Using a Scanner

*Scanning* is the process of creating a digital image from a paper document. Scanners come in a variety of configurations. The type you get depends on both your scanning needs and your budget. The most popular “type” is the Flatbed scanner.

**Flatbed scanners.**

This scanner provides a flat glass surface onto which the original is placed. The illumination and sensing elements move under the glass to scan the image. Flatbed scanners are available in a wide range of sizes, prices, and capabilities. Some flatbeds offer a “Slide” scanning adapter as an option.

**Connecting the Scanner to a Computer**

There are two things you will need, to move the scanned image from the scanner into the computer, an **interface** and **software**. The manufacturer will provide both of these but it is handy to know what you need before you purchase.

**The Interface.**

Originally the scanners connected to computers using the Printer Port (also called the parallel port). Now computers use direct connections to their processors.

**USB**

The most common and desirable type of interface is USB, which stands for Universal Serial Bus. This is a relatively new type of interface that combines the advantages of being fast and easy to set up. USB consists of a single connection similar to a telephone wire between the computer and scanner. All relatively new computers have USB ports and support USB, so be sure that you have a USB port on the back of your computer before buying a USB scanner. With some USB scanners you don't need a power cable because the power comes from the computer.

**SCSI**

Next to USB, a SCSI (Small Computer System Interface) interface is preferred. It offers excellent speed but can be difficult to set up. To use a SCSI interface scanner you must have a SCSI port on your computer. Usually this requires the installation of a separate card in the computer. This card may be provided as part of the scanner package, or you may need to buy it separately. SCSI cables are thick and unwieldy and make it difficult to position your scanner at a distance from the computer.

**The Software.**

You need a TWAIN compliant software. “TWAIN” is a standard software protocol and applications programming interface that regulates communication between software applications and imaging devices (Scanner, Digital camera etc.)
TWAIN actually stands for, “Technology (or Toolkit) - Without an Interesting Name” and was created by the TWAIN Working Group, a not-for-profit organization which represents the imaging industry. www.twain.org

**Scanning Graphics**

There are many software packages that will do this for you. Most scanners come with some sort of software like “ScanGear”. This software takes the information from the scanner and produces it on the screen. It generally does not have an effect on image quality, but can influence scanning speed.

Basically scanning pictures is a 4 step process;
   1. Use a “Preview” button to scan the object,
   2. Nominate an area you want to scan (you can also do minor adjustments)
   3. Use a “Scan” button to rescan the final product.
   4. Save the final result

Some “Paint” programs like Paint Shop Pro can tap into the TWAIN software and bring the scanned image directly into the program.

**Scanning Text**

There is special Software, like “OmniPage Pro” that will read text and produce a text document (like Word) as an output.

**Scanned Images**

Scanned images can be delivered to a number of applications such as a “Paint” program like Paint Shop Pro or Photoshop or if you want to put them in programs like Word, you can simply save them as a file, first and import them.

Before you scan you need to work out where the scanned image will end up – screen or print?

**Original Type - Colour, Greyscale & Line Art**

Within the Image Control menu (in the TWAIN software) there is generally a choice of modes, including Colour, Greyscale and Line Art. Generally the program takes an educated guess about what it is scanning and chooses a mode.

**Colour**

Colour is used to scan colour images such as photographs and artwork using RGB colour. In Colour mode you can adjust the Brightness, Contrast and Hue of the image.

**Greyscale**

Greyscale is used to scan colour and black & white originals in varying shades of grey. Using Greyscale you can adjust the Brightness Contrast of your original.

**Line Art**

Line Art is used to scan black & white images with no intermediate grey levels. Line Art is used when scanning graphs, charts, ink sketches, text documents and architect drawings or any line art that is not made up of varying shades or hues.

You can also do this in the paint programs after you import them.
Dimensions - Scale, Size & Image Resolution

Image Scale

Image Scale represents the size of your image in comparison to the original. If you reduce the scale to 50% it means your image will be scanned at half the size of the original. The Image Scale, Image Size and Image Resolution are all linked to each other. Increasing the Image Scale increases the Image Size and resolution.

Image Size

Image Size is the width and height measurement of your scanned image. You can enter a new size in both the width and height boxes. These measurements will change proportionately to each other. You can choose which unit you want to measure by - pixels, centimetres, millimetres or inches. Once again, think about your destination. If you are using your scanned image in a text document or graph, measure your image in inches or centimetres. If you are using your scanned image on the web, multimedia application or screen, use pixels.

Image Resolution

Image Resolution is a measure of how many, dots per inch (dpi), make up the image. The greater the resolution, the greater the amount of detail is visible in the image. You can change the Image Resolution by clicking on the arrow in the Dimensions menu.

Things to consider:

- Always scan for the capability of the output device. That is, choose a resolution based strictly on the needs of the device that will process your image, either computer or printer.
- Scanning techniques differ considerably depending on whether you are scanning for print or screen.

As a guide the following table shows the difference between the two:

<table>
<thead>
<tr>
<th>Properties of Printed Image</th>
<th>Properties of Screen Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>Image size is measured in inches/cm</td>
<td>Image size measured is pixels</td>
</tr>
<tr>
<td>Image size doesn’t vary with scanned resolution</td>
<td>Image size does vary with scanned resolution</td>
</tr>
<tr>
<td>Image is modified by scaling</td>
<td>Image is modified by resampling</td>
</tr>
</tbody>
</table>

Screen Resolution

When scanning for the screen we don't need the scanning resolution to be any more than 72 dpi. The reason for this is that our computer screen's maximum output is 72 dpi. Scanning at a higher resolution than 72 dpi does not increase
the quality of the image, just the file size and the physical size that the image will appear on your screen.

**Screen size image.**

Most of the time getting an image to the required screen size is all about experimenting with resolution, cropping and sometimes resampling. There is a formula that will help you work out approximately how the scanner is going about calculating it. If we scan a 6 x 4 inch photo at a resolution of 100 dpi, we will end up with an image screen size of:

\[(6 \text{ inches} \times 100 \text{ dpi}) \times (4 \text{ inches} \times 100 \text{ dpi}) = 600 \times 400 \text{ pixels.}\]

So all this calculation is doing is multiplying the real size of the image by the number of pixels/dots per inch we will scan at.

Imagine we are wanting to display the image on a screen that is 640 x 480 (current standard size) our image of 600 x 400 pixels will almost fill our computer screen. When scanning for the screen, always try and think in terms of pixels rather than inches or centimetres, as it will help you understand how small or large the image will approximately end up.