

The Truth about Turbo Scanning

Many large format scanners are extremely slow if scanning in color at the full optical resolution. The explanation for the entry level CIS scanners is quite clear since they take three lines with different colored illumination per scan line. This can only be accomplished if the scanning speed is reduced by a factor of three, compared to grayscale or binary scanning.

The explanation of various throughput speeds in a high end CCD type scanner becomes more complicated. In general, scanning with three or four cameras at the same time could be as fast as scanning on a normal midrange sheet feed scanner because all cameras, as well as each individual color, run in parallel. As long as the electronics behind the cameras and the interface used are not a limiting factor, there is no reason for any speed penalty if switched between binary, gray scale or color scanning.

Still, there is a huge difference in speed versus color depth with all scanners currently on the market, except our own scanners. Most vendors do not even list scanning speeds at full optical resolution because they are afraid to list top speeds like 0.2 inches per second at 600 dpi color. To overcome this problem, some scanner manufacturers list speeds at half the vertical resolution, such as 400*200dpi; the latter being the resolution in the transport direction. This technique was invented with fax machines many decades ago to overcome the bottleneck of bandwidth limitations on telephone lines. The reduction of the vertical resolution by a factor of two (200*100dpi) is of little visible effect, if a text using Latin characters is scanned in portrait mode. The reason for this is the fact that there is a lot more information in the appearance of Latin characters in the horizontal direction than in the vertical direction. Most fax users know that they have to go to "high resolution" (200*200dpi) if they want to fax other content; i.e. drawings or images. There is obviously no reason to assume that horizontal lines in a drawing are twice as wide as vertical lines and that they can be scanned at 200*100dpi without degradation.

Thanks to the marketing department of some large format scanner vendors, this reduction in the vertical scanning direction is now referred to as **turbo** mode. The word turbo was created because these scanners, similar to almost all other scanners, scan faster (or, better said less slowly) at reduced vertical resolutions.

Our conclusion to this scenario is the following:

If you own a scanner which has these throughput limitations and if you want to scan documents with Latin characters in the portrait orientation, change to turbo mode. In all other cases, avoid the low vertical resolution turbo mode.

If you own an Image Access scanner, the speed at the full resolution is very likely much higher than the turbo mode speed of most competitors. We have therefore decided not to implement the turbo scanning modes.

We do not recommend using the resolution-limiting turbo modes. Our speed at full resolution is higher than the turbo mode on most competing scanners.