

## Bump Autos

Bump autos are a kind of floating point keyframe that differs from the rest of the floating autos, like smooth and linear, in that they have two values:

a left and a right edge value

The presence of a *bump* creates boundaries to regions on the timeline. The region begins at that bump, and extends to the next bump auto. If the bump *span* toggle is set, then adjusting the left/right edge value will raise or lower all of the auto values in the bump region. For example, if you put a speed bump in at 1.0 secs and another at 2.0 secs on the timeline, and adjust the right edge of the first auto to speed 3.0, then the first region of playback (between 0.0 and 1.0 secs) will play at normal speed, the next region (between the speed bumps) will play at 3x, and the last region (after the 2.0, which moved to 1.333 after speed up) will play at normal speed.



Adjusting the *bump* edge values when *span* is on modifies all of the keyframes between edges of bumps, or to the beginning or end of media if there are no bumps to end the bump region. Turn *span* off if you only want to change the edge value without modifying the region values.

### Technical Insight:

The *bump* is a kind of FloatAuto, an element in an automation list that is one of the 12 automation types of keyframe lists:

*mute, cam x,y,z, proj x,y,z, fade, pan, mode, mask, speed*

which are part of the Track. A FloatAuto is one of 4 auto *value* types that are stored in the auto at the keyframe position: float, mask, int, pan.

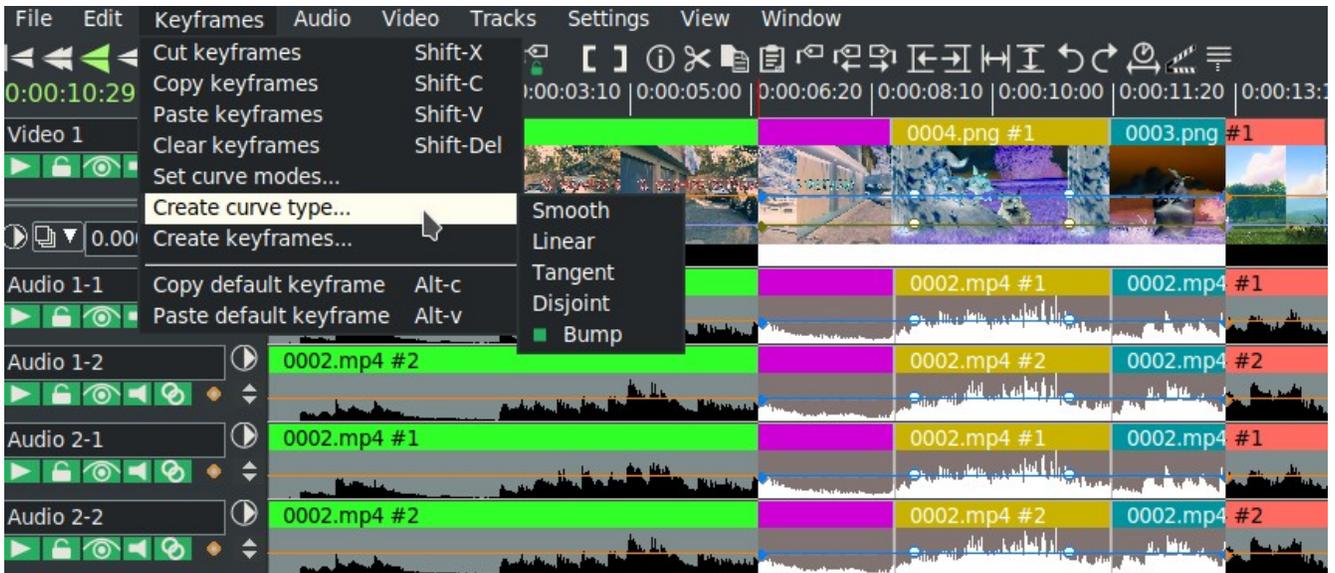
A FloatAuto stores a floating value for the automation at a position on the track. When a FloatAuto *get\_value* is invoked at a track position, the position is used to access a previous and next auto list element values based on the *current* position. The returned value is generated using one of 5 modes of curve interpolation: smooth, linear, tangent, disjoint, bump.

When a FloatAuto is created, it gets a list default value. This varies by auto type speed=0, fade=100, ..., and at position 0, but this is almost always immediately changed to a value specified for the current position, a value/mode you specify in the sliders and drag values of the GUI updates.

The best way to create bump keyframes is highlight a region and then:

Keyframes → Create curve type → bump

Keyframes → Create keyframes → speed (or other)

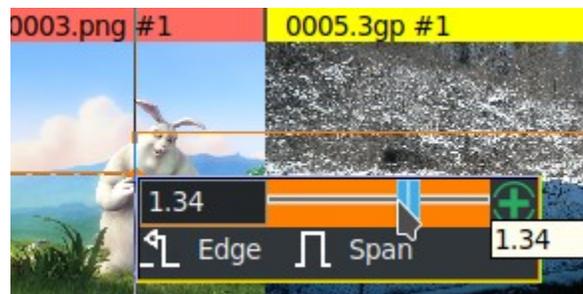


However, you can also create them by clicking or double-clicking on the curve, then:

- RMB → bump
- RMB \$ → speed (or other)

Make sure that the keyframes at the edges are bump type, span is active and that the left edge is set to the right and the right edge is set to the left. This way the changes will only affect autos within the range.

**Warning:** bump autos work only via slider. Dragging the keyframe with the mouse makes you lose the *right/left edge* and *span* settings and behave as normal autos.



With using the sliders on a track, the keyframes ganged track are changed if the positions match; tracks can be excluded by switching the track gang mode off. Another way to edit all armed tracks of all types at the same time is as follows:

- disable *Master track* of all tracks except the first one, on which we will work.
- switch to *gang media* mode. Now only the Master track is visible, but every change made on its keyframes is also applied to the other tracks.

In the Camera and Projector tools configuration window you will find the *Bump curve*, *Span* and *Right/Left Edge* buttons. The Camera-XYZ and Projector-XYZ curves can also create and use Bump autos.

Note: do not confuse the autos bump span button with the keyframes span button of the plugins (on the MenuBar); they are different and work differently. With the plugin keyframes, the update is done by first creating a textual diff on the xml values of the plugin keyframes, then applying that diff to all of the keyframes selected in the *span* range. The bump FloatAuto bump\_update subtracts the old and new values to create a diff that is added to all of the values in the *right\_edge ... auto values ... left\_edge* region created by bump autos and media endpts.