University Archives & Special Collections Regular Scanning Settings

This document will provide the optimum settings for the digital output of remediating material from the archives using regular tabletop scanners.

The general accepted principle is to scan at a very high resolution to create an uncompressed archival quality file in order to avoid the necessity of handling the document again; therefore, we will always be scanning at "archival quality" with the option for making derivatives programmatically for access copies.

File type: Always scan as TIFF (tagged image file format): this is an uncompressed format (there are some forms of compression available for TIF files, like LZW, but **do not use any compression**) that stores information for every pixel; TIFF files will be *preservation copies*. JPG and other formats have compression algorithms that shrink file size, but also lose information (called lossy compression). JPGs or PDFs can be created programmatically afterwards as *access copies*.

Resolution: Current standards of practice suggest that a target resolution for normal size items is whatever achieves 4000 pixel along the long-side of the image. This means that the DPI (dots per inch) is variable depending on the size of the original object. When using standard software (i.e. Epson) draw your marquee tool around the preview of the image; it will display the current pixel count at the bottom of the preview screen. If it is too large or too small you can adjust the DPI from the drop down box to achieve 4000 pixels. Sometimes due to large jumps at higher DPI ranges (if scanning small material) it is acceptable to go just below 4000 pixels instead of way over (i.e. 3800 pixel on the long edge at 1200 dpi versus 7600 at 3600 dpi). The reason for these jumps in DPI is called interpolation (explained below).

Exceptions: Certain bigger artefact sizes will require more pixels on the longer edge (Because the ratio of document size to digital size will be too small if kept at 4000 for the larger items).

- If an photograph object is much larger because of the matting/frame scan the whole thing, but adjust the specs as if scanning for just image (i.e. so the image itself is 4000 pixels on long side – the entire scan might be many more pixels on long side)
- If the image is 8" x 10" up to 11" x 14" scan the long side at 6000 pixels (likely 600 DPI)
- If the image is larger than 11" x 14" scan the long side at 8000 pixels (11"x14" would be 720 dpi – a slightly larger item might be 600).
    - Note: very large items would be scanned on the over-size scanner at 300 dpi
- For negatives 4" x 5" up to 8"x10" scan the long-side at 6000 pixels (4" x 5" = 2400 dpi and 8" x 10" = 800 dpi. 1200dpi likely for stuff in-between)

- For negatives larger than 8"x10"scan the long side at 8000 pixels (probably 800 dpi, possibly 600 for larger ones, which are also likely rare)

Interpolation:

"Best practice often recommends that a scanner be set at its native resolution – being its highest optical resolution – or at a setting equally divides into it to minimize interpolation (see table below for settings for common scanner optical resolutions). Scanners should not be set above the optical resolution even if the software allows it, as all those settings will be interpolated." – From DigitalNZ.org

Interpolation is when the step-motor of the scanner cannot move at the desired increments to achieve a requested DPI. That is, a scanner with a native 4800 dpi resolution can only move 1/4800 of an inch at a time. Therefore, it can achieve resolutions that divide into 4800 evenly: 2400, 1600, 1200, 800, 600, 400, 320, 200, 100, 60, etc. If one attempts to put in an arbitrary resolution, say, 1400 dpi, which the scanner cannot do (i.e. cannot move at 1/1400 of an inch) then it will in effect simply guess the extra pixels which will do two things: a) introduce information not present in the original and b) increase file size with no improvement of quality. To avoid interpolation simply use the drop down box available on most scanning software.

Sampling settings that minimize scanner interpolation:

6400ppi optical scanner	4800ppi optical scanner	4000ppi optical scanner	3600ppi optical scanner	2400ppi optical scanner
6400	4800	4000	3600	2400
3200	2400	2000	1800	1200
1600	1600	1000	1200	800
1280	1200	800	900	600
400	960	500	720	480
320	800	400	600	400
	600		450	300
	480		400	
	400		360	
	320			
	300			

Digital resolution:

Apropos to above, options in the dropdown for standard scanning software (like Epson) usually will include vert high resolutions (i.e. up to 12800dpi) that are *digital* not *optical* resolutions, meaning that the software is adding more pixels, not the scanner itself. The scanners maximum optical resolution is the highest that should be used. Common (as of 2016) for normal scanners is 4800 dpi, though some may be 2400 dpi.

Colour Depth: Colour depth is the amount of available colours in order to achieve color accuracy with the original. We use the highest colour depth available for our equipment: 48-bit (16 bit per channel, red, green, and blue [RGB]). This doubles file size over 24-bit (8 per channel) but offers more accurate colour representation and more overhead to adjust parts of the image (like alpha space). If doing greyscale, choose 16-bit grey scale.

NOTA BENE: it is often useful to scan seemingly greyscale images in colour to see variations in colour (if its orangish, or bluish grey) that gets wiped away in a grey scale color mode, and any imperfections/writing on the image itself that are in colour will also get changed. For large projects this will typically be decided beforehand.

Other Considerations: Typically it is improper to use things like dust removal and unsharp mask as this allows the software to interpret the image and change it. There are some examples where it is hugely beneficial, however, including using unsharp mask on scanned newsprint or certain transparencies on the flatbed, like 35mm slides, though they should be scanned on the automated slide machine.

Examples:

- 35mm Slide: Scan at 4800 dpi if doing on a flat bed (or 5000 if doing on the Braun automatic scanner) – 2400 is a little small and ~3000 would be an interpolating error
- 4" x 3": 2400 dpi
- 4" x 6": Scan at 720 or 800 dpi
- 5" x 7": 600 dpi (barely) or 720 dpi
- 8.5 x 11" (letter size): Scan at 600 dpi
- 8.5 x 14 (legal size): Scan at 600 dpi

There are two main types of scanning, reflective and transmission (i.e. film).

Scanning Procedure:

Reflective Scanning:

• If your scanner allows for transparent scanning make sure the document cover is in the top of your scanner lid (The white reflective plastic). If you are unable to find it, or your scanner didn't have one, use a thick piece of white paper. This prevents bleed-through or opacity in the scan in things like carbon paper.

• Encapsulated items should be removed from their sleeves if possible. If glare is an issue they should be reconsidered for digitization or, if necessary, digitized with a DSLR camera or the i2S oversize scanner

• Items featuring embossed or wax seals should be digitized on a scanner set to use one directional light if possible

• Place the object on the scan bed with the edge of the item next to the arrow at the corner of the scan bed, which indicates is the proper place for the object (if possible). Otherwise put it up against a corner or edge of the bed. This will help to straighten edges.

• Close the lid. This will reduce glare. If object is large or delicate closing the lid may not be an option. If the scans are too faded, glare occurs, or is otherwise compromised, consider a digital camera as source for digitization.

• Make sure the "thumbnail" box is NOT checked off (if using software that has it);

Hit preview; After a preview of the image comes up, use the size selector tool to highlight only the desired size of the image. Generally the long-side of the image should be 4000 pixels. If, after the size-selector tool is adjusted the number of long-side pixels is too small or too big adjust the drop down menu for DPI (dots per inch) to either higher or lower until the number is above but the closest possible to 4000 pixels. If, due to interpolation the choice is either very close to

4000 but below or quite a bit above 4000 you may choose to be slightly below 4000 for storage space considerations. Interpolation is explained below.

• Exceptions: Certain bigger file sizes will require more pixels on the longer edge

(Because the ratio of document-size to digital size will be too small if kept at 4000 for the larger items).

If a photograph is much larger including the matting/frame scan the whole thing but use the specs as if scanning for the smaller image (i.e. so the image itself is 4000 pixels on long side – the entire scan might be many more pixels on long side)

If the image is 8" x 10" up to 11" x 14" scan the long side at 6000 pixels

If the image is larger than 11" x 14" scan the long side at 8000 pixels

Transmission Scanning [aka Film Scanning]:

• Select positive or negative depending on the orientation of the object. Always scan in colour if possible, for greater grey tonal variation and to catch any irregularities or hand-coloured touch-ups.

• When transmission scanning make sure the emulsion (chemical) side is up, if possible; if you are using slide holders that they are placed correctly into them.

• Make sure they are entered straight and the slide holders are properly placed onto the scan bed, as crooked scans may result. Remove the white reflective screen from the scanner lid.

• To reduce flare in both positive and negative transmissions scanning, cover the scanner glass so that only the area of the item being scanned is exposed. Using slide cradles will help this as well

• Use compressed air to remove any dust. If there is any other substances you may use a cleaning cloth if the negative is in good shape to attempt to remove it.

• Click "preview" – this will quickly show what the final scan would look like

• If scan previews look incorrect (ie. out of focus, colours way off, etc.) check to make sure the slides are in the holders correctly (including having the proper orientation), the holders are in the proper place on the scan bed, and that the scan mode/type is set to transmission or film scanning. Even if the images you have do not perfectly fit in scan holders, you may want to use some anyway if they can hold the image on at least 2 sides to prevent curling/warping etc.

• If you are using the slide or negative holders then perfectly sized previews should show in the window. Make sure they look correct before continuing.

• If you are not using them and the image shows up very small then surround it with the size selector tool and click "zoom" which will re-preview the item much larger. Then you can set the image size selector to take only the desired portion of the image to be scanned.

• Also, if possible/desirable, you may include a small sliver of black along one side of the negative to show the dark black side for improved contrast/colour density.

• Use things like text, body language, or other clues as to whether the transparencies might be backwards: flipping the image in post-production is not ideal.

• Make sure the preview has a long edge (i.e. the bigger number) of 4000 pixels (for large exceptions see below). If the number is too small or too big adjust the drop down menu for DPI to either higher and lower until the number is closest possible to 4000 pixels. Ideally err on the large size, unless file size is an issue.

• Make sure to select TIFF (make sure to select uncompressed if there is an option)

Click "scan."

Scan sizes: For 35 mm up to 4"x5" negative film (Generally 2800 DPI for 35 mm up to

800 DPI): 4000 pixels across long dimension, excluding uninformative borders;

For negatives 4"x5" up to 8"x10" scan the long-side at 6000 pixels

For negatives larger than 8"x10"scan the long side at 8000 pixels