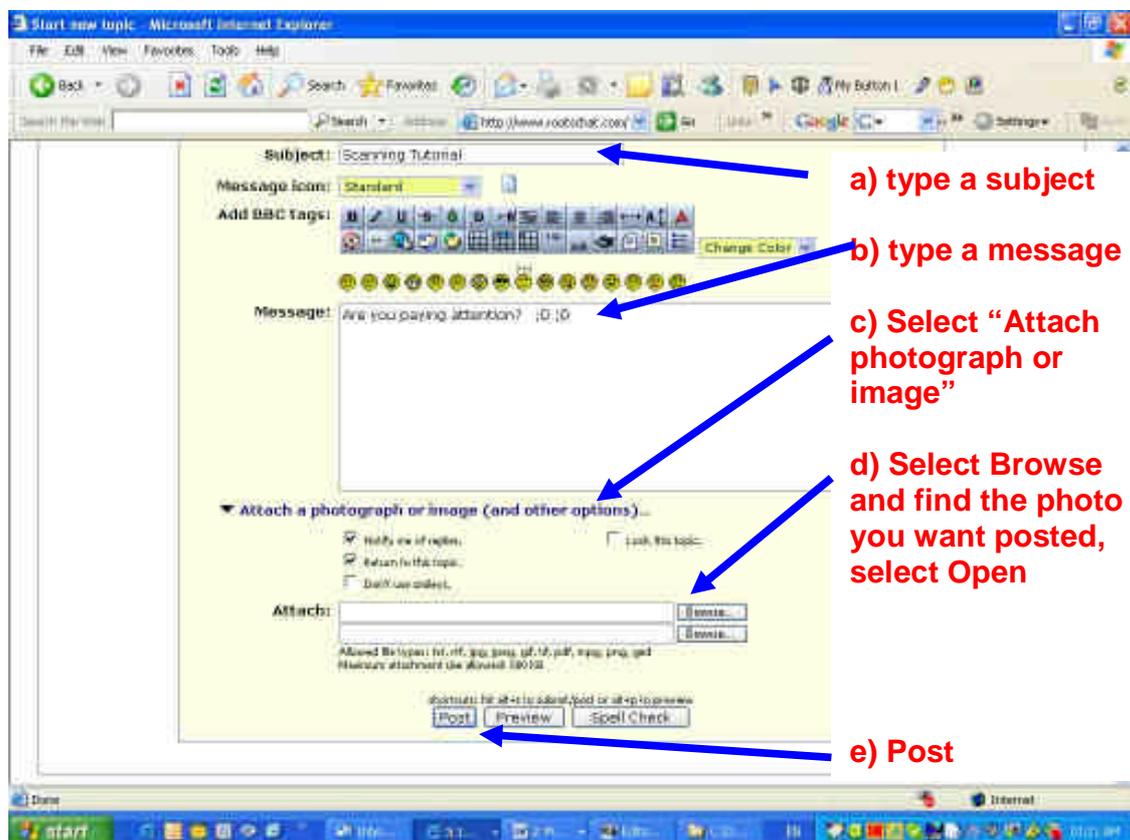
I won't even pretend to know how this works, frankly I don't care, just as long as I get the results!

## POSTING

Now you've scanned and reduce the size of the file, you are ready to post your image

### STEP 1

Simply 1) create a new message, 2) type in a subject and a message; 3) select "Attach a Photograph or an Image". A drop down menu will appear. 4) Click on the browse button to find the directory where the image you want to post is saved and then select Open. The image will then be uploaded ready for posting. 5) Hit the Post button.



**CONGRATULATIONS, YOU HAVE NOW GRADUATED FROM THE ROOTSCHAT SCHOOL OF SCANNING!!!**