

## BCC Optical Stabilizer Filter

The new Optical Stabilizer filter stabilizes shaky footage. Optical flow technology is used to analyze a specified region and then adjust the track's position to compensate. Playback appears smooth because the track moves incrementally to offset the unwanted motion. You can also stabilize just a portion of a track to correct isolated camera bumps or smooth the track, such as when panning a hand-held camera.

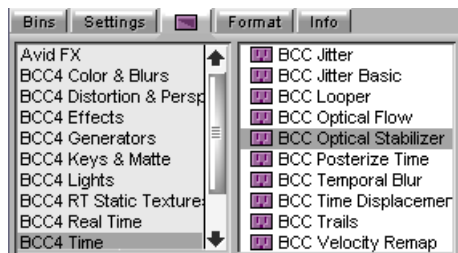
So when should you use Avid's Region Stabilize and when should you use the BCC Optical Stabilizer? You need to consider several factors when making this choice.

- Avid's Region Stabilize effect only takes horizontal and vertical movement into consideration; the BCC Optical Stabilizer allows you to take horizontal and vertical movement, rotation and scaling into account when stabilizing.
- Because it uses optical flow technology, the BCC Optical Stabilizer is more render intensive than the Region Stabilize effect.
- The Region Stabilize has a handy Auto-Scale feature. The Optical Stabilizer provides more options if you prefer to create new pixels instead of scaling the existing pixels.
- Unlike Avid's Region Stabilize effect, the BCC Optical Stabilizer does not require you to set user-defined tracking points. This is useful for images where tracking data would be unreliable such as the example footage of a shaky surfing clip shot from a boat. However, not all imagery is appropriate for optical stabilization. For example, images with large uniform textures, like grass, will not work well. You may want to try Avid's Region Stabilize first to see if you can achieve the desired result. If you can't, then try the Optical Stabilizer filter.



Do you need to create shaky footage, instead of correcting it? You can easily create a jittery "earthquake" effect with the BCC Film Damage filter. Simply apply the filter and turn off all parameters except for the Shake parameters.

1. Choose *Effect Palette* from the **Tools menu**.
2. Click to select the *BCC4 Time* category on the left.
3. Drag the *BCC Optical Stabilizer* icon onto the clip that you want to stabilize.
4. Enter Effects Mode.



This tutorial uses a surfing clip provided courtesy of Art Beats ([www.artbeats.com](http://www.artbeats.com)). However, you can use any media that you like.

5. Make sure that the **Video Quality** is set to *Full Quality*.

6. In the Effect Editor window, set the **Mode Menu** to *Setup Region* and use the onscreen controls to set up the target region.



Make this region as large as possible while excluding areas of uniform texture such as cloudless sky, still water or other difficult to track areas such as motion blur or low contrast. In general it is easier to use the onscreen point controls to set this up, then use the **Corner 1** and **Corner 2 position controls** for finetuning. The points set the location of the upper left and lower right corners of a rectangular region.

A good target region is high-contrast with good vertical and horizontal edge definition as well as large areas of non-uniform detail, especially edges in various directions. This region should be as large as possible while excluding areas that are difficult to track such as motion blur or low contrast areas. With the example footage, the cloudless areas of the sky were not included in the target region.



Large areas of uniform textures, like fields of grain, sky, still water, or blank walls will not work well. Lots of motion blur or low contrast images may also cause problems. In addition, perspective shifts (for example, a forward dolly shot) or moving foreground objects that dominate the image will not generate optimum results. For best results, your target region should include a fair amount of contrast with good vertical and horizontal edge definition as well as large areas of non-uniform detail, especially edges in various directions. Motion should only include panning, zooming and rotation. Large background areas with objects moving independent of the background are also suitable.

7. Set the **Reference Frame** to assign the frame that is used as a reference for the filter. When stabilizing, the other frames are transformed to match the reference frame. With the example clip, the first frame is used, so this parameter is left at the default value of **1.0**.
8. If you will be smoothing instead of stabilizing, adjust **Smoothing Range** to set the number of frames that are used to calculate the average position of the image.
9. Set the **Stabilize menu** to the appropriate choice for your footage. With the example footage, **+Zoom** was chosen. The choices are as follows:
  - **Translation** tracks the motion on the X and Y axis only.
  - **+Rotation** allows you to take motion and rotation into account when stabilizing.
  - **+Zoom** allows you to take motion, rotation and scaling into account when stabilizing.
10. Set the **Edge Handling menu** to the appropriate choice. This determines how the filter creates pixels to fill the space created as the image is offset. For example, suppose the image shakes vertically. As the image moves up to offset the unwanted motion, the bottom of the image is raised above the bottom of the frame. With the example footage, **Reflect** was chosen. Instead of filling this area with new pixels you may opt to scale the image to fill this area.
  - **Color** produces a solid color on the edge of the image. The **Edge Color** parameter determines the color that is used.
  - **Transparent** leaves the space transparent, revealing any tracks lower in the timeline.
  - **Repeat** repeats the pixels on the edge of the image, producing a smeared effect.
  - **Reflect** produces a mirror image copy of the pixels adjacent to the edge.
  - **Tile** produces an image copy of the pixels adjacent to the opposite edge of the image.



*Reflect*



*Repeat*

11. Make sure you are on the first frame in the effect and set the **Mode Menu** to *Stabilize* and click **Play**. **Stabilize** locks all the frames to the reference frame, eliminating all motion. The other choice, **Smooth** is used to smooth, but not eliminate all motion, such as when panning a hand-held camera.



If you are not on the first frame of the effect, the filter will stabilize every frame up to the current frame before displaying the current frame. Nothing indicates that the filter is calculating, so you could mistakenly believe that the filter is frozen.

12. If necessary, correct any errors using the Optical Flow parameters. For details, see “Correcting Stabilizing Errors” on page 5.
13. Now you can finetune the results by adjusting the **X Translation** and **Y Translation**, **Rotation** and **Scaling** parameters to correct any mistakes made by the filter or to finetune the results.
  - **X Translation** and **Y Translation** position point controls allow you to move the center point of the clip on the X and Y axis respectively.
  - **Rotation** allows you to rotate the clip on the Z axis.
  - **Scaling** changes the size of the image along the X and Y axis. This parameter scales as a percentage of the image’s original width and height. Thus, a Scaling value of 200 produces an image twice as large as the original.
14. If you like, adjust the **Clip Top**, **Clip Left**, **Clip Bottom** and **Clip Right**. These parameters allow you to crop the edges of the clip after it is stabilized. This allows you to finetune how edges are handled. For example, if you set the Edge Handling menu to Repeat or Reflect, you may want to adjust where the repeat or reflect begins. With the example footage, Reflect was chosen and the left edge of the image was clipped slightly to make it appear more natural.
15. Render the effect. Continuum Complete AVX effects render exactly the same as Avid effects. For more information, consult your Avid documentation.

## Correcting Stabilizing Errors

The Optical Flow parameters estimate the motion between frames of video and use that information to calculate the motion of the image. Optical Flow analyzes the frames before and after the current frame to determine which pixels are moving. For example, if an area in your image is not supposed to move, check the display for that area. You can use the Optical Flow parameters to correct any stabilizing errors.



**Macintosh only:** The Optical Stabilizer filter in BCC AVX Version 4.0 and 4.1 does not work properly on current versions of Avid software. It works correctly on Avid Xpress Pro versions 4.6 and earlier. Boris and Avid are working together to resolve this issue.



The Optical Stabilizer filter works best with progressive footage. This limitation will be corrected in a future release. If you are not working with progressive footage, you can use one of two workarounds if you encounter problems. First, you could apply the BCC Deinterlace filter and render the clip before applying the Motion Key filter. Second, you could create a 100% speed Avid motion effect and set the **Render 2-Field Motion Effect Using menu** to *Duplicated Field*. Then apply the Optical Stabilizer to the rendered motion effect.

1. To correct any errors using the Optical Flow parameters, set the **Mode menu** to *Show Vectors*. Show Vectors displays onscreen motion vectors. The array of vector lines indicate the direction of motion of the pixels in the image in the current frame. This can be helpful for finetuning.
2. Use the Vector View Spacing and Vector View Scale parameters to set the motion vectors display.
  - **Vector View Spacing** adjusts the number of onscreen motion vector lines. The array of vector lines indicate the direction of motion of the pixels in the image in the current frame. Higher values produce more vectors. At a value of 0, no vectors display.
  - **Vector View Scale** controls the length of the individual vector lines. The array of vector lines indicate the direction of motion of the pixels in the image in the current frame. Higher values produce longer lines. At a value of 0, no vectors display.
3. Increase the value for **Stabilization Samples**. This parameter sets the number of vector field samples that the filter takes. Increasing this value produces more accurate analysis but increases rendering times.
4. Adjust **Span** to set the percentage of samples that are considered to be representative of the background. If the image is nearly all background, increasing Span can increase the accuracy of the stabilization.

5. Adjust **Edge Contrast** to set a threshold for the minimum amount of detail in a region. Regions containing less detail than the threshold are treated as having no detail. If your frame includes a lot of motion in areas that are very detailed or small objects, decrease this parameter. Edge Contrast does not depend on the motion, only the texture and detail of the frames.
6. Increase the **Resolution menu** to adjust the quality of the analysis. The choices are *Full*, *Half*, *Quarter*, *Eighth*, *Sixteenth*, *32nd* or *64th*. The default Quarter resolution setting often produces good results. However some images may require Half or even Full to produce good results. Easily tracked images may be able to use lower resolutions. Higher resolutions take more time to process but can create more accurate results.
7. **Velocity Limit** constrains the magnitude of motion estimation. This value corresponds to a percentage of the size and resolution of the Source Layer. For example, when working with a D1 image, the value of 100 corresponds to approximately 100 pixels. If the estimated motion is larger than the actual motion, the stabilization will be incorrect and the motion vector display will show long motion vectors. If this occurs, try decreasing Velocity Limit to approximately 50.
8. **Low Velocity Correction** sets a threshold for detecting motion in a region. If the Optical Flow shows vectors in an area that is not moving, adjust the **Low Velocity Correction** value.
9. When you finish adjusting these parameters, return the **Mode Menu** to *Stabilize* and click **Play**. The filter will stabilize the clip.