

The Digital Coach™

Easy-to-understand training in Digital Imaging & Color Management



Banding on Imacon/Hasselblad Scanners

To understand how to troubleshoot the scanner you need to understand how it works. The scanner contains a CCD with 3 rows of 8,000 pixels. Each row is filtered Red, Green or Blue. That is a single row of red, a single row of green and a single row of blue pixels. As the drum rotates, it captures a stripe of info containing the three rows, groups the data into RGB pixels and transfers those to the computer, rotates the drum, captures another row etc.

The first step of troubleshooting is to determine the direction of the banding. Was it in the direction of travel, vertical band or across the image, horizontal band?

Horizontal bands are the result of data lost in transfer to the computer. If you look carefully at your scan and zoom in, you will see the missing row of pixels. Most of these occurred on the SCSI machines and could be cured by unplugging and replugging the cables. That works because it tends to wipe the cable connections clean. In more stubborn cases polishing the contacts with an eraser should do the trick. If that doesn't work try another cable. The most severe case would be a defective motherboard not transferring the data.

Vertical bands can be more complex. Is the band in focus? Most often the artifact (band) is caused by something blocking the light from reaching the CCD. This could be dust on the lamp, dust on the lens, dust on the CCD (rare) or dust on the film. It can also be just not enough light reaching the CCD.

One of the things you can do is to scan an empty frame both as a positive and as a negative. Better yet, you can also scan a piece of neutral density filter or a colored gel. The color is not too important, but a constant density is. A filter in negative form that makes the color of the sky is good as that is where the artifact usually appears. You could make one by photographing a backdrop paper the color of the sky. This will generally let you see the band and eliminates the film as the cause.

I recently discovered something that may be a factor. When you scan as a negative, either as a color or a B&W neg, the Setup could shorten the dynamic range and affect your result. You can see in the Histogram that de-

fault settings may clip some of the image. The way the color correction works, this may also affect your result.

Another technique I like to use is to scan a 21 Step Sensitivity Scale. This is a transparent gray scale with 21 different steps. I insert mine into an opaque material and put it in my 4 x 5 holder. I scan with the RGB Standard Setup. I can also scan it as a negative. That will show me the compressed dynamic range. If banding occurs, I can see at which density. Remember, the cause is usually a lack of light reaching the CCD. So that would be in the highlights in a negative and in the higher densities or shadows in a transparency.

If the cause is dust on the lamp or lens it would be out of focus. If on the CCD it will be more sharply focused. Cleaning the lamp is straightforward, the lens is just like your camera lens as far as cleaning it. The CCD rarely need cleaning as it is mounted pointing down and dust usually falls off. If yours should need cleaned, treat it like a camera lens.

Most lenses had an acetate filter and an infrared filter on the rear of the lens that corrected the color temperature of the lamp to the optimum color temperature of the CCD. These filters are acetate and some warped with age or deteriorated in some fashion. They were cut from squares to fit the lens. Various ones were used at different times, maybe to match a bath of CCD's, which were made by Kodak. The filter stock is still available at some pro camera stores, theatrical lighting suppliers and scientific suppliers. Some users on this thread have removed them altogether. This will cause a color shift that needs correcting. This might be done with a custom setup. There are filters available in glass to replace the acetate one.

The very worst vertical band is caused by a dead pixel in the CCD. this will show up as a colored stripe always in the exact same place in the image. You can zoom into 100% and see it. The fix is a new CCD. This is not generally a do it yourself job.

Problems with drum rotation can cause a horizontal artifact in your image. Generally this is a blurred section where the drum jumped or slowed down. The best test is

to remove the drive belts and rotate the drum by hand, it should rotate smoothly. See the Tutorial on Drive Belts and Bearings for how to check it out and repair.

There is a calibration procedure you should do for scanning reflective originals. This procedure is in the users manual and involves scanning a white sheet provided with the scanner. If you don't have the factory target you can use a sheet of white paper. This procedure evens out the light from the lamp. As lamps age they darken on the ends and you lose light output.

Your scanner is a very rugged machine and with a little care will last many years. Parts that were manufactured by Imacon/Hasselblad are getting scarce. Those items that were 3rd party, for the most part are still readily available. Give it a little TLC and you will be happy.

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