PFClean 2.1 Tutorial

Defect Map

Introduction
This tutorial describes how to automatically fix errors in a clip that contains a Defect Map generated by a scanner.
This tutorial comes in two parts: the first describes how to clean up the entire clip using spatial information only. The second part describes how to cut the clip into sections and clean using temporal information to provide a more accurate fix.

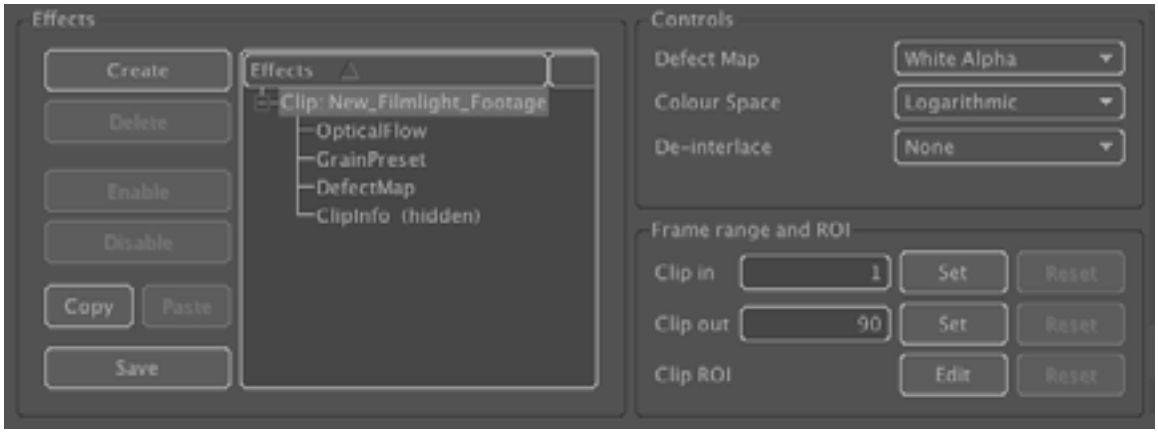
Download Footage
This tutorial requires you to download and uncompress the following footage to an easily accessible storage location: http://www.thepixelfarm.co.uk/Footage/New_Filmlight_Footage.tar.gz

Setting up footage
Load the "####.dpx" clip by dragging the folder into the media bins from the file browser.

Loading a clip into the 'Edit' tool
Drag the tutorial clip into the media bins, click on the clip with the left mouse button and press "Select" (or shift-double-click with the left button) to start editing and switch to the clip panel.

This clip contains 3 shots, with a defect map in the alpha channel. First of all, we need to tell PFClean that this clip contains a defect map, so change the "Defect Map" control to "White Alpha". This indicates that defective pixels are represented by a value of "1" in the alpha channel (use the viewer RGBA controls to confirm this).

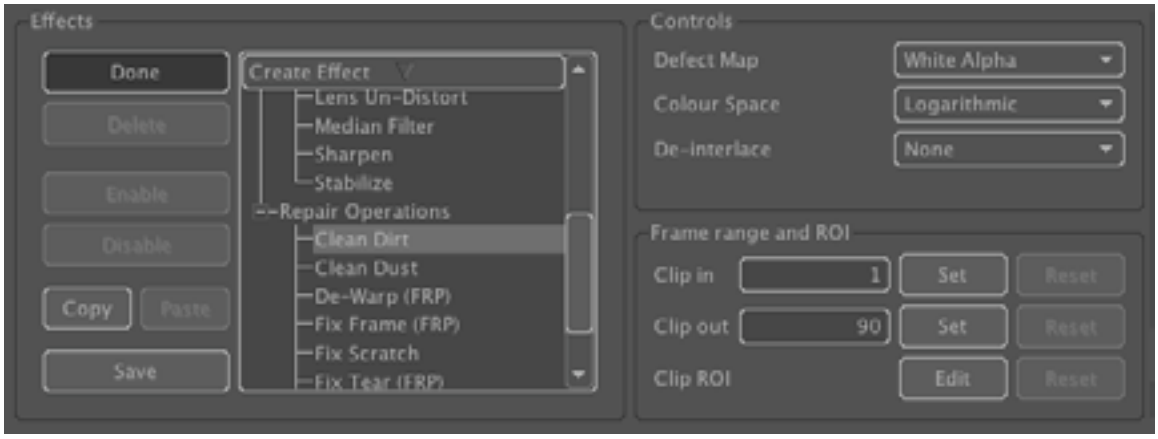
This clip is also in log space, so whilst in the clip panel, change the "Colour Space" option to "Logarithmic". This will help PFClean to improve the accuracy of operations applied to the clip.



Fixing the defect map spatially
There are two methods available for fixing a defect map: using Spatial or Temporal information. Spatial fixes use information from the current frame only, and Temporal fixes use information from preceeding and following frames.

In the case of a spatial cleanup, fixing one frame does not require information from any other, so we can fix this entire clip at once even though it actually contains three separate shots.

In the clip panel, click "Create" to show the list of available effects. Scroll down to find "Clean Dirt" (it is located in the "Repair Operations" section of the list) and click it with the left button to create a dirt effect. The "Create" button has changed labels to "Done", so click "Done" to stop effect creation and switch to the dirt toolset.

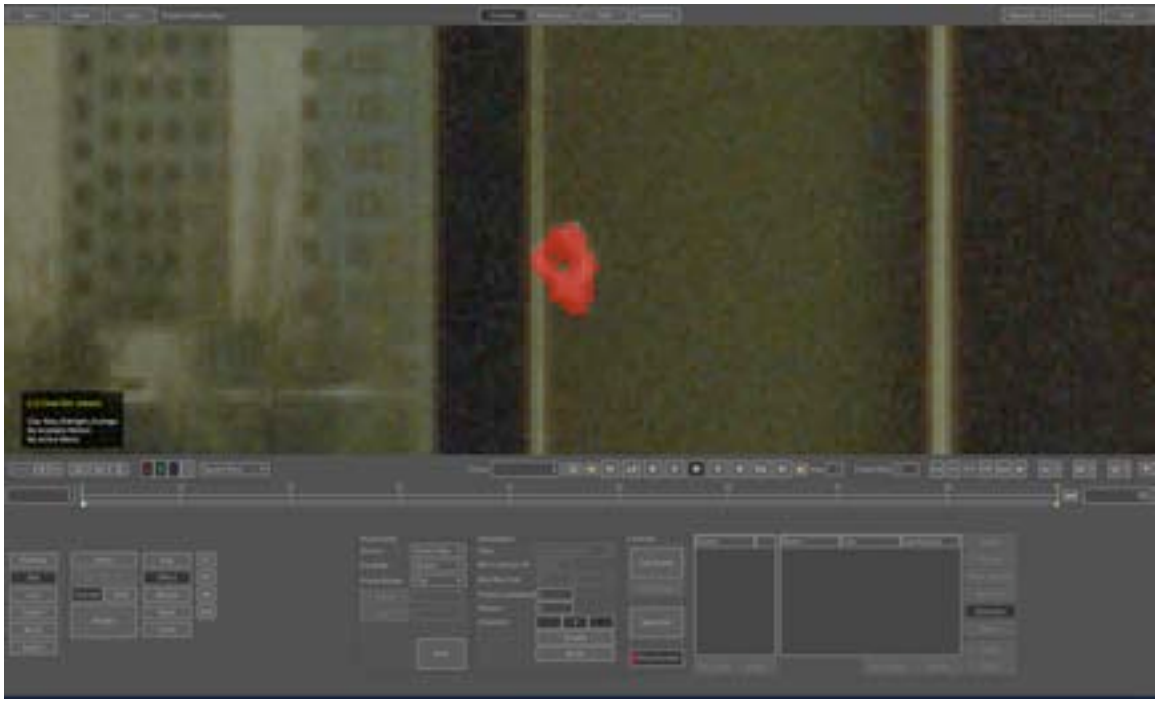


Because we have already told PFClean that the clip contains a defect map, you will see that the dirt effect has Source has defaulted to "Defect Map", and the Fix Mode is set to "Spatial". These are the defect dirt cleanup parameters when using defect maps.

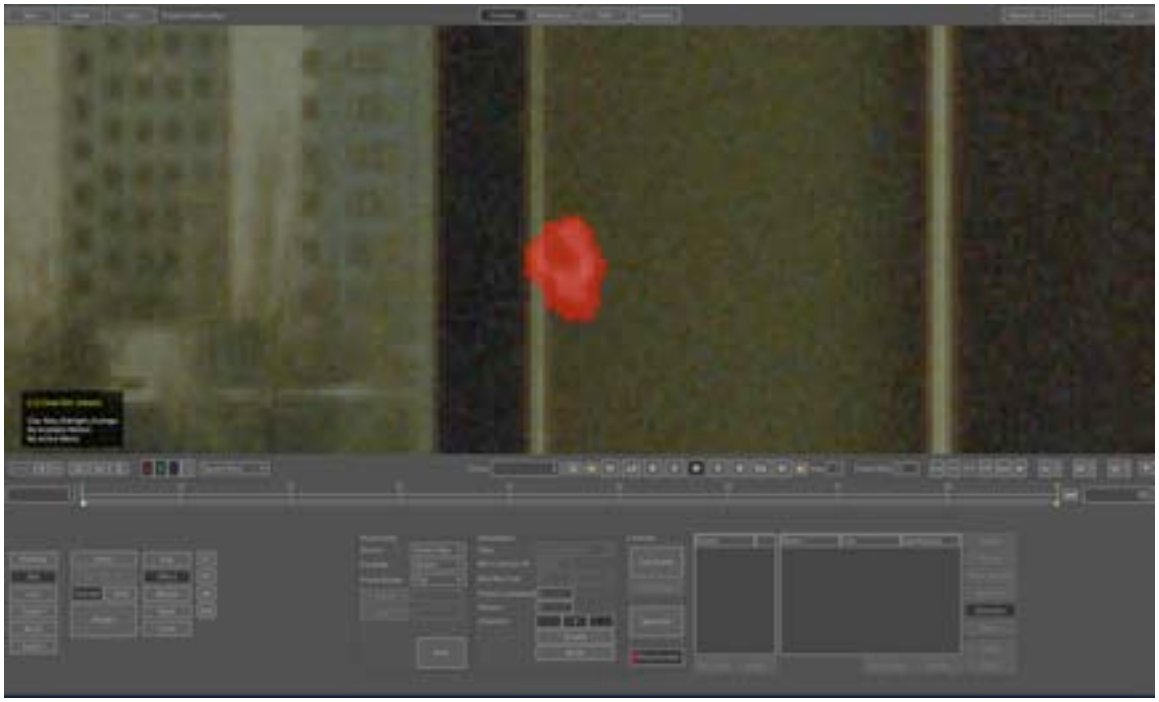
Checking the defect map

Before cleaning the clip, let's take a look at the contents of the defect map to see which pixels will be fixed. Switch on the "Dirt Preview" button and zoom into part of the frame.

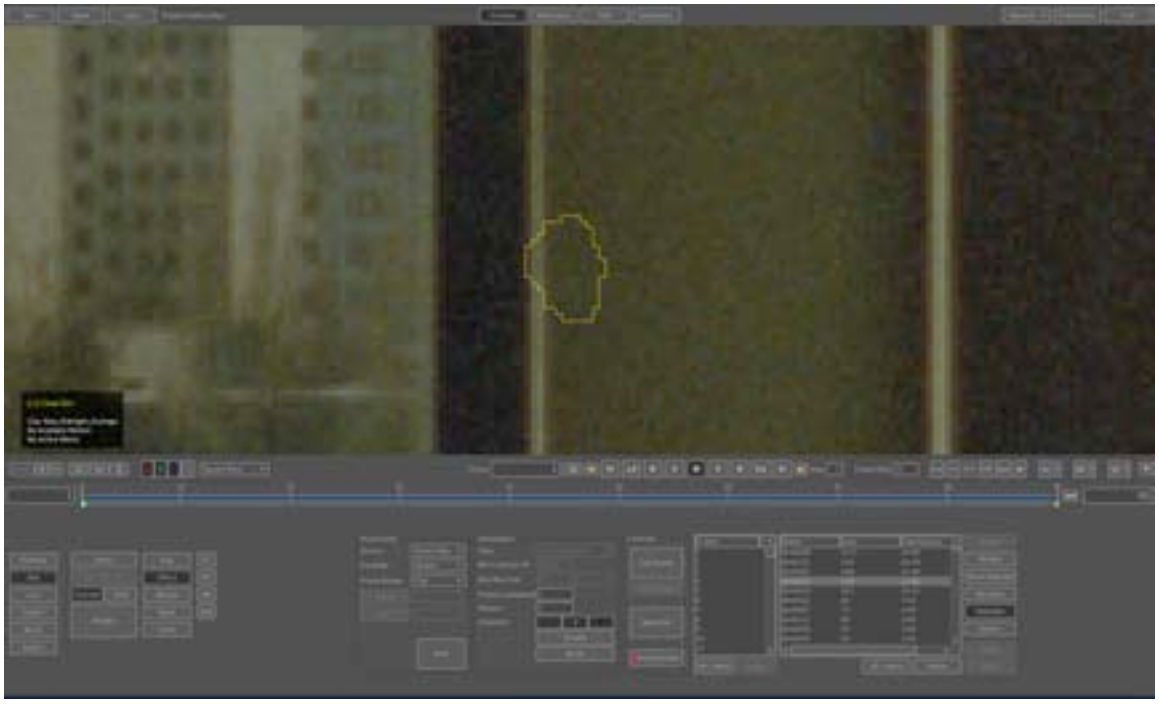
> Note: the quality of the defect map can vary between scanner manufacturers, and is beyond the control of PFClean. If your defect map is missing pixels or incorrectly positioned, please contact your scanner manufacturer for assistance.



In this case, the defect map is not actually covering all the dirty pixels, so we'll increase the "Dilation" parameter to expand the defect map slightly. Change this value to "1" to dilate by one pixel, and you will see the dirt preview update to show that the defect map now covers the pixels that need fixing.

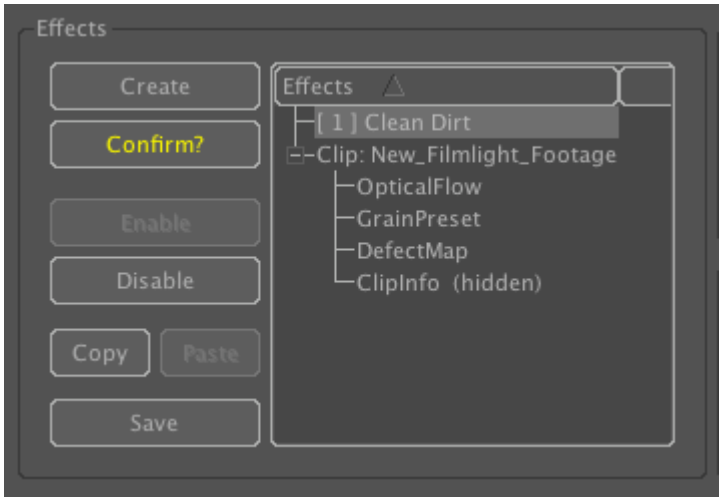


Cleaning the clip
Now that the cleanup parameters have been set, press "Start" to begin the automatic cleanup. After a few seconds, the calculation will complete and you can see the results of the spatial fixes.



Fixing the defect map temporally
In many situations, spatial cleanup of a defect map will be sufficient, especially when the defects are small. However, if the clip contains large defects, or the motion of the background is relatively complex, spatial fixes will not give sufficient accuracy.

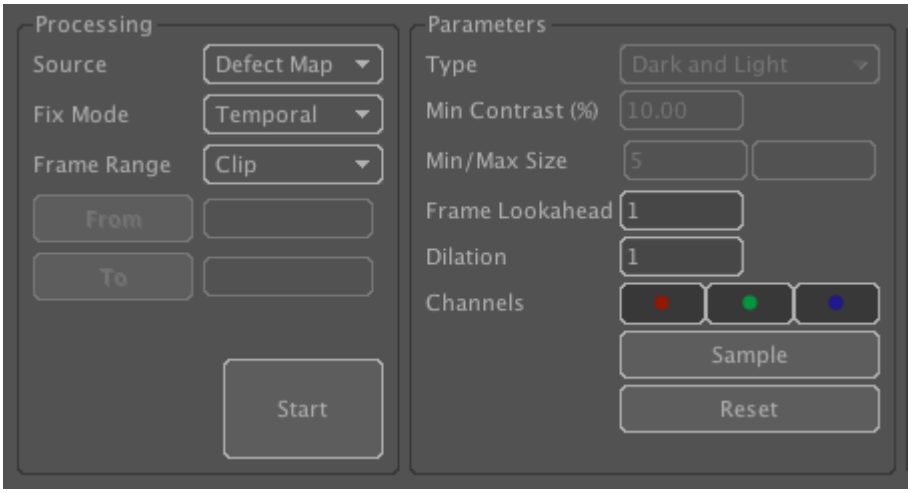
In these cases, the defect map can be cleaned using temporal information, but we first need to cut the clip up into separate shots, so each can be processed individually. Go back to the clip panel, make sure the dirt layer is highlighted and click "Delete" (Click the button again to confirm when prompted).



Now, press the "Done" button to stop editing and switch back to the Media Bins. Before we can start to fix using temporal information, the clip must be cut into separate shots.

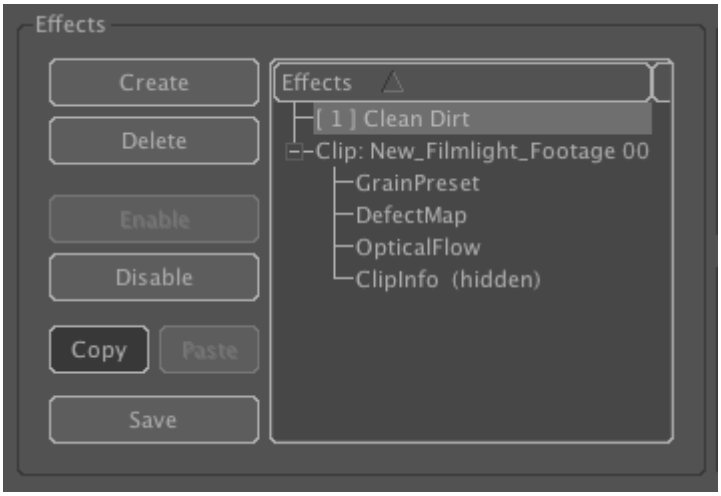
Open the Cut tools by clicking the "Cut" button, and drag the clip into the "Clip" box. Press the "Detect" button and after a short time the cut detection will complete (see the Cut Detection tutorial for more details). Once the cuts have been detected, press "Commit" to store them and go back to the media bins, where you will see the 3 scenes as separate clips.

Fixing the first clip
Press "Edit" to switch to the clip editing tools, highlight the first clip and press "Select" to start editing. You will notice that the "Defect Map" and "Colour Space" controls are already set from before, and have not been changed by the Cut tool. Create a Dirt layer as described above, but change the "Fix Mode" to "Temporal" (make sure you set the Dilation parameter as well).

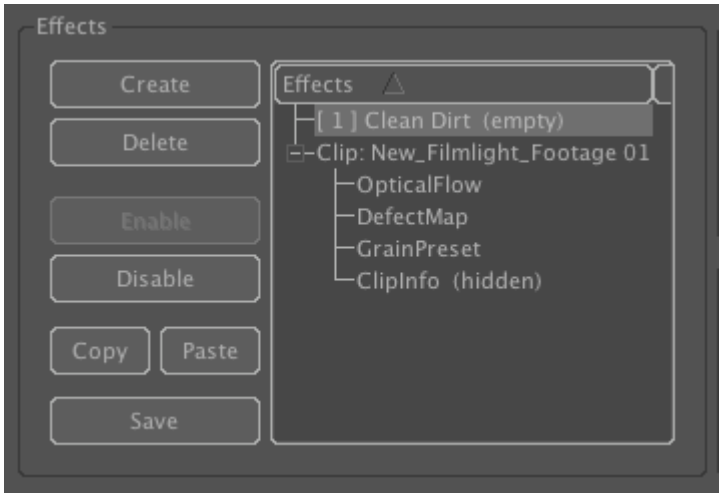


Now, press the "Start" button. Notice that it takes a longer to perform the cleanup in this case, because PFClean needs to analyse motion in the clip when performing temporal fixes.

Copying the effect stack to other clips
After the temporal cleanup has finished on the first clip, you can copy the dirt effect over to the other two clips and clean those up as well. Switch to the clip panel by pressing the "Clip" button, and then press the "Copy" button to take a copy of the effect stack.



Now stop editing this clip by pressing the "Done" button. You will switch back to the Media Bins where you can see the other clips. Highlight the second clip and press "Select" to start editing. Now, press the "Paste" button in the clip panel to paste the effect stack into this clip. You should see a copy of the dirt effect appear in the effect list.



Click the "Effect" button to switch to the dirt effect tools, and press "Start". You can repeat this process to clean up the third shot as well.

> Note: Applying the same operation to multiple clips can be automated using the Batch Processing tools. See the PFClean documentation for more details.