

Colour banding

Posted by schrauber - 05 Dec 2019 23:47

Edit:

Hello.

We are currently experimenting with different effect to reduce different types of color banding.

The effect " [Artifacts-blur](#) " reduces color banding, which is visible due to compression artifacts in imported low-quality material. Or when a color correction has increased normal 8-bit banding. Applicable also in the case of **strong banding**.

The effect " [Uncontour](#) " reduce colour banding by position dithering (diffusion, generates image noise). This can also reduce the minimum 8-bit color banding that is sometimes visible on 8-bit monitors. This may require a high bitrate export, which needs to be tested.

Applicable for **light to medium banding**. in case of strong banding, a combination with artifact blur may be useful (blur at the beginning of the routing, and dithering at the end of the routing; for color correction in between, at least 16-bit GPU precision is recommended).

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Re: Colour banding

Posted by jwrl - 06 Dec 2019 03:35

I've split this into its own thread, since it's really about a developing a specific effect, and hopefully we'll get a lot more responses if people know what this is about. And as promised, here's my first test combining Tenderizer and Dithering_test02.

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Re: Colour banding

Posted by G0bble - 06 Dec 2019 03:52

Do you need sample footage to test your effects? I can upload some raw protune clips of 10secs each that really need to be pushed with the color grading controls - when the banding appears. I am not sure banding would appear on ordinary footage that is only mildly tweaked normally...

let me know

G

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Re: Colour banding

Posted by jwrl - 06 Dec 2019 04:25

Download schrauber's and my effect and try them. If you haven't, follow the instructions in [CUSTOM EFFECTS INSTALLATION](#) to install them. They won't harm your computer and you can easily remove them if they don't do what you need.

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Re: Colour banding

Posted by G0bble - 06 Dec 2019 05:19

jwrl wrote:

Download schrauber's and my effect and try them. If you haven't, follow the instructions in [CUSTOM EFFECTS INSTALLATION](#) to install them. They won't harm your computer and you can easily remove them if they don't do what you need.

That I will tomorrow. I meant it for the effects developers to quickly test if it works or tweak the effect further ..

Cheers

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Re: Colour banding

Posted by hugly - 06 Dec 2019 05:46

Just I side note: I gather G0bble intends publishing on Youtube, if finished and well working, the effect should be optimized for the Youtube encoders.

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Re: Colour banding

Posted by schrauber - 06 Dec 2019 07:47

EDIT:I edited parts of the original text and moved them to the first post.

G0bble wrote:

Do you need sample footage to test your effects? That might be helpful, thank you.

jwrl wrote:

.. And as promised, here's my first test combining Tenderizer and Dithering_test02. Thanks, I'll test it later.

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Re: Colour banding

Posted by schrauber - 06 Dec 2019 21:18

jwrl wrote:

... And as promised, here's my first test combining Tenderizer and Dithering_test02.

Applied to the [underwater images](#) , these settings seem to give good results (slight noise):

When using other material with true 8-bit color depth, without compression artifact, a threshold of about 15% seems to be sufficient to simulate a fake color depth > 8-bit by diffusion.

(I tested it with the color grading effect at 8-bit GPU precision.)

In my tests, the results were similar to those of the Dithering_test02 effect if the settings were adjusted accordingly. Partly, the included Tenderizer had little visible effect on areas not exposed to diffusion. I couldn't form an opinion whether this would have a positive effect on the overall impression (with the material I used).

We are looking forward to the results of other testers ...

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Re: Colour banding

Posted by jwrl - 06 Dec 2019 21:35

schrauber wrote:

the included Tenderizer had little visible effect on areas not exposed to diffusion.

Thanks. That's actually by design. The theory is that the dithered pixels have higher density at the contour boundary. The spline interpolation then takes over, and gives a controlled colour mix of those pixels to produce a new intermediate colour which will vary with the dithered pixel density. While you may not see the result as clearly in preview, when you encode the sequence using MP4 or similar the image quality should improve, because you will be dealing with a more evened out dither noise pattern.

Where the contour is actually a single bit difference the difference it makes will be less obvious, but where the contour has developed as a result of strong grading it will be more effective. If you check out the vector scope as you adjust the settings you should see the gaps in the waveform fill as you adjust chroma interpolation.

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Re: Colour banding

Posted by jwrl - 07 Dec 2019 01:47

Ok, I've downloaded the underwater scene and experimented with various settings. I ended up pushing things a little harder than you did, schrauber. I first adjusted the mask settings until I had the blue area as clean as possible. This gave me a threshold setting of 100% and a radius of 28.4%, which I rounded to 30%. I then turned the mask off and checked the image. As expected the dither noise was quite visible.

I next adjusted the chroma interpolation to minimise that noise. With those settings I determine that 73.29% gave a subjectively appealing result, so I rounded that to 75%. I chose not to adjust the image sharpness from the default 50% at all. The end result preserved detail on the fish while giving a very smooth blue gradient background. There was some slight softening of detail in some of the rocks with those settings, but I felt that would be unnoticeable to anyone who had not seen the original.

In short, with those settings the contouring was gone, but the image was preserved. I haven't posted the result because the only way that I could get the forum software to accept it would be to export it as a JPEG and that would add artefacts that would mask what I'm trying to show. However set the effect to 100% / 30% / 75% / 50% and you will be able to duplicate what I'm seeing here.

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Re: Colour banding

Posted by jwrl - 07 Dec 2019 02:04

I've taken my PNG export from Lightworks into Photoshop and exported it as JPEG with minimal compression, baseline optimised. This gives an idea of the result, but the original is better. It's worth your while testing it yourself. Right click on the image and get your browser to show the link in a new tab to see it full size.

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Re: Colour banding

Posted by GObble - 07 Dec 2019 02:12

Here are two UW AVI files - one original protune raw footage converted to AVI from mp4 in Resolve, and another color-graded. This example is pointing into the sun so color banding is inevitable due to sensor limitations and 8bit format I guess...

The graded file is 1GB and QFHD as LWKS does not allow QHD 2560x1440 exports. The AVI is +700MB.

drive.google.com/file/d/1d9QWuDwkmBMIFd2exlV0qgHGzG8rLAKj/view?usp=sharing

drive.google.com/file/d/1r6pZKkvEhJbXVSSrLfU1CWz1P3E1eGGQ/view?usp=sharing

HTH

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PS: I have no use for this footage, anyone is free to use it as a benchmark for testing their grading effects to mask the banding and publish freely the results on the Internet.

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Re: Colour banding

Posted by jwrl - 07 Dec 2019 02:53

A tool that could help to create contoured video is in the zip file attached here. I have no intention of releasing it, so it's pretty rudimentary. It's what I've been using to generate test images. It allows you to enforce various bit depths from four to eight. So far I haven't been able to correct the extreme contouring produced by the four bit setting.

I also make no claim as to sampling accuracy with this tool. I was more interested in generating contours than achieving bit depth precision. Replacing the integer presets with a fader might give you more control, but it did what I wanted at the time and I haven't bothered doing anything more than adding the Notes parameter before zipping it.

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Re: Colour banding

Posted by schrauber - 07 Dec 2019 10:30

jwrl wrote:

.. The theory is that the dithered pixels have higher density at the contour boundary. The spline interpolation then takes over, and gives a controlled colour mix of those pixels to produce a new intermediate colour which will vary with the dithered pixel density.. Would it make sense to selectively apply spline interpolation only to areas affected by diffusion?

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Re: Colour banding

Posted by schrauber - 07 Dec 2019 11:24

G0bble wrote:

Here are two UW AVI files - one original protune raw footage converted to AVI from mp4 in Resolve, and another color-graded.

The graded file is 1GB and QFHD as LWKS does not allow QHD 2560x1440 exports.

Thank you.

Is "Banding-Test-Sample-01-**QHD**.avi" the file you imported into Lightworks?

"Banding Test Sample-01-**QFHD**.avi" you seem to have exported with Lightworks. Did you do the color correction with Lightworks? Have you already applied an effect to it to reduce color banding?

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