

Software specification for *iMedia Unit 1 Digital Graphics* = **Serif PhotoPlus**

# 1 Use digital sourcing hardware to obtain bitmap digital graphics material

1a Use digital sourcing hardware to obtain source graphics

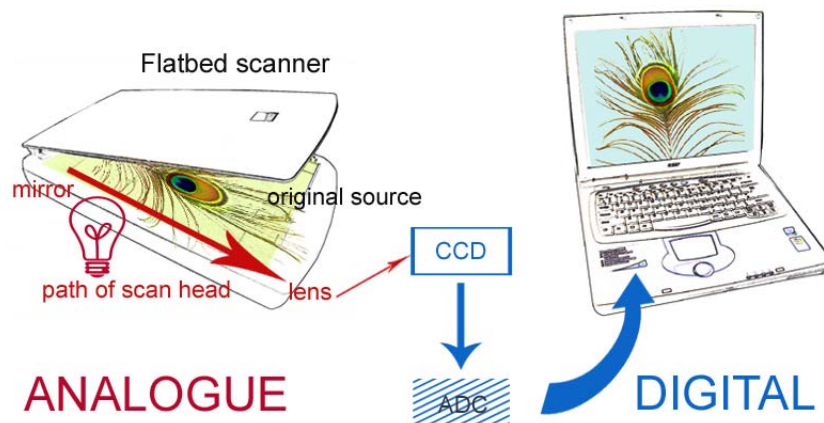


## Digital Scanners



### Fact file 1 - How it works

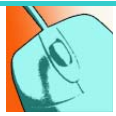
A scanner is a device that captures images, digitises them and feeds them into a computer. The object to be scanned is placed face down on the glass plate of the scanner. A lamp fixed on the scan head illuminates the object as it moves across it. An angled mirror that is also fixed on the scan head bounces the reflected image through a lens onto a Charge-Coupled Device (CCD), or image sensor like the one in your digital camera or camcorder. The quality of a scanner is determined by the number of samples that its sensor can take in one inch (SPI). The data is then directed through an Analogue-Digital Converter (ADC), which digitises it, as the name suggests. Finally, your computer needs a driver, or special software to interpret the data. This is called a TWAIN driver. Serif PhotoPlus has built in TWAIN support. Just select **File > Import**, then choose **Acquire** from the sub-menu to bring in your scan.



For a more detailed account of how scanners work with illustrations, visit:  
<http://computer.howstuffworks.com/scanner1.htm>

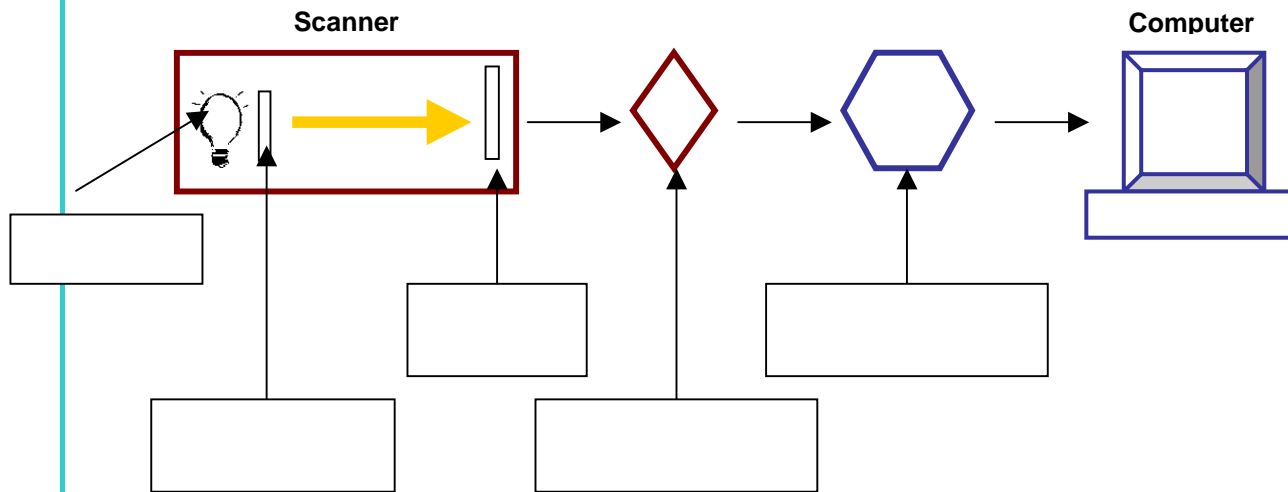
### Note -

There are two explanations for the origin of the term TWAIN. Some people argue that it stands for "**T**echnology **W**ithout **A**n **I**nteresting **N**ame". Others believe it comes from a poem by Rudyard Kipling called "*The Ballad of East and West*", in which he writes "... and never the twain shall meet ...", because in the early days it was difficult to connect scanners successfully to personal computers. What do you think?



## Activity 1

Copy this simple flow chart to explain how a flatbed scanner digitises an image, or use the prepared worksheet in the Extras section. Write the labels and save the diagram for your digital sketchbook as *1Scanner\_flowchartXXX* (replace XXX with your own initials or naming convention agreed by your ICT teacher).



**LABELS:** lens, ADC (Analogue/Digital Converter), mirror, lamp, CCD (Charge-Coupled Device).



## Fact file 2 - Scanner Types

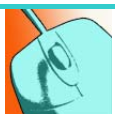
*There are four basic types of scanner: hand-held, flatbed, film, and drum.*

**Hand-held scanners** can be used when portability or size is an issue, but the quality depends on how steady your hand is when passing the scanner across the object or text. Resolution is low - around 200 DPI. However, their portability makes hand-held scanners ideal for the mobile office. With OCR (Optical Character Recognition) capability, the software converts scanned documents into editable text. Some hand-held pen scanners even have the capability of translating lines of scanned foreign text. Stores sometimes use hand-held barcode scanners for bulky items.

**Flatbed scanners** are the most popular type with consumers because of their low cost, free editing software and ease of use. Resolution is normally between 1200 and 2400 SPI. With some makes of flatbed scanner transparency adapters are available that provide an alternative light source to scan film negatives and slides, but do not produce such high quality scans as dedicated film scanners. Stand-alone scanning devices for use without a computer exist that can transfer images directly to a zip or pen drive and that can also be used as a copy machine when connected to a printer.

**Film Scanners** are designed to read images directly from film negatives or slides. Like a flatbed scanner, they digitize the source material and send the data to a computer for processing, storage, or output. However, the great advantage of dedicated film scanners is that they have superior optics, giving a higher resolution with a smaller scanning area. Resolution ranges from about 2,000 DPI to over 6,000 DPI.

**Drum scanners** are generally in use by professional printing and digitization labs for scanning transparencies, negatives, original film or flexible artwork. Their high cost, larger size and more complex technology make them unsuitable for general purposes. Unlike a flatbed scanner the light source is in the middle of the drum, while the photocell (in this case not a CCD, but a much more sensitive Photo Multiplier Tube, or PMT) is outside it. The drum rotates, scanning every point on a circle around it, and then the light and PMT move to the next line. The distance between the artwork and light source is constant because of the curved drum, which avoids problems with reflections. The resolution may be up to 8000 SPI, which is also referred to as LPI, or lines per inch for print.



## Activity 2

Use a search engine to find a picture of each of the four basic scanner types on the Internet. Copy and paste them into a Word document for your digital sketchbook, or use the prepared worksheet in the Extras section. Make a note of the cost next to each. Can you find the optical resolution? If you can, record that too: you'll learn about resolution in the next section. Save the work as *1Scanner\_typesXXX*.



## Activity 3

Four people are looking to buy or use a digital scanner for a particular purpose. Which type of scanner would you recommend in each case? Add this information to your *1Scanner\_typesXXX* document and save it.

**Case 1:** Alan is a busy sales executive who travels a lot by air and train on business with his laptop.

**Case 2:** Kaye is a successful illustrator who has signed a deal with a major publishing house for her latest children's book. She works in traditional media like ink, watercolour and pastels on paper.

**Case 3:** Jenny is a newly qualified social worker. She wants to digitize some of her old photos and slides to send to former classmates she's contacted through Friends' Reunited.

**Case 4:** Matt is an amateur photographer who is making a website portfolio of his work. He only recently switched to using a digital camera and some of his best photos are on negative film and transparency. He plans to carry on using his traditional camera as well as his digital one.



## Fact file 3 - Resolution

*Before you start to scan you need to understand something about image resolution.*

**Resolution** determines the quality of a scan: the higher the number of dots per inch (dpi), the finer the quality, but the larger the file size. An A4 scan at a high resolution and at 100% of the original size can use so much RAM (Random Access Memory) that it takes a long time for the software to apply any formatting and may even cause your computer to crash. Try scanning large originals at a scale of 50% or even less.

**Interpolation** is a process used to enhance the resolution of an image by creating extra pixels in between the ones actually scanned in. Interpolated resolution gives a misleading measure of actual resolution, making it seem higher.

**Optical resolution** gives a true measure of a scanner's capability, being the amount of information its optics can sample as the CCD moves across the image, typically 300 x 600 to 600 x 1200. When considering a scanner's specifications this is the figure to take into account.

Remember these three points:

1. Many printers have an optimum resolution of 300 to 400 DPI (dots per inch). Check yours. There's no point in scanning work at a higher resolution than your printer can output.
2. The higher the resolution, the bigger the file size.
3. For web graphics or multimedia presentations 72 PPI (pixels per inch) is adequate for viewing on most monitors.

### Note -



A typical 17-inch monitor might have a horizontal screen area of approximately 12 inches. If your screen resolution is set to 1024 x 768, then 1024 pixels = 12 inches, or 1 inch = about 85 pixels. Round the figure up to 100 for a rough calculation. If the scan is to appear on the monitor screen at the same size as the original, the resolution needs to be about 85 DPI. For a screen resolution of 800 x 600, the scan resolution only needs to be 67 DPI. 72 DPI is a good compromise. Remember DPI for print (dots) and PPI for screen (pixels).



## How to do it - Acquire a scan

You can easily acquire an image from the scanner from within **Serif PhotoPlus** because it supports the TWAIN standard. You can find a single sheet guide with screenshots in the Extras section.



## Activity 4

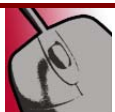
Begin to build a personal e-gallery of different types of scan that you will be able to use as elements in your digital designs in future. Start now by collecting and scanning 5 different textures that you could use for backgrounds. Think about the most suitable resolution. Will you be using the scan for print or screen or maybe both? What's the resolution of your printer? Make a new sub-folder in your *My Pictures* folder called *my\_scans*. Save all your scans to this folder with recognisable descriptive names e.g. *1Acrumpled\_foilXXX* (replace XXX with your own initials or naming convention agreed by your ICT teacher).

Here are some other suggestions for scanning: fabrics or textures, lace, patterned glass, natural objects like leaves, flowers or seeds, bus or concert tickets, confetti, old family photos or documents, scraps of wallpaper, rubbings, crumpled wrappers, packaging or foil, slices of fruit or vegetables (protect the glass with a sheet of acetate), small toys, beads or badges (cover small objects with a shallow lid painted black inside to cut out light).



## Fact file 4 - Moiré

Moiré is a term from the French word for watered silk that describes the patterned interference you often get when scanning postcards, book illustrations, newspaper or magazine images and other printed sources. Some scanning software has a built-in descreen feature to remove this unsightly pattern before opening the scan in your editing software. PhotoPlus allows you to remove the moiré effect completely.



## How to do it - Descreen moiré

You can easily descreen a moiré pattern in *Serif PhotoPlus*. You will find a single sheet guide with screenshots in the Extras section.



## Activity 5

Scan a postcard or other printed picture. Save it to your digital sketchbook as *1Amoire\_effectXXX*. Experiment with removing the pattern. Save the enhanced file as *1Amoire\_descreenXXX*.

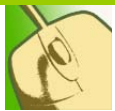


## Mini brief - Scanned collage

Make a birthday card for a friend. The design should be based on a collage of printouts from three scans that suggest your friend's hobbies or interests, or the idea of celebration in general. Use three different types of scan - a texture or natural source, a small object and a paper based source. Fix the scans onto card with glue-stick or PVA. Torn shapes are more interesting than regular ones.

Save the scans to your *my\_scans* folder for future use.

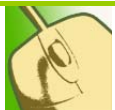
Scan the finished card and save it to your digital sketchbook as *1AcollageXXX* (replace XXX with your own initials or naming convention agreed by your ICT teacher).



## Review

Show your card to your friend and to your teacher and ask them for feedback. What do they think is good about it and what could be improved? Make a note of how you might make changes to the design in response to their comments.

Download a blank feedback and review form to use and save it to your digital sketchbook or project folder as *1AreviewX XX* (replace XXX with your own initials or naming convention agreed by your ICT teacher).



## Self-review

Complete **1a Digital scanner** in the **Part 1** skills and evidence checklist you can find in the Extras section below. How much have you learned about using a scanner? Is there anything you are still unsure of? Save the document for your digital sketchbook or portfolio as *1skills\_evidenceXXX* (replace XXX with your own initials as before).

