



grass valley

A **BELDEN** BRAND

# AUDIO EDITING

## User Guide

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## Conventions Used

### Text

<Text>	indicates a specific key press on the keyboard.
NN/nn	indicates a value entered on a numeric keypad.
<b>Text/text</b>	indicates either an application menu function or a Windows/Grass Valley installation/system setting.

### Symbols



**See: Reference to items in other documents.**



**Notes: System, software and workflow points to consider and remember.**



**Tips: Useful hints and advice when undertaking tasks.**

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# 1. Getting Started

## 1.1 Audio Controls

When the Edit application is first opened, the timeline displayed (by default) contains two virtual audio tracks and one video track.

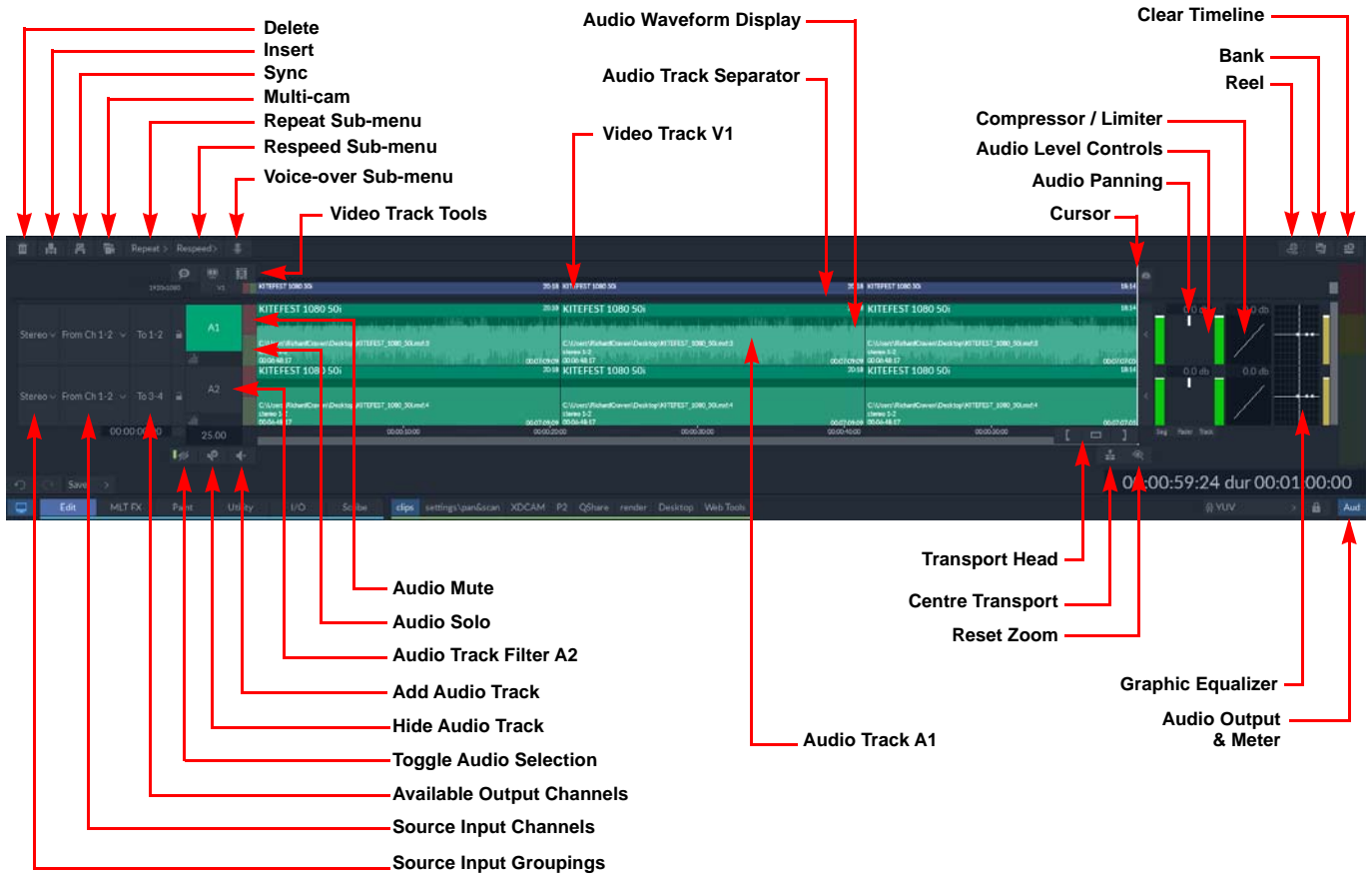


Figure 1 Controls in the Edit Timeline Window

Depending on the system being used, up to 32 mono audio tracks can be displayed on the timeline, with mono, stereo and quad audio supported within a single track.<sup>1</sup> Standalone workstations can support up to 16 channels, similarly, sQ workstations also support up to 16 channels (i.e., the maximum supported by the sQ Server).

Each audio track is fully editable using the timeline. Tools are provided to assign audio input and output, control audio levels and compression levels, add audio transitions and much more. Output channels can be selected using the audio channel output boxes. When a finished edit is published to a server the audio is mixed down, ready to play out of the assigned ports.

This guide provides information on the different aspects of managing and editing audio within the Edit timeline application.



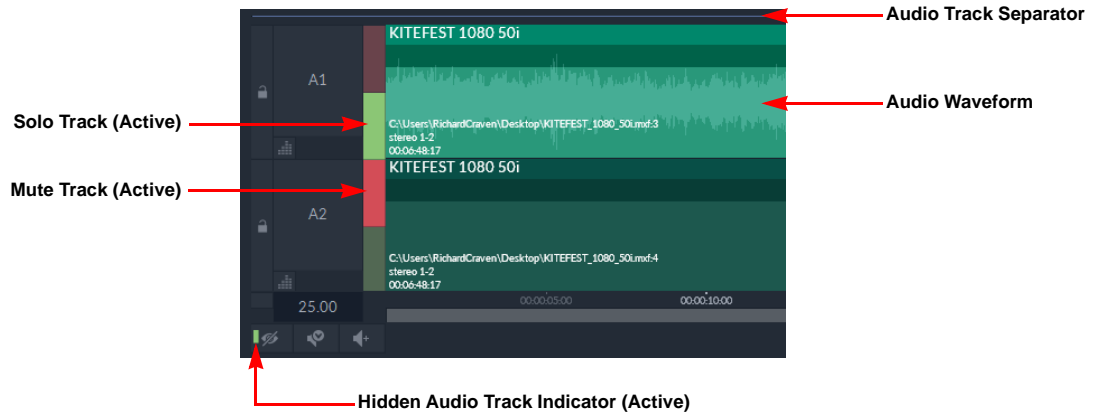
For general information about the interface, using the timeline and overall video editing see the *Desktop Editing User Guide* or the *Timeline Editing User Guide*.

1. For more information on video/audio I/O interface cards, see the *Technical Specification* or consult your SAM representative.





## 1.2 Managing Audio Output

### 1.2.1 Mute and Solo Audio Tracks

The audio **Mute** and **Solo** boxes are located to the left of each timeline track.





**Figure 2 Audio Solo and Mute Boxes**

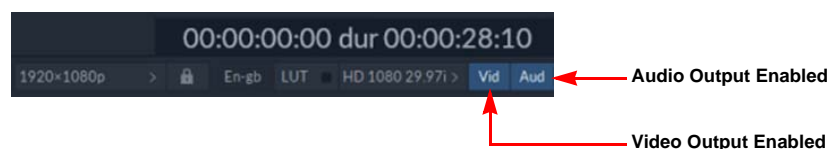
Audio Control	Function	Description
	Mute (Inactive)	Use the red <b>Mute</b> boxes to mute specific tracks so that they are excluded from the overall output.
	Mute (Active)	The Mute boxes do not affect the video or audio if the clip is saved or published.
	Solo (Inactive)	Use the green <b>Solo</b> boxes to specify a single track to be monitored.
	Solo (Active)	The Solo boxes do not affect the video or audio if the clip is saved or published.



**Multiple tracks can be muted at any one time, however, only one track can be soloed at any one time.**

### 1.2.2 Activating and Deactivating Audio Output

The **Aud** box  at the bottom-right of the Application Bar controls the audio output. When the **Aud** box is enabled, it changes color to blue  and audio is output to external speakers.



**Figure 3 Audio and Video Output Boxes**

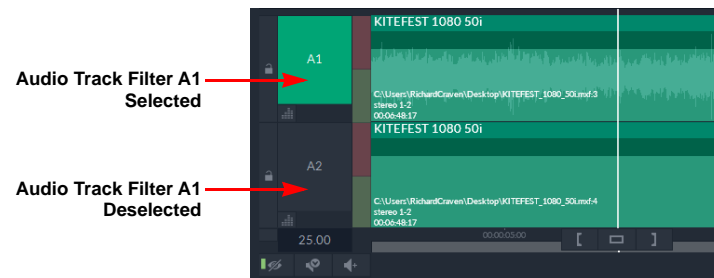
To activate/deactivate the audio output, simply click on the **Vid** and/or **Aud** box. Activating or deactivating the **Aud** box does not affect the audio if the clip is saved, played-out or published.



**If the audio is deactivated using the Aud box, the audio meter at the far-right of the timeline is not visible.**

### 1.2.3 Selecting and Deselecting Audio Tracks

Press the Track Filter boxes (**A1**, **A2** etc.) to select or deselect one or more audio tracks. Only the selected audio tracks are affected when any subsequent adjustments are made to the timeline or any processes are applied. Any deselected tracks remain unaffected.



**Figure 4 Audio Track Filters**

This is useful when performing video-only or audio-only editing. The Track Filter boxes do not affect the video or audio if the clip is saved or published.



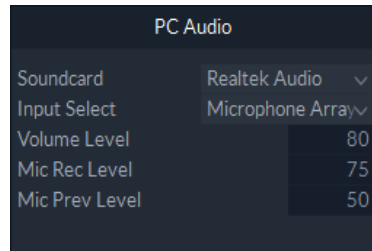
**If none of the tracks are selected, any process that is applied affects all the tracks.**



### 1.3 PC Audio Settings

The PC Audio menu in the <F1> Configuration window includes a number of controls to adjust the PC audio settings.

The PC Audio menu is used to set up the audio interface card for voice-overs and FX loop purposes. To access these tools press <F1> and navigate to the **PC Audio** section.



**Figure 5 PC Audio Configuration Settings - <F1> Configuration**

In order to record a voice-over, a microphone must be connected to the Mic-In input jack and **Microphone Array** should be selected from the blue **Input Select** scroll box. Before recording a voice-over, adjust the **Volume Level** and check that the **Mic Rec Level** (record) and **Mic Prev Level** are set to the required level.



**If a microphone is not connected then the Voiceover box is not displayed on the Edit timeline.**

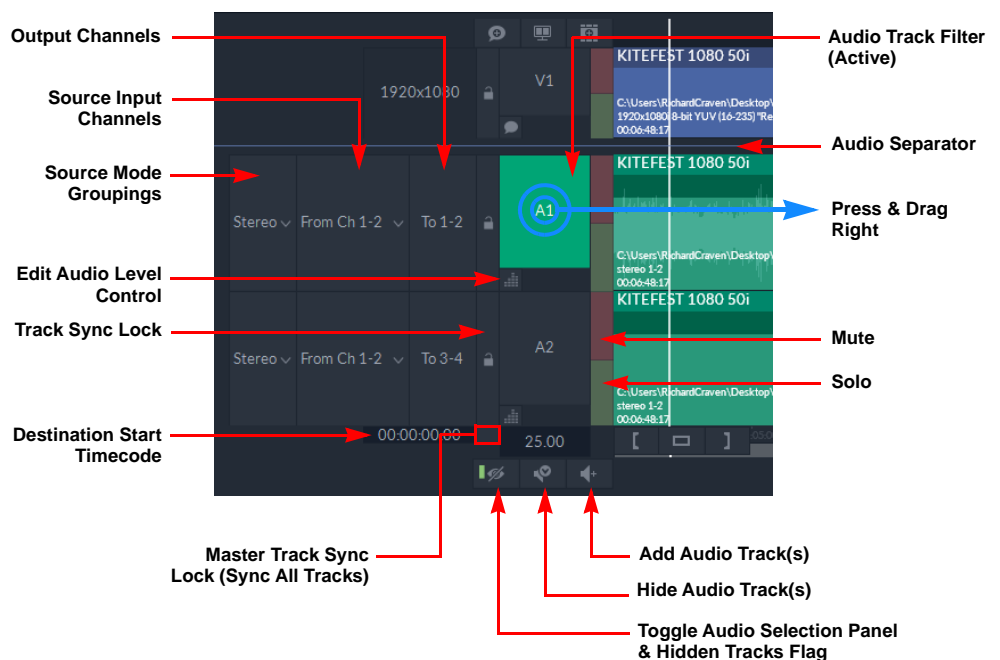
### 1.4 Hidden Audio Options

Many of the audio management tools are located in *hidden* menus that can be opened for adjustments to audio settings when required. Two hidden menus are available on the timeline that allow audio levels to be controlled and channels settings to be assigned.

#### 1.4.1 Accessing the Audio Channel Controls (Left Hidden Menu)

To access the audio channel controls in the left-hand hidden menu:

1. Click, hold and drag any of the Track Filter boxes (V1, A1 etc.) to the right. This reveals audio input/output controls as well as a number of other useful tools.
2. Click and drag to the left to hide the menu again.



**Figure 6 Opening the Audio Channel Controls Menu**

The audio tools described in the following sections are available after opening the left-hand hidden menu:

1.4.1.1 Audio Source Groupings

The Source Groupings scroll box displays the input source grouping of the clip, e.g. **mono**, **stereo**, **quad**, etc. This can be changed (where available) by scrolling to a new grouping. This setting applies to the whole track unless a segment has been selected by double-clicking on it.


1.4.1.2 Audio Source Channels

The Source Channels scroll box specifies which source channels are used. This setting applies to the whole track unless a segment has been selected by double-clicking on it.

1.4.1.3 Audio Output Channels


The Output Channels scroll box defines the output channel(s) set for each track. See section 2.3 *Managing Audio Channels* on page 18 for more information on using these features.

1.4.1.4 Hide Audio Tracks

The hide box  temporarily *hides* the audio tracks together with all audio tools and controls. See section 1.6 *Hiding Audio Tracks to Clear the Workspace Temporarily* on page 8 for more information about this feature.

1.4.2 Accessing the Audio Level Controls (Right Hidden Menu)

To access the audio level controls:

1. Press, hold and drag any of the reveal handles  at the right of the timeline and drag to the left to reveal the menu.
2. Press and drag to the right to hide the menu again.

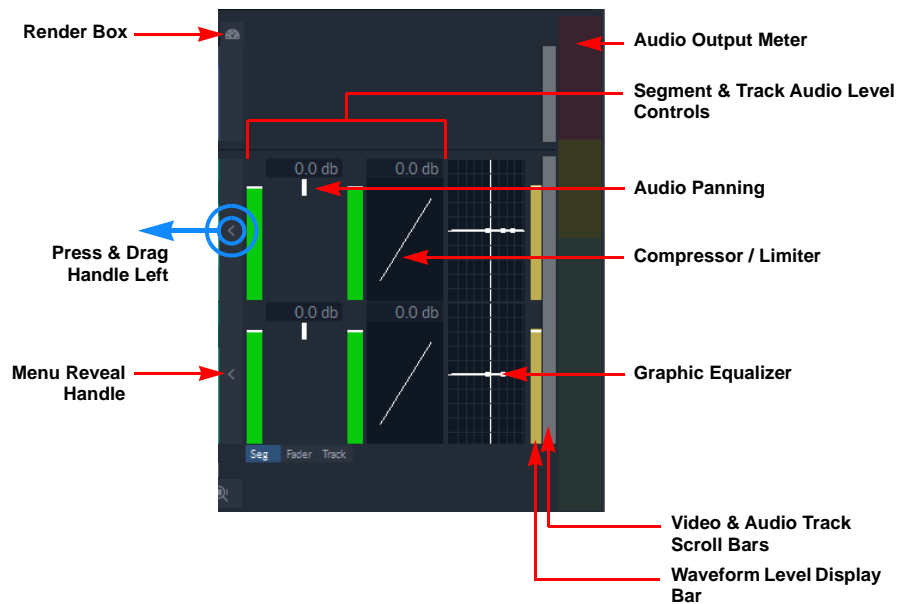


Figure 7 Opening the Audio Level Controls Menu

Each audio track has its own set of audio level controls as follows:

1.4.2.1 Segment and Track Audio Levels

The Segment and Track Audio Level bars increase or decrease the audio level for a selected segment or for the whole track. See section 2.4 *Managing Audio Levels* on page 24 for more details about setting segment and track audio levels.

### 1.4.2.2 Waveform Level Display Bar

The Waveform Level Display bar adjusts the height of the audio waveform display on the audio track. Adjusting the waveform display does not affect the output levels. See section 1.5 *Audio Waveform Level Display* on page 6 for information on adjusting the waveform display.

### 1.4.2.3 Compressor/Limiter

The compressor provides a form of automatic level control. Limiting is an extreme form of compression, where the output signal is limited at a particular level. See section 3.10 *Using the Audio Compressor/Limiter Tools* on page 48 for information on using the Compressor/Limiter tool.

### 1.4.2.4 Graphic Equalizer

A three-band graphic equalizer is provided for each audio track and allows accurate adjustments to be made to the audio. See section 3.11 *Using the Graphic Equalizer Tools* on page 50 for more information.

## 1.5 Audio Waveform Level Display

The audio waveform level display can be used to evaluate the audio track accurately between video frame boundaries.

### 1.5.1 Accessing the Waveform Level Display Bar

The controls for the waveform level display are located in the hidden menu to the right of the timeline, see section 1.4.2 *Accessing the Audio Level Controls (Right Hidden Menu)* on page 5 to access these controls.

The **waveform level display** controls can be used to adjust the scale of the waveform display on the audio tracks.

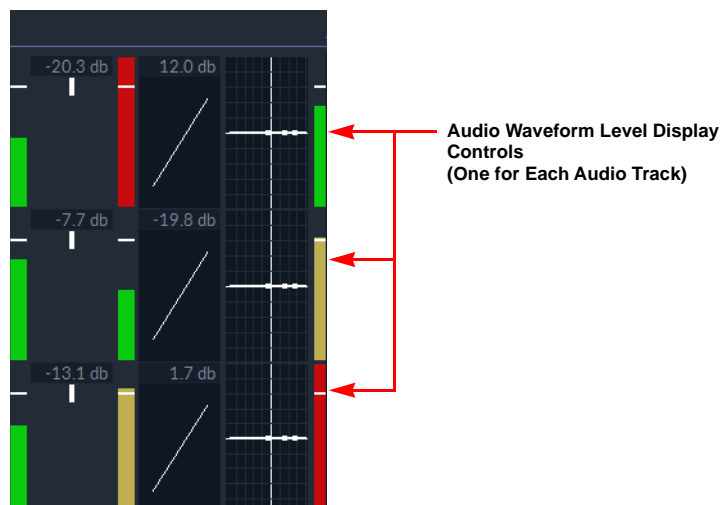
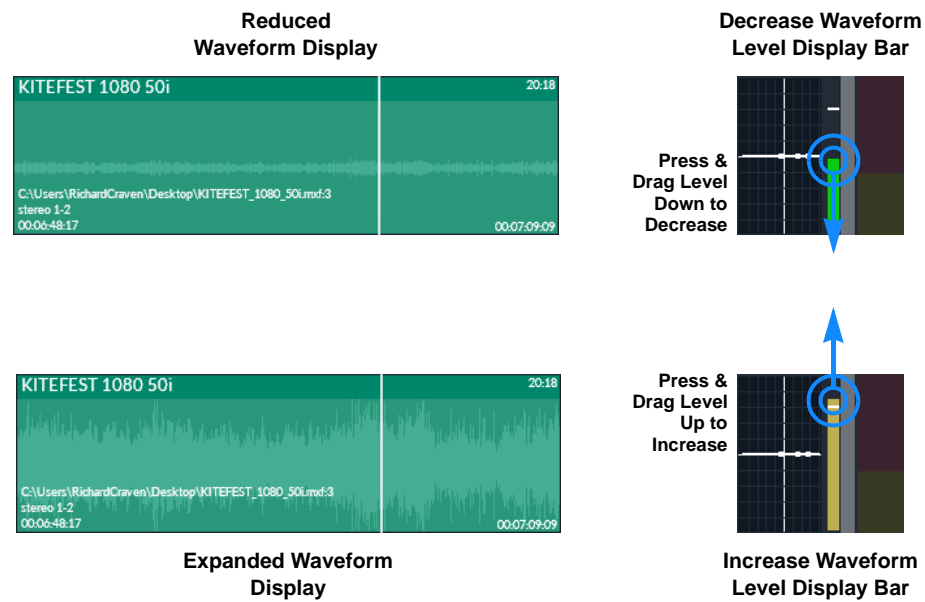


Figure 8 Different Levels Set on the Audio Waveform Controls

To adjust the scale of the waveform display, click and drag the scale bars up or down. Drag up to increase the vertical scale of the waveform display on the associated track. Drag down to decrease the vertical scale of the waveform display, see Figure 9.





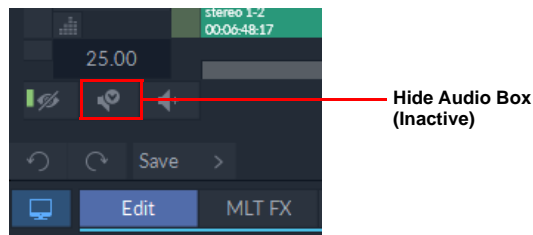
**Figure 9 Using the Waveform Display Tool**



For clips held on a remote server, the waveform is displayed only after the clip has been played through once and locally cached. Purging the cache (press <F12>) removes the waveform until the clip has been played through again.

## 1.6 Hiding Audio Tracks to Clear the Workspace Temporarily

The **hide audio** box  temporarily *hides* the audio tracks and all audio tools and controls. Hiding the audio tracks can be a useful way to create more space temporarily on the workspace in order to focus on video editing. When selected, the hide box changes color to blue: 



**Figure 10** Location of Hide Audio Box

For example, Figure 11 shows a typical interface with multiple audio tracks, a single video track and the Reel open. With the **hide** box inactive, the interface may become quite crowded:



**Figure 11** Full Workspace Showing Audio Tracks and Tools

With **hide audio** selected, the audio tracks and tools are temporarily hidden from the interface, creating a less crowded workspace:



**Figure 12** Audio Tracks and Tools Hidden

## 2. Managing Audio Tracks

### 2.1 Adding Audio to the Timeline

Clips can be placed on the timeline in a number of ways depending on user preference and workflow. Entire tracks (including both video and audio) individual audio segments, multiple segments or marked sections of tracks can all be added to the timeline.

To load a specific track, first ensure that the correct track filter box is selected. For example, to add a single audio track from a Floating Clip to the timeline, select the relevant track filter box on the Floating Clip. To place the new track onto a specific target track on the timeline (e.g., **A2**) select the **A2** track filter on the timeline.

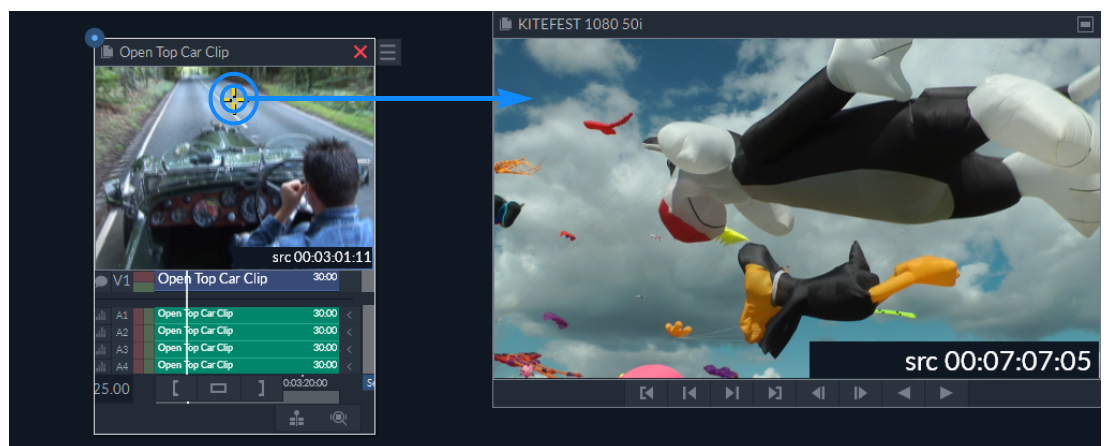
Multiple clips can be added simultaneously to the timeline by pressing the **<Ctrl>** keys to select the required clips, or by drawing a lasso around them, and then dragging the selection onto the timeline.

When adding a clip to the timeline, be aware of the cursor position. The cursor position on the new source clip determines which frames are added to the timeline. The cursor position on the target timeline determines where the new frames are added. For example, if the whole clip needs to be added, ensure that the cursor is positioned at the start of the clip as only frames after the cursor are added to the timeline. If the new clip needs to start at the beginning of the timeline, ensure that the timeline cursor is at the beginning.

To add a clip onto the timeline choose the most suitable method from any of those described in the following sections.

#### 2.1.1 Using the Edit Window to Add Audio

Clips can be dragged directly from a bin or from the desktop and dropped onto the Edit window to load the clip on the timeline at the current cursor position. Hover the clip over the Edit window before letting go to see a preview on the timeline of where the clip will be placed. The borders of the Floating Clip and the Edit window are highlighted in yellow.



**Figure 13 Dragging a Floating Clip onto the Edit Window to Add to Timeline**

If an edit already exists on the timeline the new clip overwrites any existing frames that are overlapped, unless **insert** is active. Most editors prefer to use this method.

#### 2.1.2 Selecting Specific Timeline Tracks

Clips can also be dragged directly onto the timeline. A yellow highlight indicates where the clip will be placed and which tracks it will occupy. If an edit already exists on the timeline, the new clip overwrites any frames that it overlaps.

### 2.1.2.1 Inserting all Video and Audio Tracks

Dragging a clip and hovering in the dark gray area directly above the video track ensures all video and audio tracks are transferred to the timeline.

When the clip is hovered above the video track the yellow highlight displays across all tracks indicating that all tracks will be populated by the new clip.

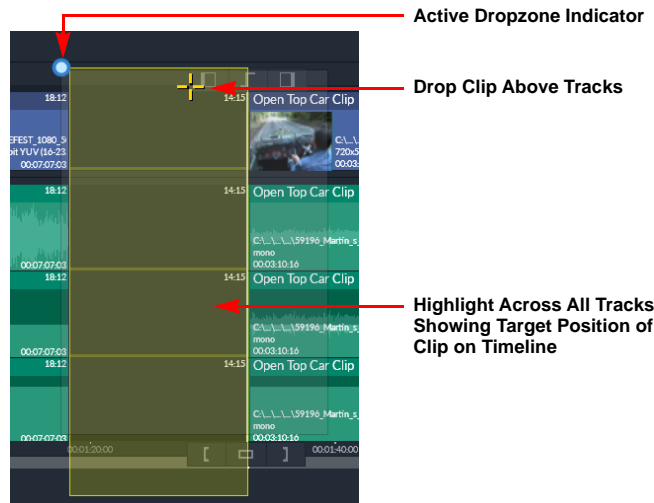


Figure 14 Dragging a Floating Clip Directly onto the Timeline

### 2.1.2.2 Inserting a Single Audio Track

Hold the clip directly on top of the destination audio track to add only the audio track. Only this track is highlighted and only a single audio track (A1 unless otherwise specified) is placed on the timeline when it is dropped.

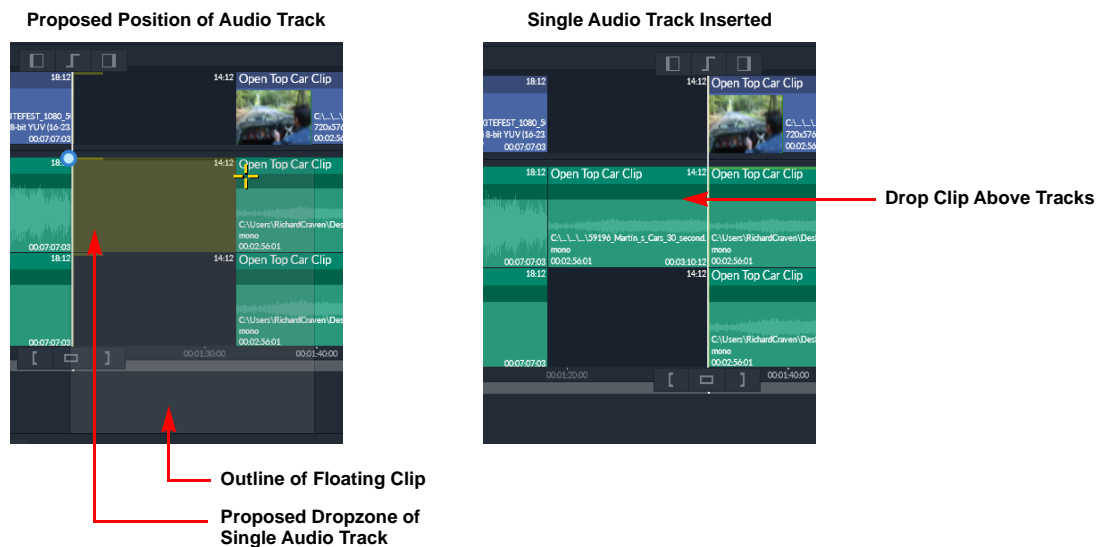
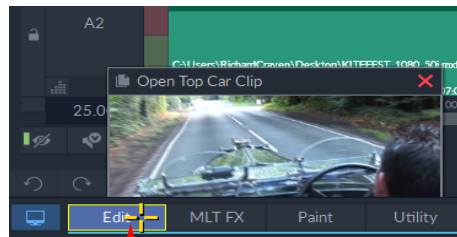


Figure 15 Dragging a Single Audio Track Directly onto the Timeline

### 2.1.3 Using the Edit Tab to Add Audio

Dragging a clip onto the **Edit** tab (which highlights yellow) on the Application Bar loads the whole clip on the timeline, overwriting **all** existing clips on the timeline. The Edit application does not need to be open for this operation.



Drop Clip Onto Edit Button

**Figure 16** Dragging a Clip onto the Timeline Using the Edit Tab



### 2.1.4 Using the Add Audio Track Box to Add Audio

Clicking the **add audio** box adds a new blank audio track to the timeline.

Alternatively, clips can be dragged directly onto the **add audio** box (which highlights yellow) to create a new audio track and load the audio from the clip at the current cursor position.

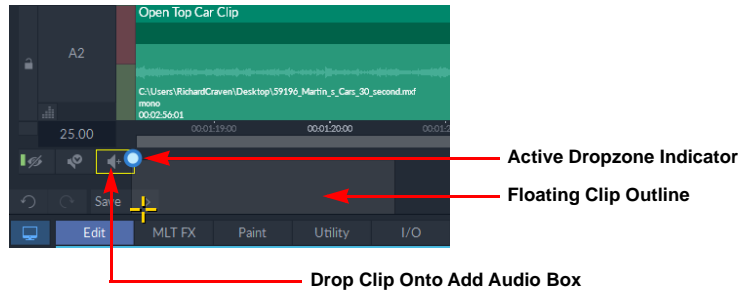



Figure 17 Dragging a Clip onto the Add Audio Box



Dragging a clip directly onto the add audio box only adds the highest audio track (A1) from the clip. Any video or subsequent audio tracks are not added when using this method.

### 2.1.5 Adding Audio Using the Insert Edit Function

The **insert** box  at the top-left of the timeline can be used to insert a new clip into the timeline without overwriting any existing frames.

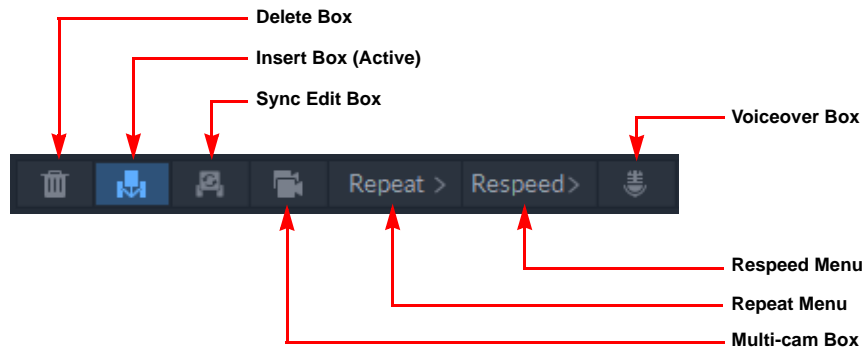

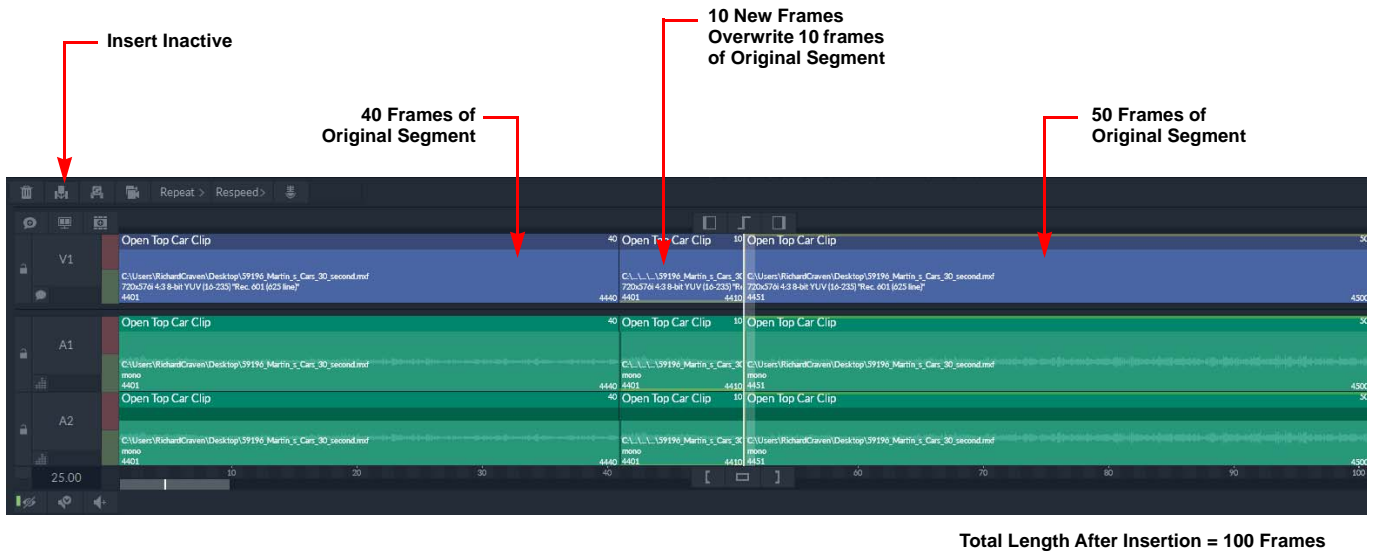


Figure 18 Insert Box in Toolbar

When new media is placed onto the timeline with the **insert** box selected , the existing clip is split and the new media is inserted in the middle. This is referred to as an **insert edit**.

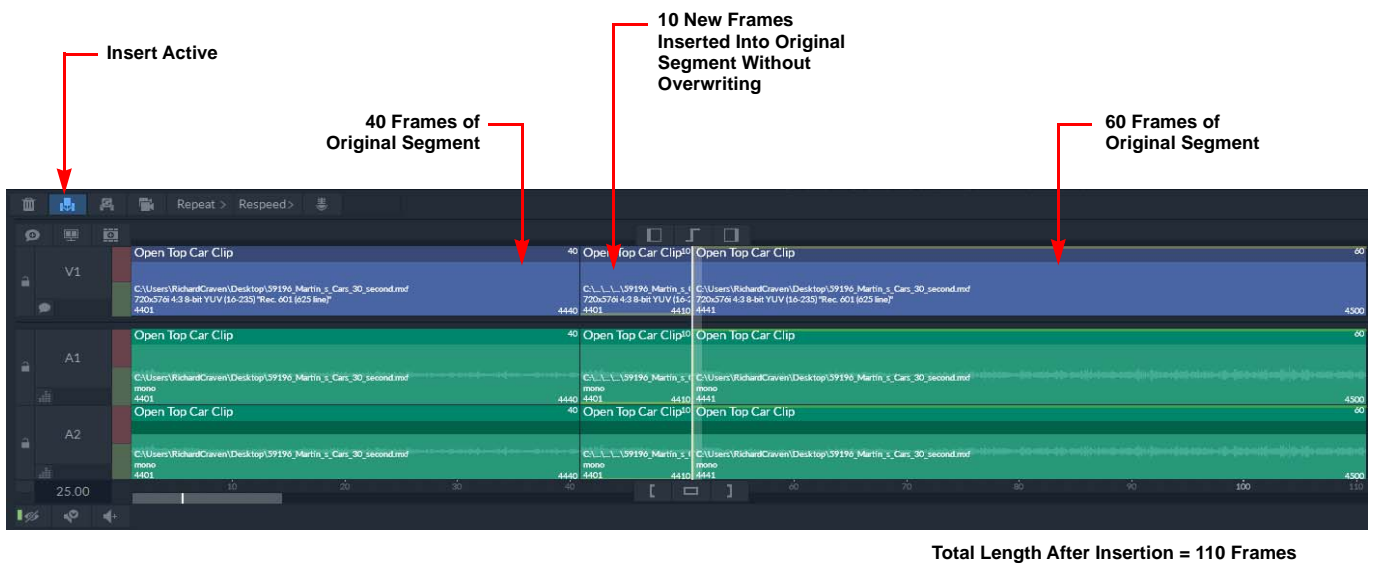
For example, if a 10 frame segment is dropped into the middle of a 100 frame segment on the timeline without **insert** selected, the length of the resulting clip would remain at 100 frames, with the new 10 frame segment overwriting 10 frames of the original segment. With **insert** selected, however, the resulting clip would be 110 frames long as all of the original frames are retained and the 10 new frames are inserted at the current cursor position.

Without **insert** selected:



**Figure 19** Inserting a Clip into 100 Frame Segment without Using Insert

With **insert** selected:

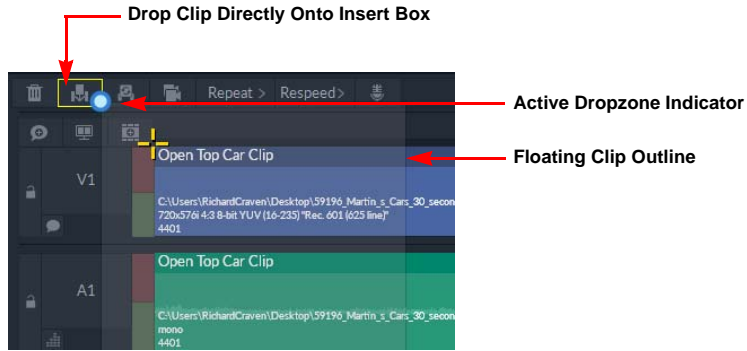


**Figure 20** Inserting a Clip into 100 Frame Segment Using Insert

To place a clip on the timeline using **insert**:

1. Select the **insert** box or hit the <Insert> key to toggle on the function.
2. Move the timeline cursor to the required timeline position.
3. Select the Floating Clip or segment to be inserted.
4. Drag and drop the clip over the Edit window or press <Return>.

Alternatively, drag the clip directly onto the **insert** box (which highlights yellow).



**Figure 21 Dragging a Clip onto the Insert Box**

The new clip is inserted at the cursor position, splitting the existing segment and moving it along the timeline accordingly.




**If In and Out points have been set on the Floating Clip, only the marked segment is inserted. If the In and Out points have not been set the whole clip segment is inserted.**

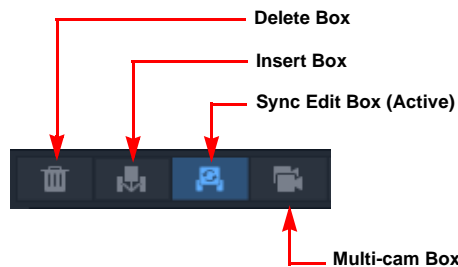


**With the focus on a Floating Clip, hitting <Ctrl><Return> performs an *insert edit* regardless of whether the 'insert' button is enabled or disabled.**

**The use of the insert function can take clips out of sync on the timeline. To avoid getting out of sync, it is recommended to use sync locks as described in section 3.6 *Using the Video/Audio Sync Tools* on page 40 for more information.**

### 2.1.6 Synchronizing an Audio Track to the Timeline Cursor Position (*Sync Edit*)


With the **sync edit** box  selected, a clip can be placed onto the timeline with its cursor point matching the cursor point on the timeline.



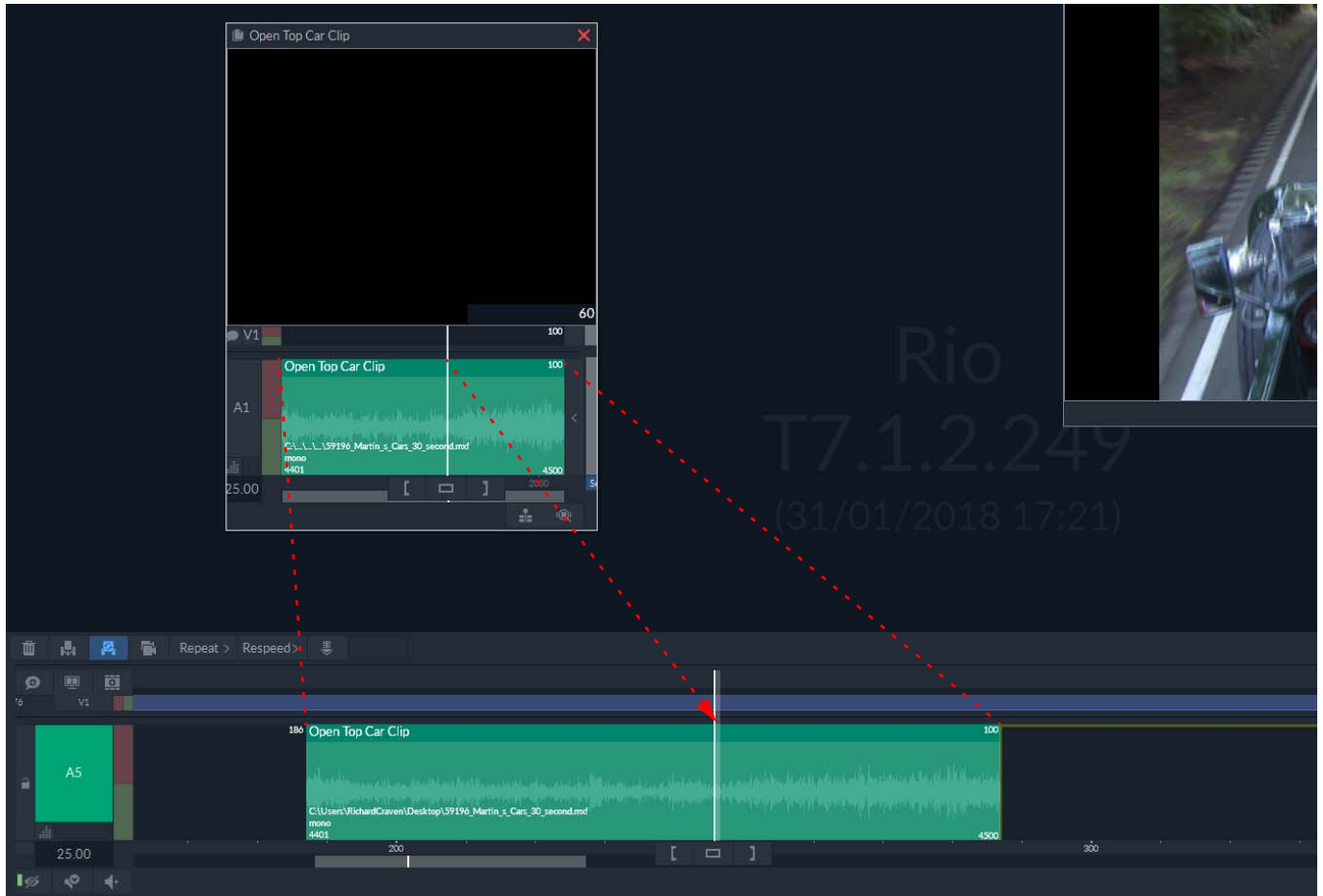
**Figure 22 Sync Edit Box**

This is often useful when synchronizing audio to video.

To use the sync feature:

1. Select the **sync** box .
2. Place the cursor at the required point on the target timeline clip and at the frame where the two clips need to match in the Floating Clip. Ensure that the correct target track filter(s) are selected in the timeline Edit window.

3. Press <Return>.



**Figure 23 Synchronizing an Audio Track to the Timeline Cursor Position**

The audio of the Floating Clip is added to the timeline using the two cursor positions as a reference point.

**2.1.7 Adding Audio Using the Floating Clip More Options Menu**

Selecting **Edit** from the **More** options menu , found at the top-right of a Floating Clip, places the entire clip or selected audio track (or a selected segment of the clip) at the current timeline cursor position or within marked In/Out points on the timeline. The new clip overwrites any media that it overlaps.



**Figure 24 Using Floating Clip More Options Menu to Add Audio to the Timeline**

The **Replace** option places the clip on the timeline and replaces all existing media on the timeline.

The **Swap** option places the content of the Floating Clip onto the timeline and simultaneously places the timeline contents onto the desktop as a Floating Clip, i.e., the Floating Clip and the timeline edit are *swapped*.



When the focus is on a Floating Clip, pressing <Return> has the same effect as selecting Edit from the More options menu.



See the *Desktop Editing User Guide* for more information about the More options menu and working with Floating Clips.

## 2.2 Deleting Audio from the Timeline

Audio can be deleted from a timeline edit in a number of ways depending on user preference and workflow.

### 2.2.1 Deleting an Audio Track

To delete a whole audio track:

1. Select the **delete** box  located at the top-left of the timeline area.


When selected, the **delete** box is highlighted in blue: .

2. Select the track filter box of the audio track to delete, e.g., **A1**.

The track is removed from the timeline edit. Any audio tracks below the deleted track are moved up the track stack. For example, if **A1** is removed from the timeline, track 2 is moved up and becomes **A1**, track 3 becomes **A2**, etc.

### 2.2.2 Deleting Multiple Audio Tracks

To delete multiple audio tracks:

1. Select the tracks to delete by clicking on the corresponding track filter boxes.
2. Select the **delete** box  located at the top-left of the timeline area.

When selected, the **delete** box is highlighted in blue: .

3. Click one of the selected track filter boxes. All of the selected tracks are removed from the timeline edit.

### 2.2.3 Deleting an Audio Segment

To delete a single audio segment from a timeline edit:

1. Double-click on the audio segment to delete.

Alternatively, hold down <Shift> and click the segment. The yellow Move menu is displayed.

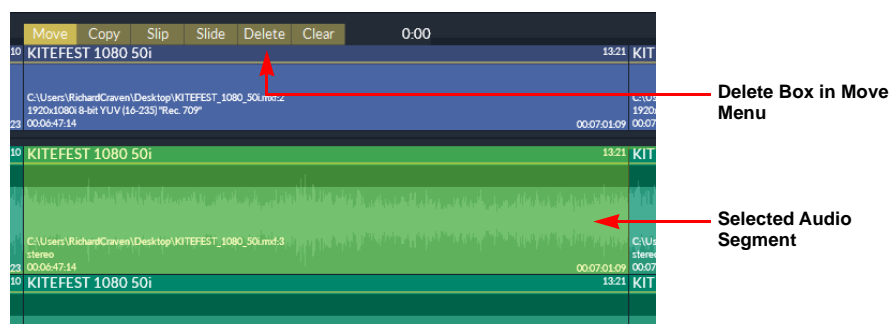


Figure 25 Deleting Audio Segment Using Delete Function in Move

2. Press the **delete** box  in the Move menu to delete the selected segment.

### 2.2.4 Deleting Multiple Audio Tracks


To delete multiple audio segments from a timeline edit:

1. Double-click on one of the audio segments to delete.

Alternatively, hold down <**Shift**> and press on the segment. The yellow Move menu is displayed.

2. Hold down <**Ctrl**> and press on each additional segment to delete.

Each selected segment is highlighted in yellow.

3. Press the **delete** box  in the Move menu to delete the highlighted segments.

## 2.3 Managing Audio Channels

### 2.3.1 Viewing Audio Tracks in the Timeline

The Audio Track Visibility panel is intended to provide a summarized overview of the current status of all possible audio tracks and can be used to select which tracks to display in the timeline. When a track is selected (for example, A1 in Figure 26) by checking its checkbox, the Solo and Mute functions can also be assigned using the corresponding Solo and Mute boxes in the panel. The panel is a useful tool to switch the display of audio tracks in the timeline.

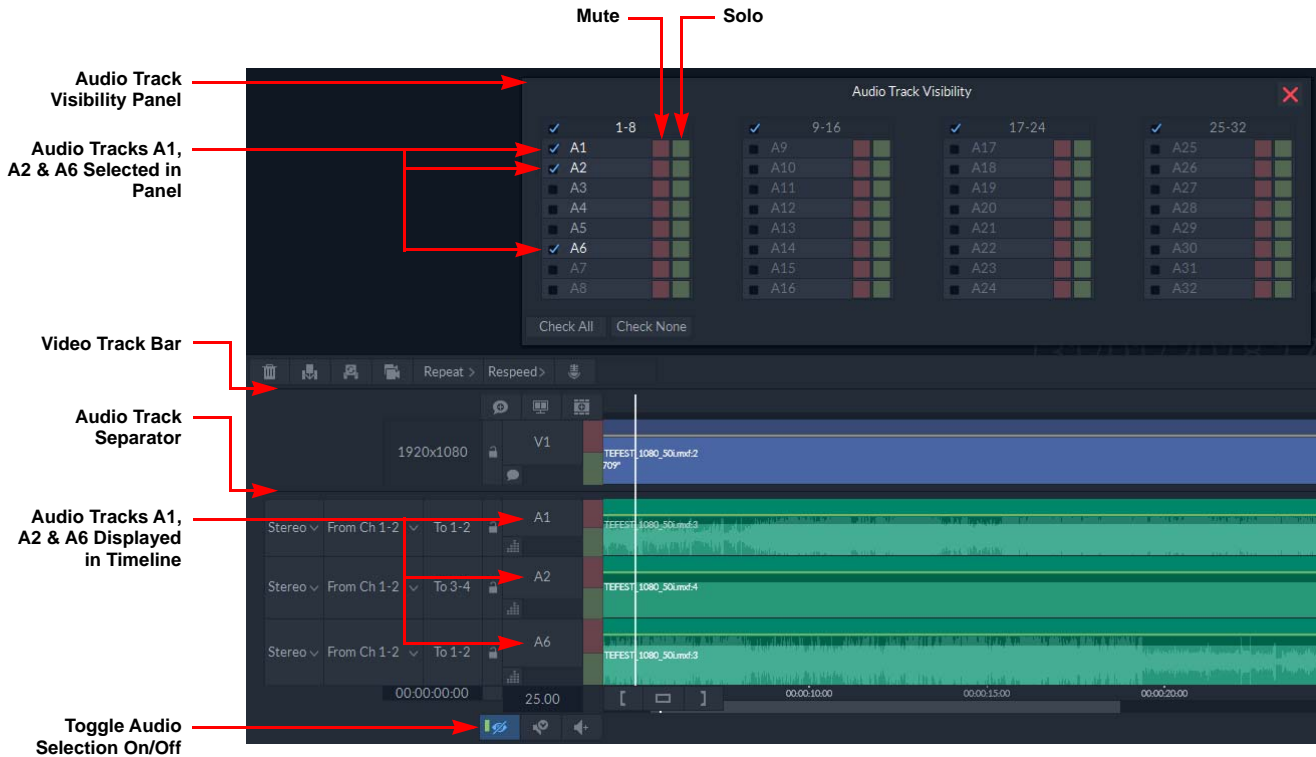



Figure 26 Using the Audio Track Visibility Panel

To display the audio track visibility panel

- Press the **Toggle audio selection** box:  or
- Right-click an audio track filter box and select **Track Visibility** from the menu.

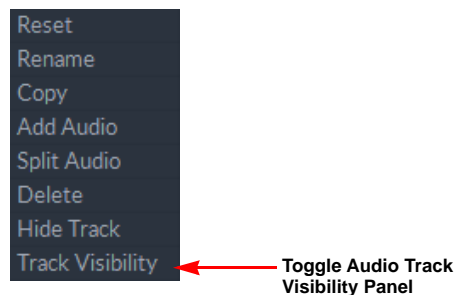


Figure 27 Audio Track Filter Menu

Depending on the system configuration, up to 32 mono audio tracks can be displayed in the Edit timeline window. As 32 audio tracks occupy considerable space, an audio separator, between the video and audio tracks, enables the vertical scale of all displayed audio tracks to be scaled as required. The audio separator can also be used to expand or shrink the video track section.

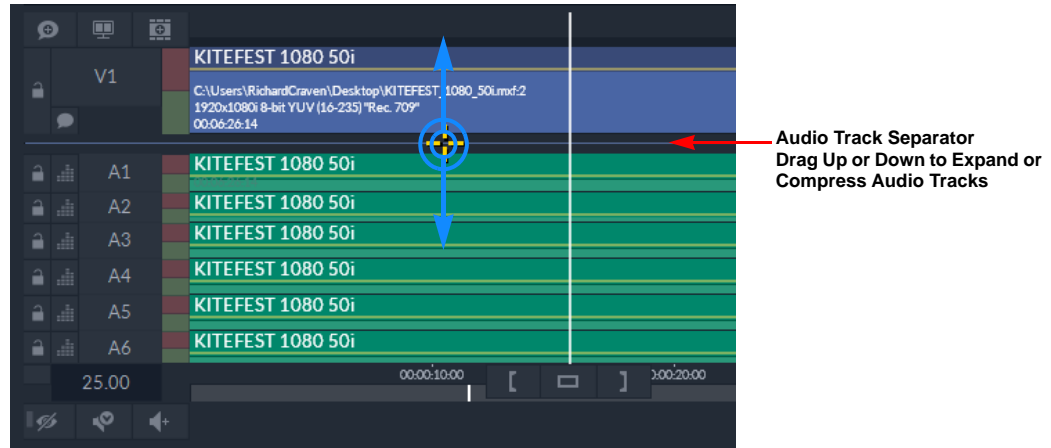


Figure 28 Audio Track Separator



The audio track separator can be deactivated, if necessary, in the Options menu of the Rio Settings by de-selecting the option Use new timeline, see Figure 29.

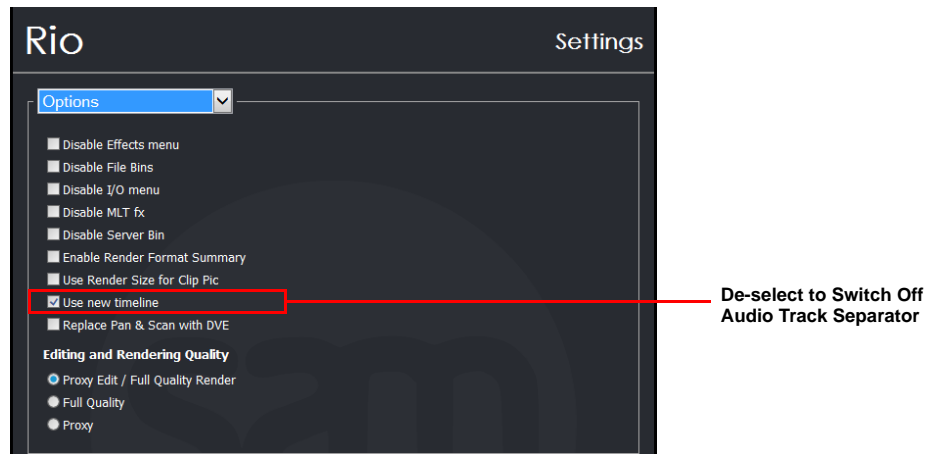


Figure 29 Rio Settings Options Configuration Menu

If the number of audio or video tracks displayed exceeds the space available in the Edit timeline window, separate scroll bars for video and audio tracks are activated at the right-hand side of the timeline. Both audio and video tracks will always reach their minimum



height before the scroll bars are displayed. track section. To scale the tracks within the existing height of the timeline window, press on the scroll bar and move to the left to expand and right to contract the displayed tracks.

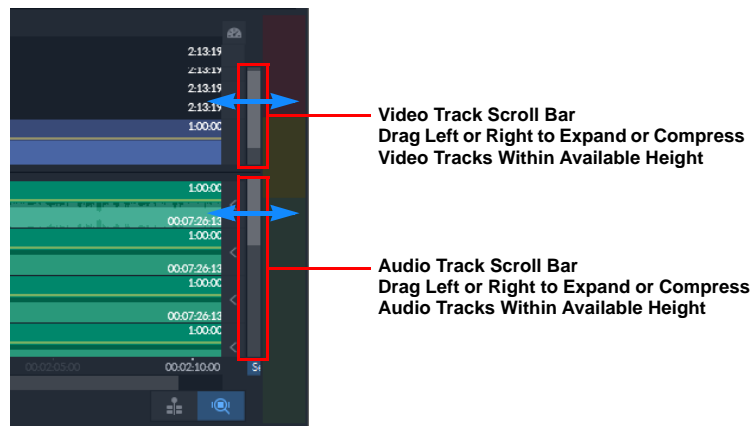


Figure 30 Video and Audio Track Scroll Bars

### 2.3.2 Setting Audio Channel Assignment

When material is recorded into the system, the required audio channels (i.e., ch 1, ch 2, ch 3, etc.) from the source are assigned to the system's internal tracks (i.e., **A1**, **A2**, **A3**, etc.) These internal tracks can be a single channel of audio (i.e., mono), a pair of audio channels (i.e., a stereo pair of channels 1 & 2, 3 & 4, 5 & 6 or 7 & 8 etc.) or a whole audio group (i.e., quad channels 1, 2, 3, 4 or 5, 6, 7, 8, etc.).

By default, the system uses the audio assignments that have been set-up during recording, so it is important that a consistent audio assignment is used for all clips recorded.

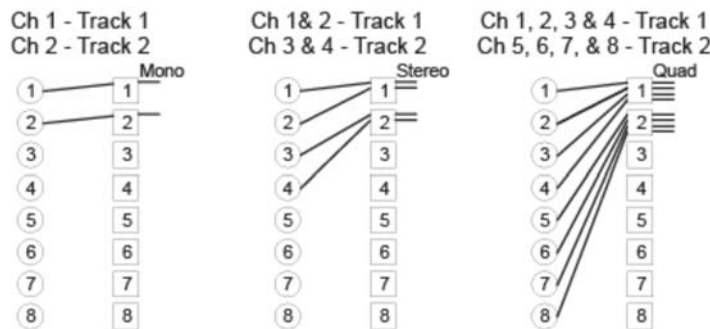


Figure 31 Assigning Audio Inputs for Mono, Stereo or Quad Channels

The internal audio tracks of the system can be mapped to individual output audio channels as follows:

1. Open the left hidden menu by dragging one of the filter boxes to the right.
2. Press one of the Output boxes, labeled, for example, **To 1-2**

This displays the output selection menu:

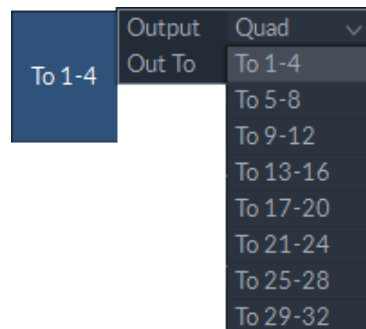
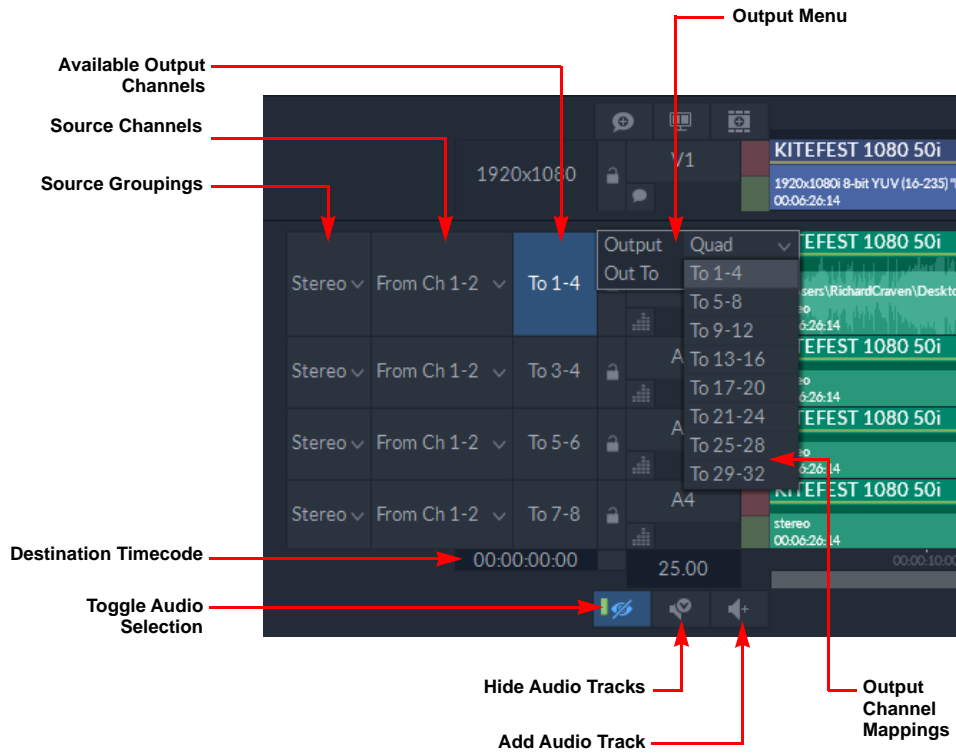


Figure 32 Assigning Audio Inputs for Mono, Stereo or Quad Channels

3. Select the output mode from the Output scroll menu; choose either Mono, Stereo, or Quad.
4. Select the required output channels from the **Out To** scroll menu.



**Figure 33 Mapping Audio Tracks in the Left-hand Hidden Menu**

When mapping the timeline audio tracks to output channels, some assumptions are made. These affect instances where there are too many track channels for the selected output channel (e.g., outputting a quad track as a single channel) or when there are too few timeline track channels for the selected output channels (e.g. outputting a mono track as a quad).

Where there is a difference in audio assignments between clips on the timeline, the audio channels are automatically re-assigned.

When there are too few channels on the track segment for the selected output channels, the most appropriate track segment channel is automatically duplicated.



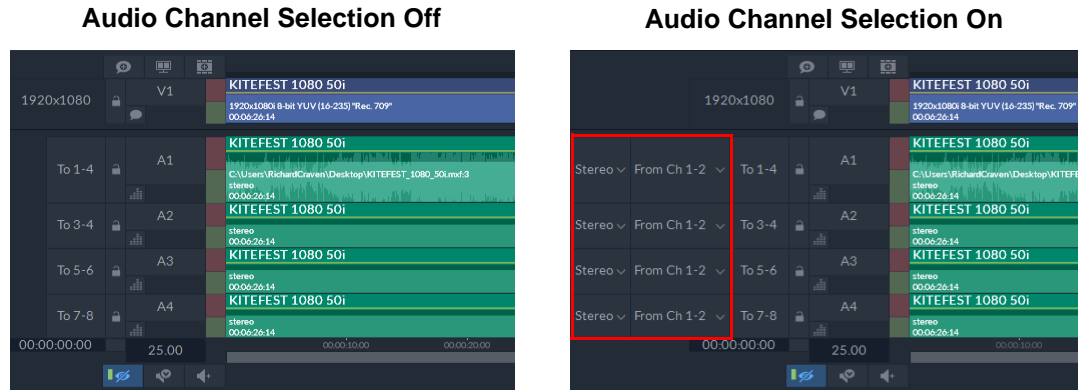
**Figure 34 Mapping Audio Tracks when Too Few Output Channels Available**

For example, routing a mono track to channels 1 & 2 places the mono channel on both channels 1 and 2. If however, a stereo track is to be output as a quad (e.g., to channels 1, 2, 3 & 4) then the stereo pair 1 & 2 also displays on channels 3 & 4.

When too many track segment channels are available for the selected output channels, unused channels are ignored, e.g., routing a stereo track to channel 1 discards the second channel.

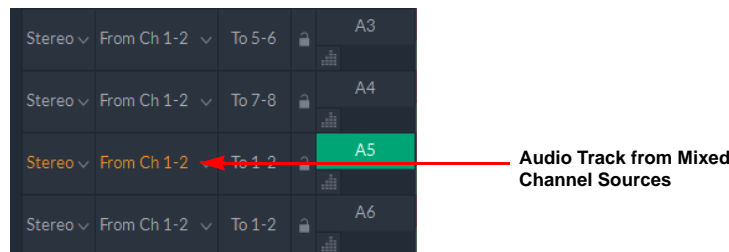
### 2.3.3 Selecting Audio Input Channels

Audio channel selection boxes can be displayed on the **Edit** timeline if required. The **Audio Channel Selection** box must be ticked in the **Clips** menu of the <F1> Configuration window before these boxes can be displayed.



**Figure 35 Effect of Audio Channel Selection Configuration Settings**

With Audio Channel Selection box selected, the Source Channels box can be used to specify the input channels. Click on the **From Ch n** scroll box and select the required source channel from the scroll menu. When there are no audio segments selected, this setting affects the whole audio track.



**Figure 36 Adding Audio From Mixed Channel Sources**

If the timeline audio segments are originally from mixed channel sources, or a segment's source has subsequently been changed, the label text displayed in the **From Ch n** box changes color to orange to indicate that the setting is not global for the whole track.

#### 2.3.3.1 Audio Grouping Options

The **Source Groupings** scroll box displays the source grouping of the clip, e.g. **mono**, **stereo**, **quad** etc. For example, to split a stereo track out to two separate mono tracks select **mono**.

Grouping options are as follows:

Grouping Options	Description
<b>mono</b>	An individual audio channel (e.g. 1, 2, 3, 4, etc.).
<b>stereo</b>	A pair of audio channels (e.g. 1 & 2 or 3 & 4, etc.).
<b>quad</b>	A group of 4 audio channels (e.g. 1, 2, 3 & 4 or 5, 6, 7 & 8, etc.).
<b>8 channel</b>	A group of 8 audio channels (e.g. 1, 2, 3, 4, 5, 6, 7 & 8 or 9, 10, 11, 12, 13, 14, 15 & 16, etc.).
<b>16 channel</b>	A group of 16 audio channels (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 & 16, etc.).
<b>32 channel</b>	A group of 32 audio channels (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 31 & 32, etc.)

If the label text in the grouping box is orange, this indicates that the clip has a mixed source grouping across the timeline. For example, there may be a mix of mono and stereo segments on one audio track.



**A stereo audio track can be split by right-clicking on either the track filter box (e.g., A2) or on the actual audio segment and selecting the option Split Audio.**



**Standalone workstations and sQ workstations support a maximum of 16 channels (the maximum supported by sQ Server.)**

## 2.4 Managing Audio Levels

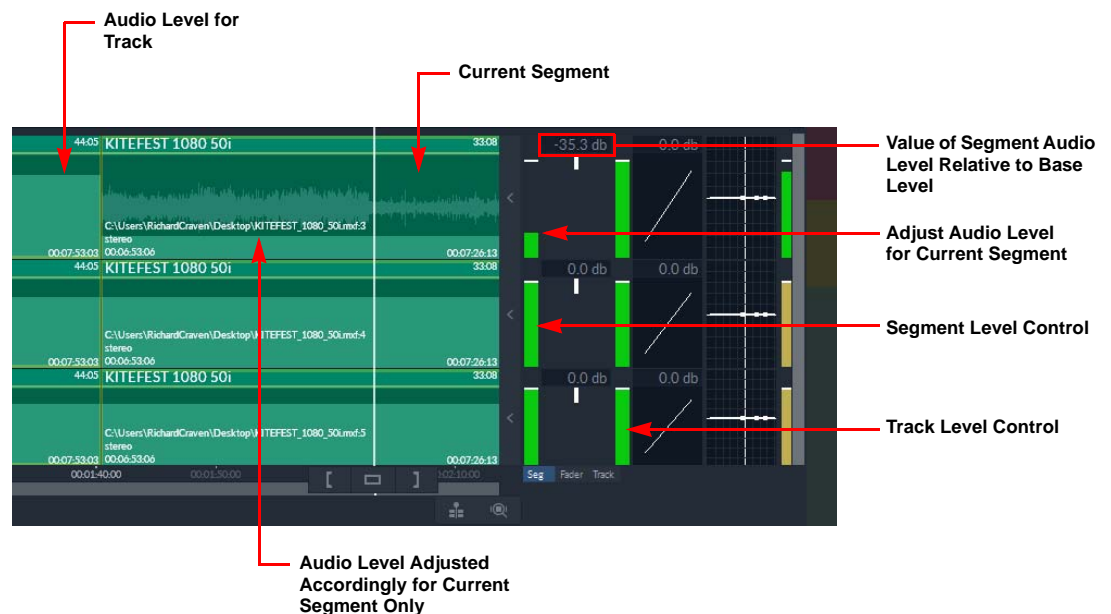
Audio level tools are revealed by opening the hidden menu to the right of the timeline. These tools allow the audio levels to be adjusted for each audio track and/or each individual audio segment.

### 2.4.1 Track or Single Segment Audio Level Adjustments

The Track Level and Segment Level boxes are calibrated in decibels. A value of 0.0 indicates that the audio level is the same as when recorded into the system, a positive value indicates that the level has been amplified from the original level and a negative value indicates that the level has been reduced from the original level.

#### 2.4.1.1 Adjusting Audio Levels for a Segment or Segments

The left-most audio level bar adjusts the audio level of the current segment in which the timeline cursor is positioned.

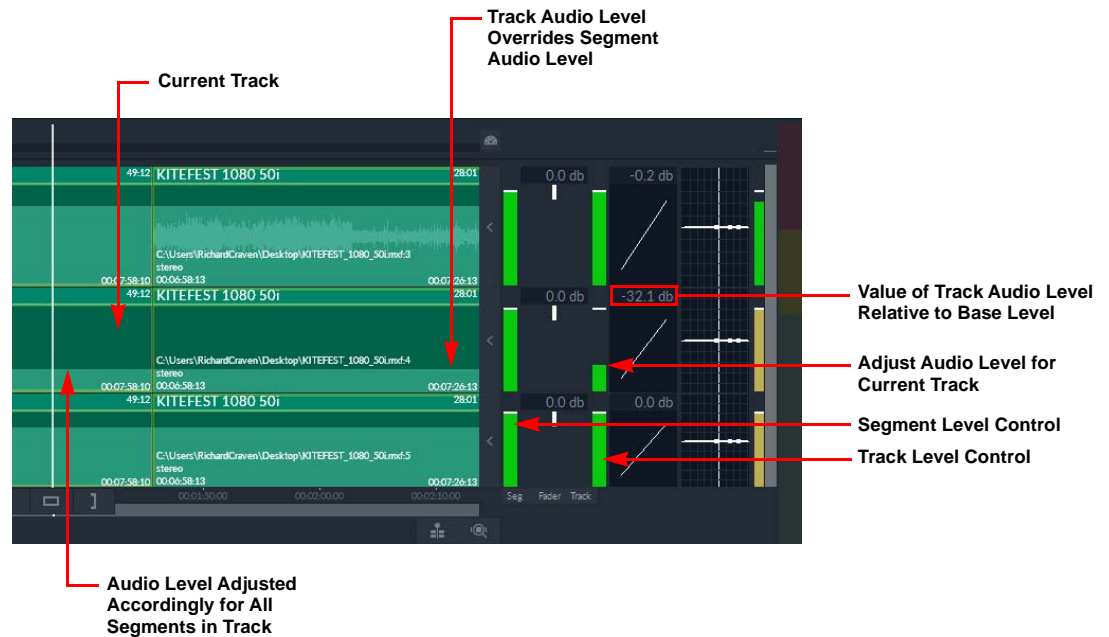


**Figure 37 Adjusting the Audio Level of the Current Segment**

By default, the **Segment Level** controls adjust a single segment at a time. To adjust the same segment across multiple tracks, select the relevant track filters and hold down **<Shift>** while adjusting the Segment Level controls.

### 2.4.1.2 Adjusting Audio Levels for the Entire Track

To adjust the audio level for the whole track, click on the **Track Level** control and drag up to increase the level or down to decrease the level.



**Figure 38 Adjusting the Audio Level of the Current Track**


To adjust the audio levels for multiple tracks, select the relevant track filters and hold down **<Shift>** while adjusting the Track Level controls.



### 3. Audio Editing Tools

#### 3.1 Using the Audio Editing Tools

The Audio editing tools enable the user to manage audio track levels and to create transitions or fades, directly on the timeline.

##### 3.1.1 Activating Audio Edit Level Tools

The Audio **Edit Level** tools enable audio levels to be managed and fades created directly on the timeline using the Audio Edit Level tools box: .

To activate the Audio Tools, select  located below each audio track filter. When activated, the box changes color to blue: .

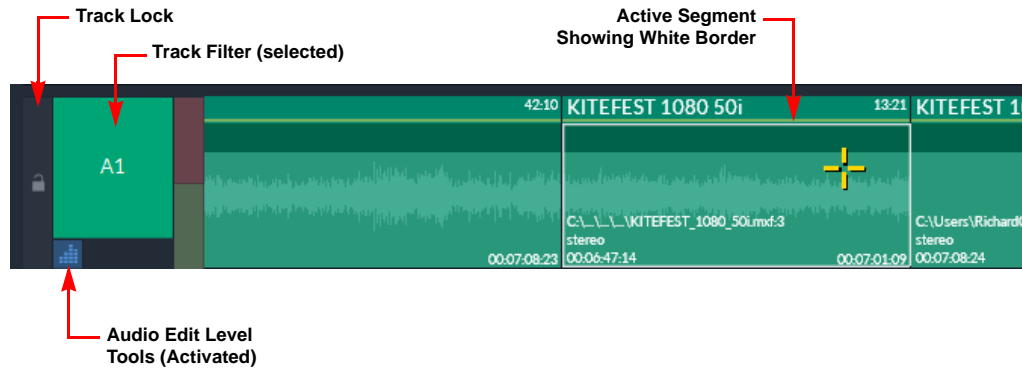



Figure 39 Activating the Audio Edit Level Tools



Holding down <Ctrl> and hovering the cursor over a segment has the same effect as when Audio Edit Level Tools is enabled. This is useful if audio needs to be quickly adjusted.

With the audio edit level tools box activated , various highlights are displayed when hovering the cursor over the audio tracks. The type and color of highlight depends on the position of the cursor and whether it is hovered over either:

- A segment of the audio track, or
- An edit point of the audio track.

When hovered in the middle of an audio segment the segment is outlined with a white border:

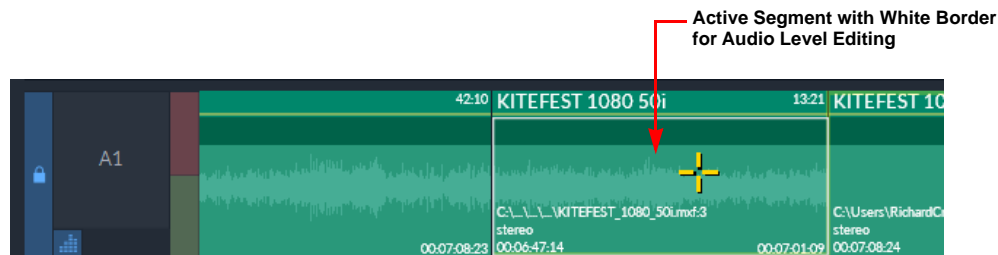
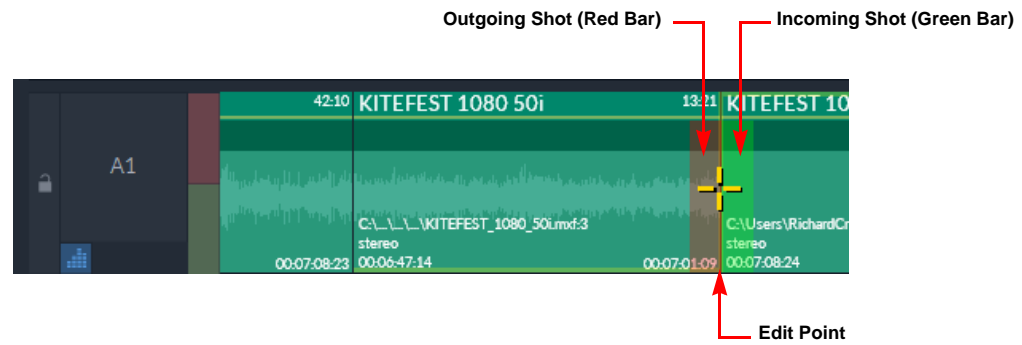


Figure 40 Editing the Audio Level of a Segment

When hovered over an audio edit point, a red bar is displayed on the outgoing shot, and a green bar on the incoming shot:



**Figure 41 Modifying the Edit Point Between Segments**

### 3.1.2 Adjusting Audio Levels

To adjust audio levels with the Audio Edit Level tools box selected:

1. Hover over the segment to be edited.  
The segment is highlighted with a white border.
2. Press on the segment and drag up to increase the level or drag down to decrease the level.

#### 3.1.2.1 Adjusting Audio Levels Across Multiple Segments

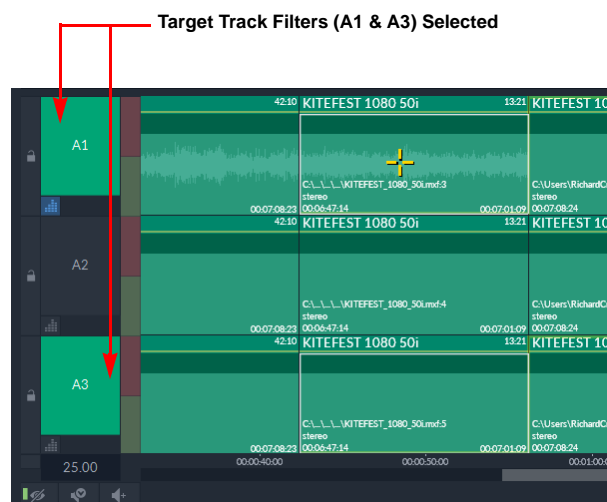
To adjust the level of a segment across multiple tracks:

1. Select the target audio tracks using the track filter boxes that contain the segments to be adjusted (e.g. **A1** and **A3**).
2. Select the Audio Tools box of one of the selected tracks (e.g. **A1**).
3. Hover the cursor over the segment that needs to be adjusted.

It must be a segment on the track where the Audio Tools are activated and the active segment is highlighted with white border.

4. Hold down **<Shift>**.

All equivalent segments across the selected tracks are also highlighted with white borders.



**Figure 42 Editing the Audio Level of Multiple Segments**

5. Press on the segment and drag up to increase the audio level or drag down to decrease the audio level.



Each highlighted segment across the selected tracks is adjusted accordingly.

### 3.1.3 Modifying Audio In/Out Points

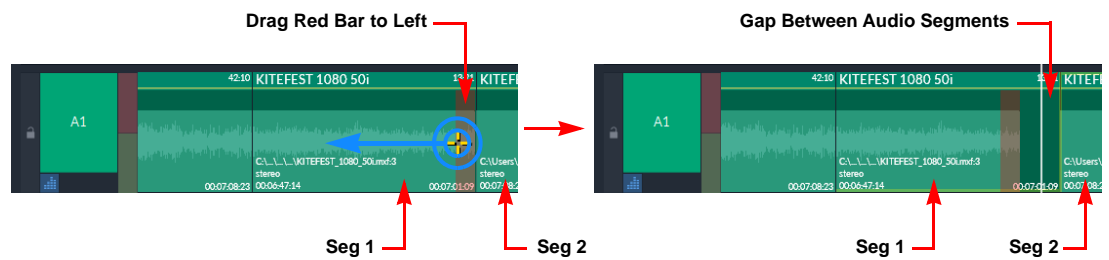
With Audio Tools enabled, the In and Out points of a segment's audio can be changed as follows:

1. Hover the cursor over the edit point to reveal the red and green bars.

Make sure that the bars are a solid color. It is important to note that when the color bar displays a color gradient, adjustment generates a fade in/out effect on the audio track, see section See "Creating Audio Transitions or Fades" on page 29. for more information.

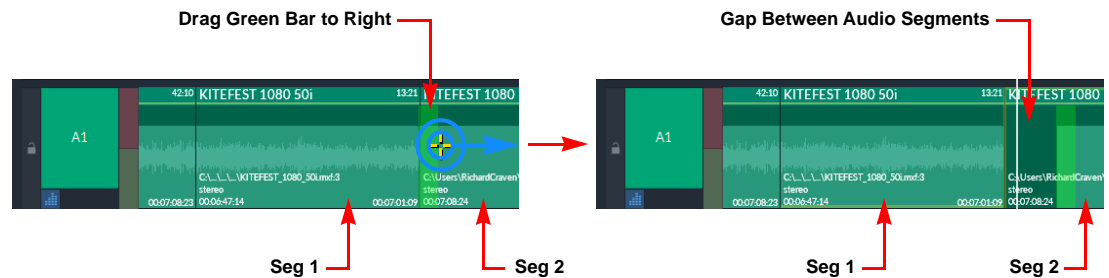
2. Press on either the red or green bar and drag it left or right to advance or delay the audio.

For example, Figure 43 shows that the Out point of Seg 1 has been moved to an earlier point, leaving a section of silence between the end of Seg 1 and the start of Seg 2.



**Figure 43 Adjusting the Out Point of an Audio Segment**

In Figure 44, the In point of Seg 2 has been delayed, leaving a section of silence between the end of Seg 1 and the start of Seg 2.



**Figure 44 Adjusting the In Point of an Audio Segment**

Alternatively, both the In and the Out points can be moved simultaneously by hovering the cursor directly over the cut point - both the red and green bars should be displayed).

When both bars are dragged left or right, the In and Out points move together.



**Figure 45 Adjusting the In & Out Points Together**

### 3.1.3.1 Overlapping In and Out points

Audio In and Out points can also be made to overlap. For example, the In point of one audio segment can be dragged forward past the Out point of the previous segment. Alternatively, the Out point of one audio segment can be dragged past the In point of the next segment:

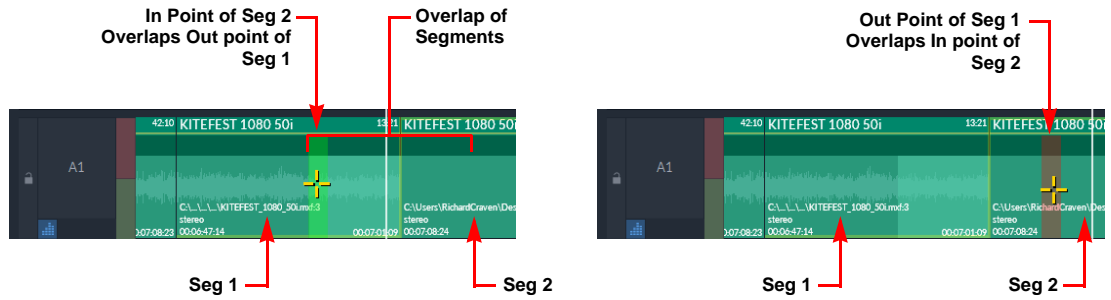


Figure 46 Overlapping In and Out Points of Adjacent Segments

### 3.1.4 Creating Audio Transitions or Fades

With the Audio Tools box enabled, audio fades and transitions can be manually added directly on the timeline. Hover over an audio edit point until the red and green in and out bars are displayed, see section See “Using the Audio Editing Tools” on page 26..

When the cursor is hovered over the red and green bars two different functions are available:

- Bars showing solid color - used to adjust the audio In and Out points, see section See “Modifying Audio In/Out Points” on page 28.
- Bars showing a color gradient - used to define audio fades between segments. Hover the cursor towards the top outer corner of the bar to activate the fade function.

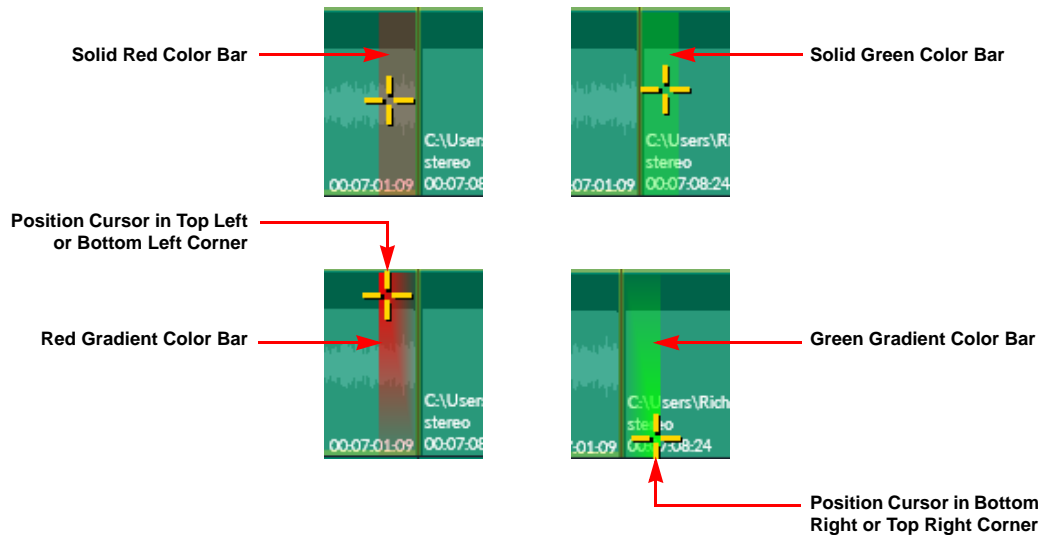


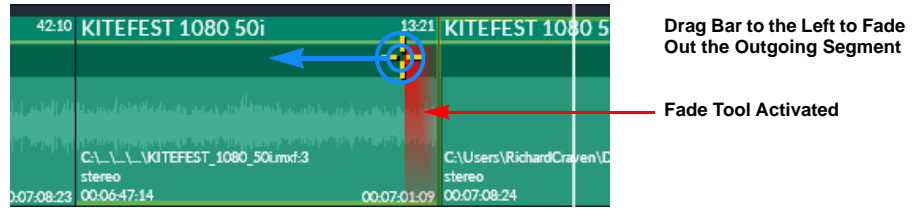
Figure 47 Selecting Color Bars to Configure Audio Fades

#### 3.1.4.1 Adding an Audio Fade

To create a fade in or out with the audio Edit Level tools enabled:

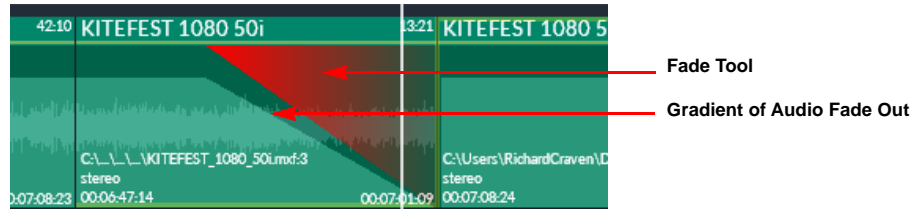
1. Hover the cursor over an audio edit point until the red and green bars display.

2. Move the cursor toward the top corner of either the Out point (red) or In point (green) until the bar displays a color gradient.



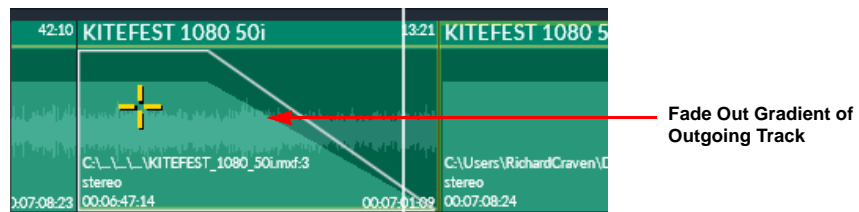
**Figure 48 Selecting the Bar Type to Define an Audio Fades**

3. Click and drag left (for the Out point) or right (for the In point) along the audio segment.



**Figure 49 Defining an Audio Fade-out**

The result is a gradual fade out or fade in of the audio track. The further the bar is dragged along the track, the longer the fade.



**Figure 50 Audio Fade Applied and Audio Edit Level Tools Deactivated**

**3.1.4.2 Adding an Audio Cross-fade**

To create a cross-fade, with Audio Tools enabled:

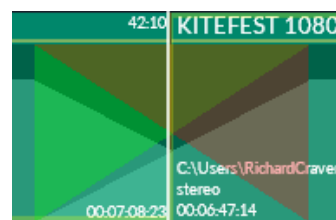
1. Hover directly over an audio edit point, in the lower half of the track.

The red and green In and Out bars are displayed.



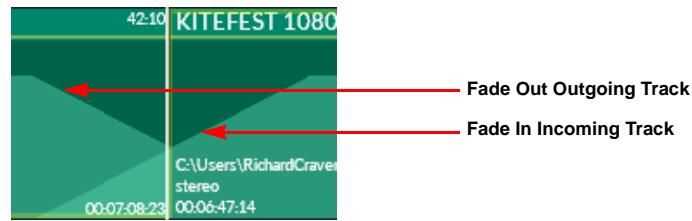
**Figure 51 Cursor Position to Apply Audio Cross-fade**

2. Click between the red and green bars and drag upward to create the cross-fade.



**Figure 52 Creating the Cross-fade**

- Click on the cross-fade and drag it left or right along the track to change the position of the fade, if necessary.



**Figure 53 Audio Fade Applied**

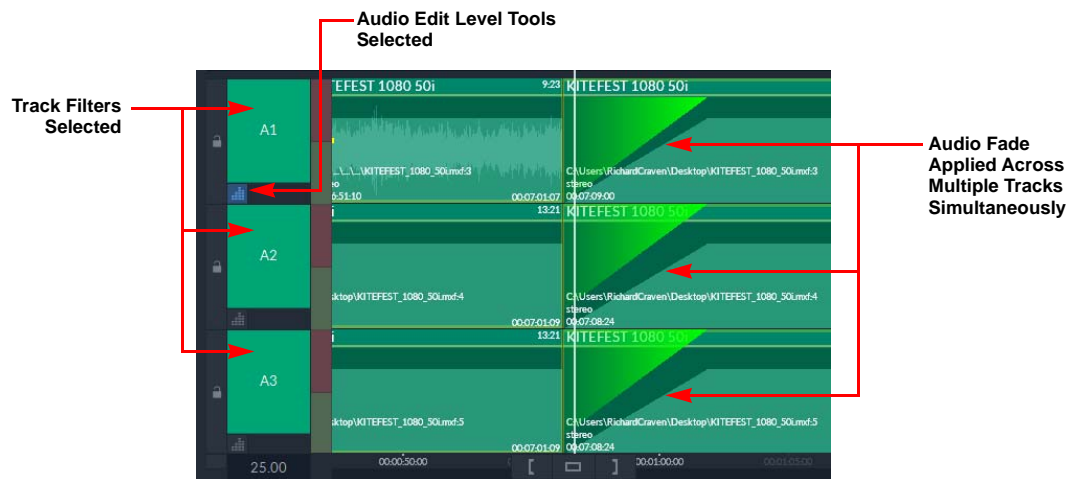
To clear an audio fade or cross-fade, right-click and select **Del Seg Fades**.

### 3.1.4.3 Applying Audio Fades Across Multiple Tracks



**A fade can only be applied across multiple tracks when the edit points are aligned at the same time point across all selected tracks.**

Fades can be applied across multiple selected tracks simultaneously when the edit points of the selected tracks are aligned at the same time point.



**Figure 54 Audio Fade Applied Across Multiple Tracks**

Apply an audio fade across multiple tracks as follows:

- Select the audio track filter boxes of the target tracks to be edited.
- Hold down the **<Shift>** key.
- Apply the fade or cross-fade as described in sections See “Adding an Audio Fade” on page 29. or See “Adding an Audio Cross-fade” on page 30..

The fade or cross-fade is applied across all selected tracks.

### 3.2 Using the Audio Transition Menu

#### 3.2.1 Accessing the Audio Transition Menu

To open the Audio Transitions menu, place the timeline cursor at an audio edit point and press <F6>. Alternatively, double-click directly on an audio edit point.

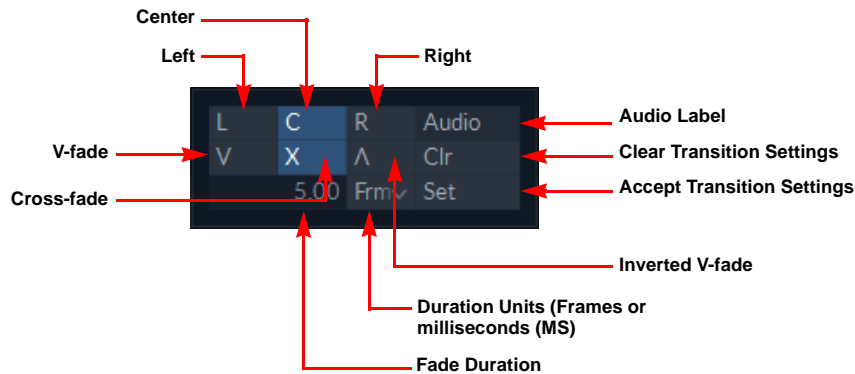



Figure 55 Audio Transition Menu Components




The menu displays as a popup above the timeline. Close the menu by hovering in the top-right of the popup and clicking: .



**Use the track filter boxes to select the target tracks to which to add the transition. If no tracks are selected, the transition is placed on all tracks.**

##### 3.2.1.1 How to Use the Audio Transition Menu

The following options allow the position and type of audio transition to be selected:

Option	Function	Description
<b>L</b>	Left	The fade starts before the edit point (at a point within the In tail of the current clip) and stops at the edit point.
<b>C</b>	Center	The fade is centered around the edit point (starting and stopping within the audio tails).
<b>R</b>	Right	The fade starts at the edit point and stops after the edit point (at a point within the out tail of the current clip).
	V-fade	Fades the first clip down before the second clip fades-up.
	Cross-fade	Creates an audio cross fade.
	Inverted V-fade	Fades the second clip up before the first clip fades-down.

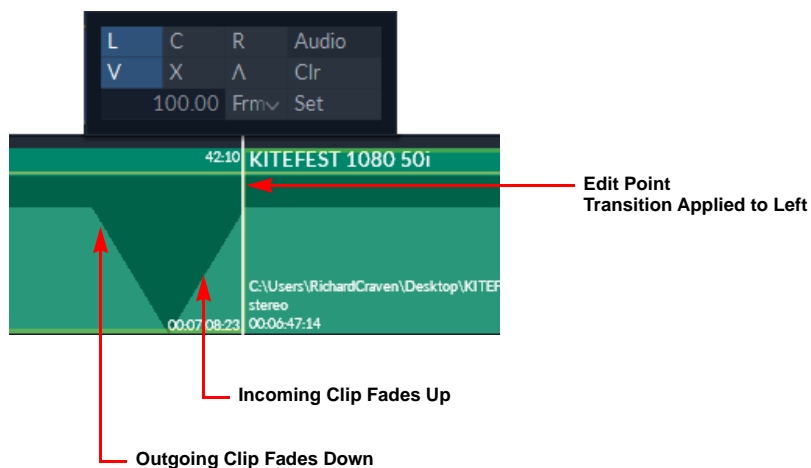


Figure 56 Audio Transition Menu: V-fade Applied to Left of Edit Point

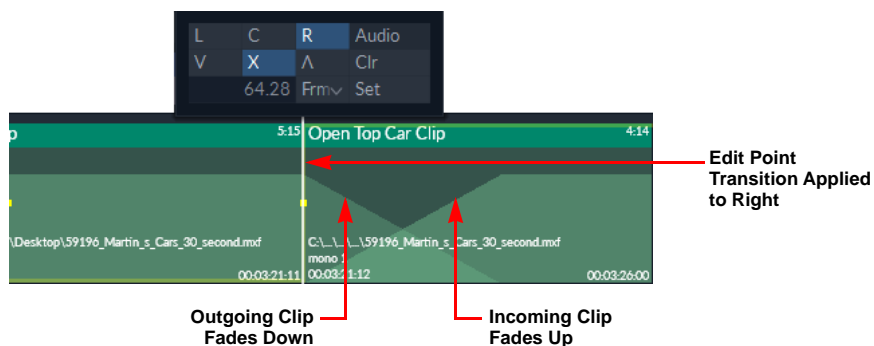


Figure 57 Audio Transition Menu: Cross-fade Applied to Right of Edit Point

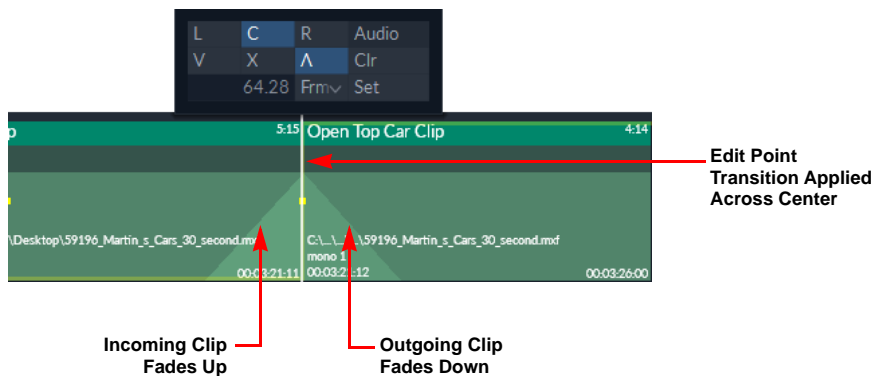


Figure 58 Audio Transition Menu: Inverted V-fade Applied Centered on Edit Point

The numeric **fade duration** box defines the total duration of the audio fade either in frames or milliseconds (select **Frm** or **MS** from the scroll box). Click **Set** to confirm the audio fade or **Clr** to clear it.

The type of fade and its position relative to the edit point is represented visually by the highlighted shape around the edit point on the timeline, see Figure 56 to Figure 58.

### 3.3 Adjusting Audio Levels Using Keyframing

Audio levels across a segment can be customized by setting and adjusting keyframes.

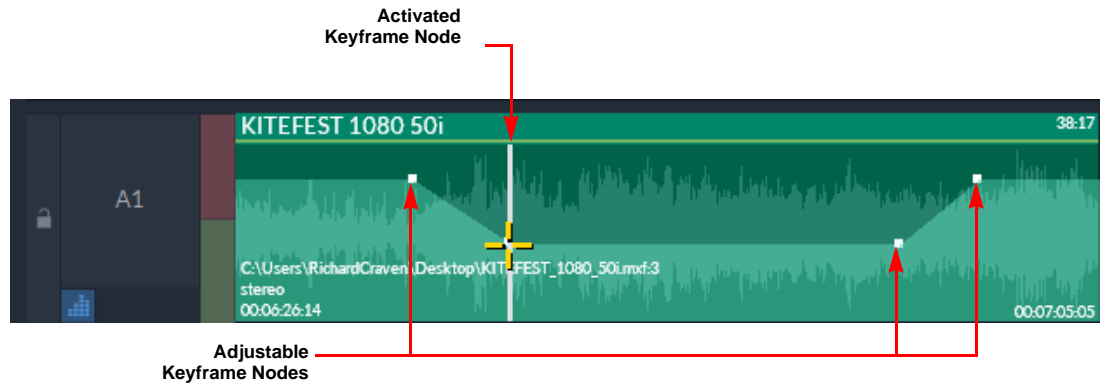


Figure 59 Audio Level Reduced Using Keyframing

#### 3.3.1 Inserting an Audio Keyframe

To add a keyframe, place the cursor on the audio segment at the required position and do either of the following:

- Right-click and select **Ins Level** from the popup menu.

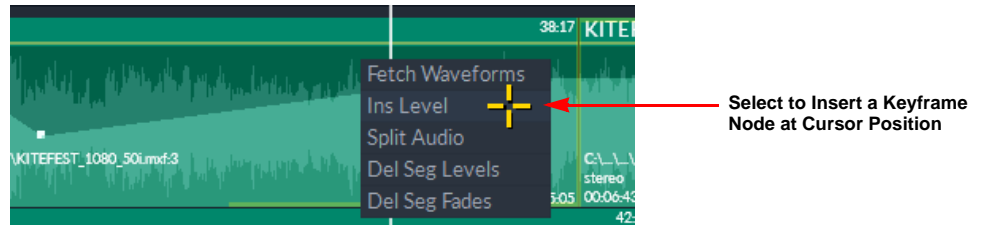


Figure 60 Inserting a Keyframe from the Popup Menu

- Press the </> key on the keyboard. Using this method inserts a keyframe on all audio tracks simultaneously if no track filter boxes are selected. The audio track filter boxes can be used to control where keyframes are inserted.

#### 3.3.2 Adjusting an Audio Keyframe

To adjust an audio keyframe enable the Audio Tools box (located below the track filter boxes) for the relevant track. Alternatively, hold down <Ctrl>.

Hover the cursor over the keyframe to be adjusted. A vertical thick white bar is displayed. To change the position of the keyframe, click the bar and drag left or right.

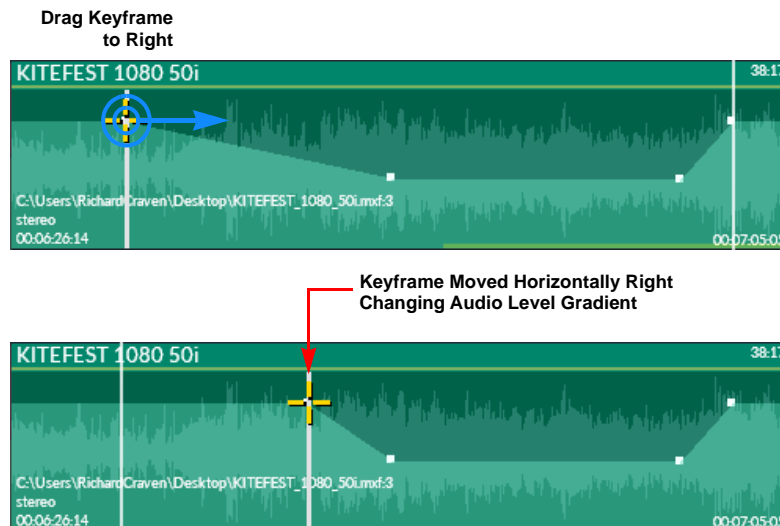
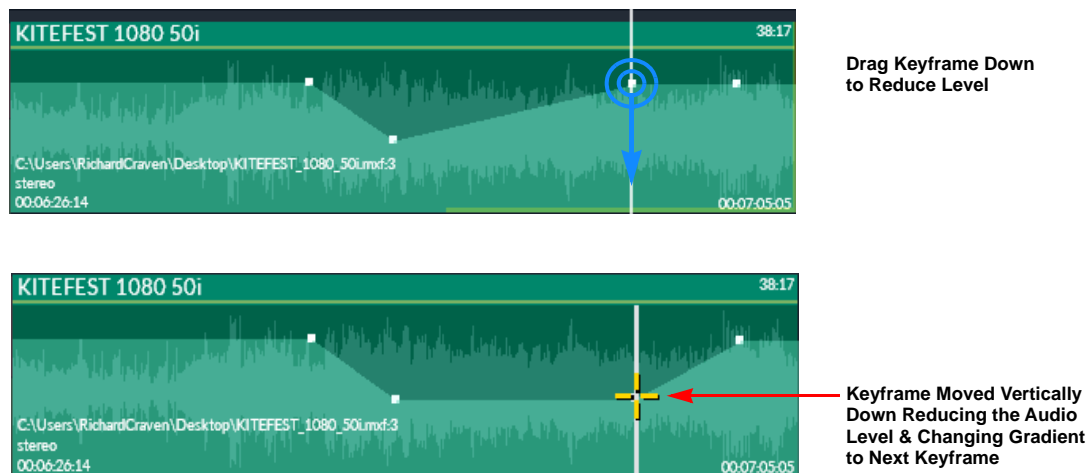


Figure 61 Horizontal Adjustment of Keyframe

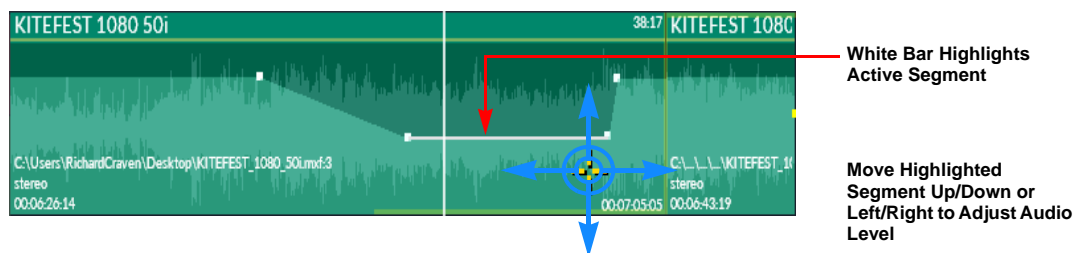
To change the audio level at a keyframe, click the bar and drag up or down to increase or decrease the audio level, respectively. The audio level between this and other keyframes on the segment is interpolated smoothly.



**Figure 62 Horizontal Adjustment of Keyframe**

The audio level between keyframes can be adjusted by hovering in the space between the two keyframes until the area of the segment is highlighted with a white bar along the top edge+. Either:

- Click and drag up or down to adjust the audio level between the keyframes, or
- Click and drag left or right to adjust the horizontal position of the segment.




**Figure 63 Adjustment of Highlighted Segment**

Delete a keyframe by right-clicking on the target keyframe, then selecting **Del Level** from the popup menu. Delete all keyframes from the segment by selecting **Del Seg Levels** from the popup menu.



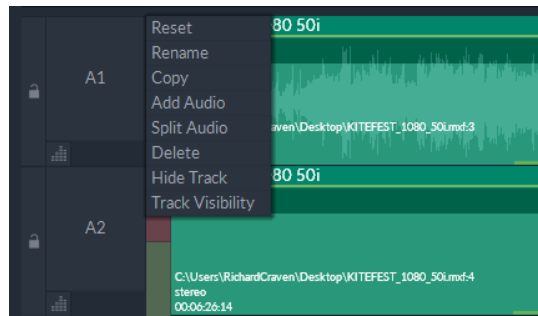
**Figure 64 Deleting a Keyframe or All Keyframes from a Segment**

Alternatively, select the **delete** box  on the top-left of the timeline and then click on the keyframe.



### 3.4 Using the Audio Track Filter Tools

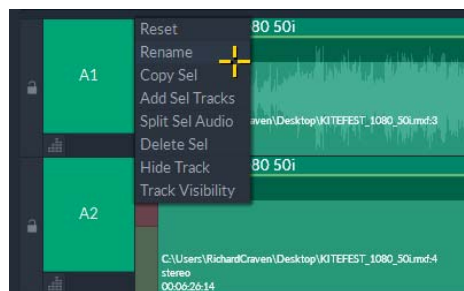
A number of additional audio tool options can be accessed by right-clicking on an audio track filter box.



**Figure 65 Audio Track Filter Tools - Popup Menu**

Available options can vary depending on the status of the audio track but include:

Option	Description
<b>Reset</b>	Restores the vertical scale of all tracks to the default.
<b>Rename</b>	Allows a new name to be entered for the current track (note that this name cannot be saved or stored after the session ends).
<b>Copy</b>	Copies the current track, including any audio settings, onto the timeline as a new track.
<b>Add Audio</b>	Adds a new audio track. The new audio track displays below the current track.
<b>Split Audio</b>	Separates the audio channels of the current audio track into additional tracks, e.g., a stereo clip can be split into two individual mono tracks.
<b>Delete</b>	Deletes the current audio track.
<b>Hide Track</b>	Hides the current track.
<b>Track Visibility</b>	Displays the Audio Track Visibility panel.



**Figure 66 Audio Track Filter Tools - Popup Menu for Multiple Selected Filters**

If one or more audio track filters are selected then the options differ as follows:

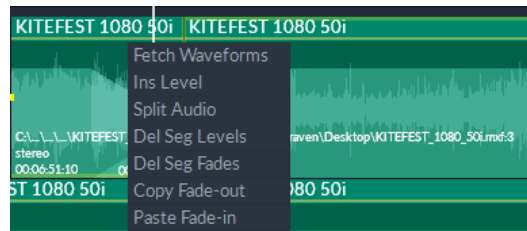
Option	Description
<b>Copy Sel</b>	Copies the selected track(s) including any audio settings onto the timeline as a new track.
<b>Add Sel Tracks</b>	Adds a new audio track under each selected audio track.
<b>Split Sel Audio</b>	Separates the audio channels of the selected audio track(s) into additional tracks, e.g., a stereo clip can be split into two individual mono tracks.
<b>Delete Sel</b>	Deletes the currently selected audio track(s).



**If both video and audio tracks are selected, the Copy Sel, Add Sel Tracks and Delete Sel operations apply to all selected video tracks as well as to all selected audio tracks.**

### 3.5 Using Additional Audio Segment Tools

A number of additional audio tool options can be accessed by right-clicking directly on an audio segment.



**Figure 67 Audio Segment Tools - Popup Menu**

These options include the following:

Option	Description
<b>Fetch Waveforms</b>	Caches and displays the audio wave for an audio track without first needing to play through the video track.
<b>Ins Level</b>	Inserts an audio keyframe.
<b>Split Audio</b>	Splits the audio channels of the current audio segment, e.g. a stereo segment can be split into two individual mono segments, the second of which is placed on a new audio track.
<b>Del Seg Levels</b>	Deletes all audio keyframes and levels from the current audio segment. The audio level for that segment returns to its original level.
<b>Del Seg Fades</b>	Deletes all audio fades from the current audio segment.
<b>Copy Fade-(in/out/both)</b>	Copies the fade settings from the current segment into a buffer.
<b>Paste Fade-(in/out/both)</b>	Pastes any fade settings held in the buffer to the current segment.

#### 3.5.1 Copying and Pasting Audio Fades

The **Copy** and **Paste Fade** options become available when right-clicking to the area directly beside or above an audio edit point. Depending on the exact area that is selected (before, after or on the edit point) the option either displays **in**, **out** or **both**:

- **Copy fade-in** Right-click to the right of an edit point.
- **Copy fade-out** Right-click to the left of an edit point.
- **Copy fade-both** Right-click directly on the edit point.

To use the copy and paste fade functions:

1. Right-click to the left, right or directly on the edit point to copy.
2. Select the required copy option from the popup menu.

The fade is saved to a buffer.

3. Right-click the audio segment to which to add the fade.
4. Select **Paste Fade-in/out/both**.
5. The fade settings are pasted onto the segment and applied.

As with other settings in this pop-up menu, the Paste Fade options are applied across all selected audio tracks. Note that the edit point must occur at the same frame across tracks for the multi-track paste operation to work. Multi-track paste will not work if the edit points are on different frames on different tracks.

In addition to copying fades between tracks, it is also possible to copy between clips. For example, a fade from the main timeline can be copied to a Floating Clip, and vice versa.

## 3.6 Using the Video/Audio Sync Tools

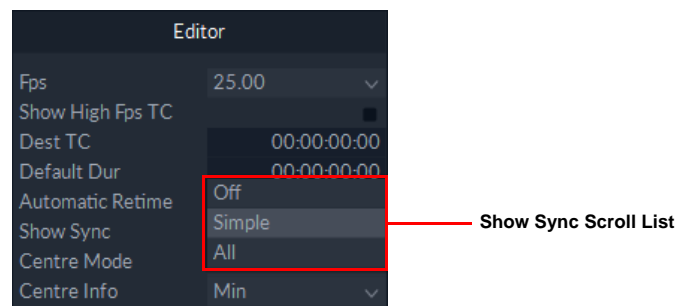
When video and audio from the same original clip are split during editing, the affected audio segments are identified either by a red underscore or a red parallelogram with an audio slip value, depending on the configuration. If the audio and video do not have an original relationship, red lines do not display when the video and audio tracks are moved independently.

### 3.6.1 Displaying the Show Sync Indicators

When audio and video tracks are edited independently of each other (e.g. when the track filters have been selected) there is a danger of breaking the relationship between them. For example, if frames are added only to the video track, all the following frames move along to make room for the new ones. The audio track however, remains in its original location and becomes out-of-sync with the corresponding video.

The timeline can display the synchronization of the video and audio segments by displaying sync loss indicators. These indicators can be turned on or off in the **Editor** menu of the <F1> Configuration window.

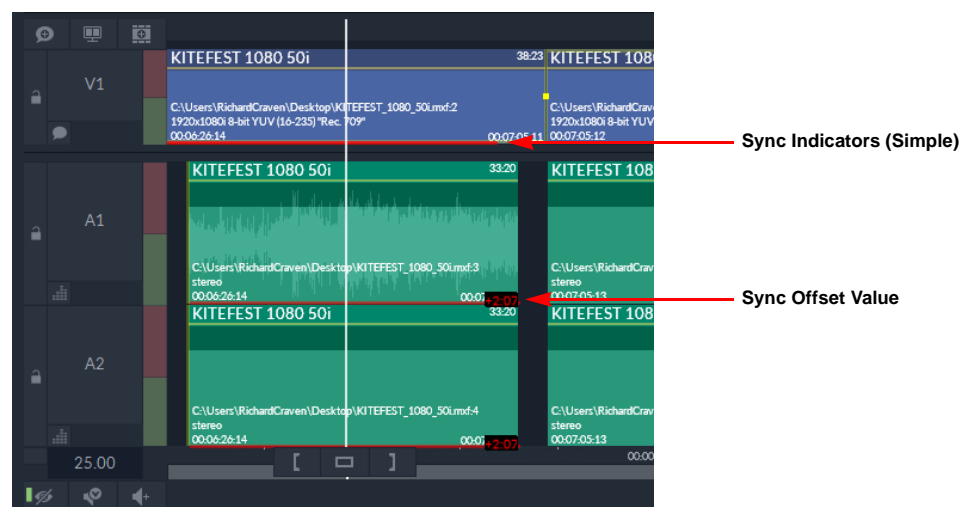
Navigate to the **Editor** section of the window and select **Show Sync**.



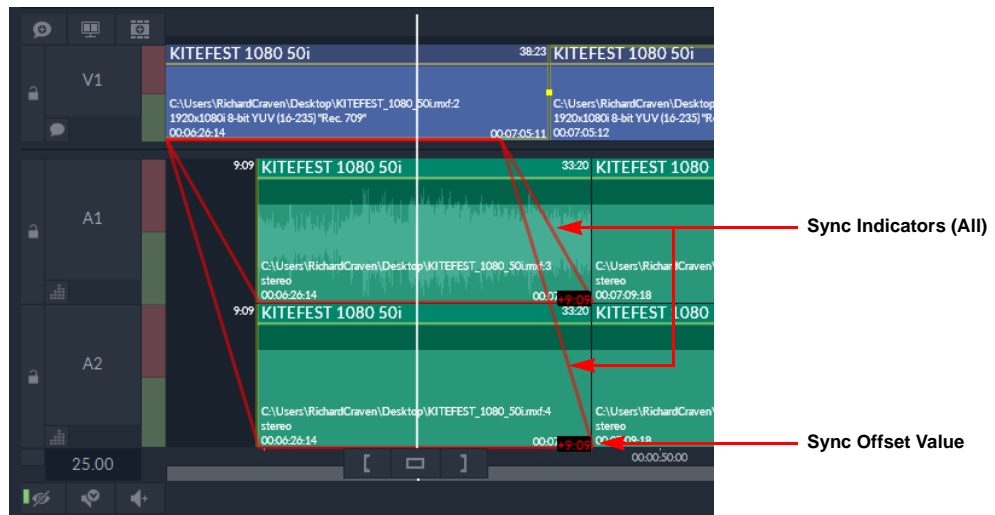
**Figure 68 Show Sync Indicator Options in <F1> Configuration Window**

From the drop-down menu select either **Off**, **Simple** or **All**.

- Off** Deactivates the sync indicators.
- Simple** Displays red horizontal lines below the clip segment that has lost video/audio sync.
- All** Displays red lines joining the original video frames with the original audio frames as well as a numeric value to indicate how far out-of-sync the video and related audio tracks are with each other.



**Figure 69 Simple Show Sync Indicators Selected**



**Figure 70 All Show Sync Indicators Selected**

### 3.6.2 Setting Track or Master Sync Locks

Typically when the content of recorded video and audio are matched (for example, a person talking to camera), sync lock must be maintained at all times. Other material such as audio effects tracks, or commentaries from other sources, may need to be slipped to correspond with events on the edit timeline.

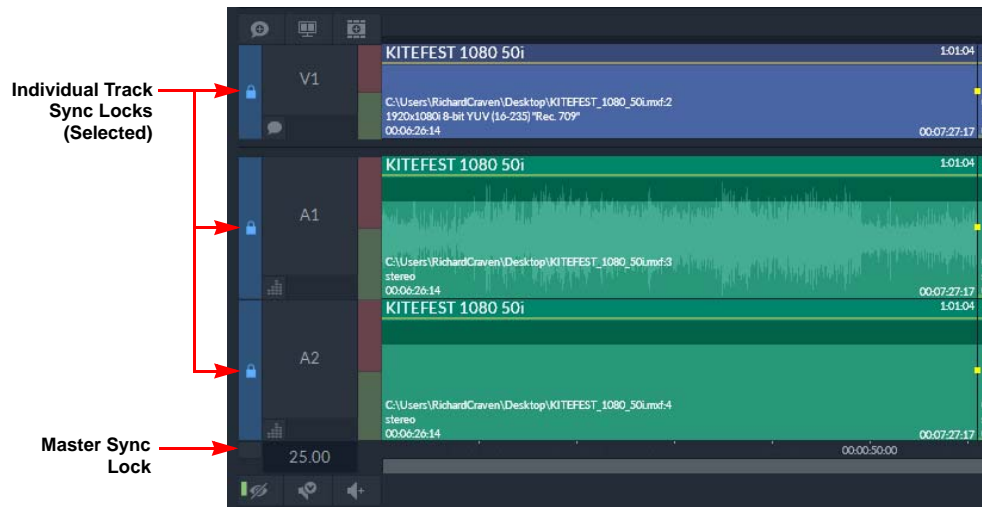


Figure 71 Master Sync Lock Selected for All Tracks

Sync lock can be maintained automatically by enabling the **Master Sync Lock** box in the bottom-left corner of the timeline. When enabled all audio and video track sync locks are highlighted blue indicating that they are locked. Filter the video and audio tracks that are included in the sync lock by activating or deactivating individual track sync locks as required.

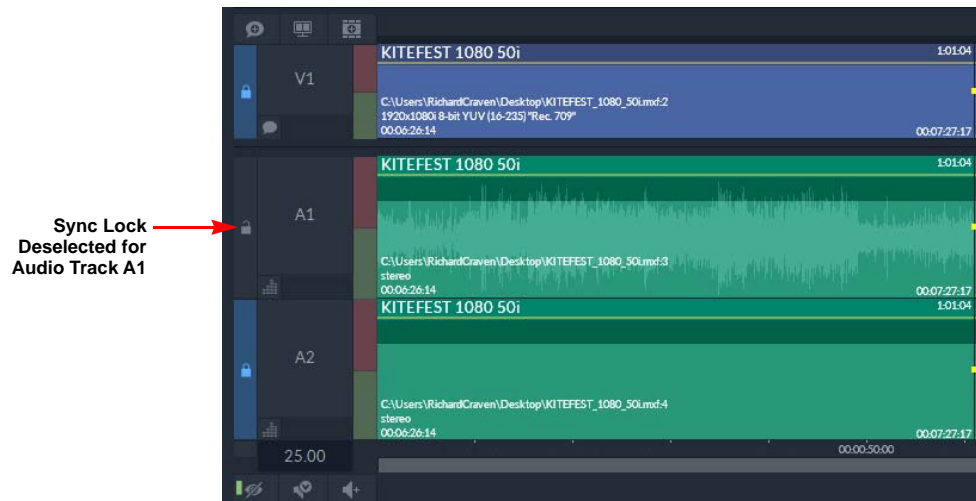


Figure 72 Individual Sync Lock for Track A1 Deselected


When the Master Sync Lock box is pressed, all tracks are sync-locked. In this situation, when one track is edited, the system automatically forces the audio or video to follow. For example, if a video-only segment is inserted into the video track then the audio tracks that are locked to it have silence inserted to maintain video/audio synchronization. Likewise if a segment of video is removed then the corresponding audio track segment is also removed.

Alternatively the individual Track Sync Lock boxes can be selected to lock or unlock specific tracks.

### 3.6.3 Correcting Out-of-sync Tracks


When audio/video sync is lost it can be corrected by noting how many frames the track is out of sync and then sliding the segments correspondingly using the yellow **Move** menu to regain sync.

### 3.7 Using the Voice-over (VO) Recording Function

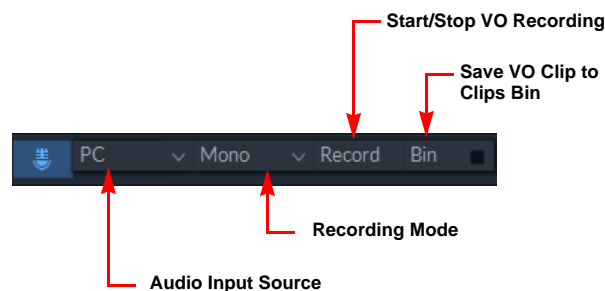
Voice-overs can be recorded directly onto the timeline using the **VO** feature located at the top-left of the timeline: .

#### 3.7.1 Recording a Voice-over Track

To record a voice-over to a specific track, do the following:

1. Use the **Add Audio** box to add a new audio track specifically for the voice-over.
2. Use the Track Filter boxes to select the track on which to record the voice-over.
3. Position the timeline cursor at the required start point.
4. Click the **VO** box: .

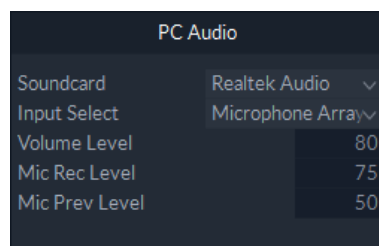
This displays the **VO** menu shown in Figure 73.



**Figure 73 Individual Sync Lock for Track A1 Deselected**

5. Select the audio input source from the first blue scroll box.
- The Edit Application uses either the XLR or PC (sound blaster) microphone input to record the voice-over.
6. Select whether to record in **stereo** or **mono** from the second scroll box.
  7. To place a copy of the voice-over in the Clips Bin as a separate audio clip select the **Bin** checkbox.
  8. Click **record** to start (or stop) the recording.

There are further options to adjust voice-over settings in the **PC Audio** section of the <F1> Configuration Window.



**Figure 74 Voiceover Settings in the <F1> Configuration Window**

This allows the microphone input source, recording and preview levels to be selected.

To fill a timeline gap, first select the relevant track filter and mark in and out points highlighting the area that needs to be filled. Place the cursor slightly before the in point and then click **record**. This allows lead-in time and leaves tails under the clips on either side.



**If no microphone is connected then the 'VO' box does not display.**

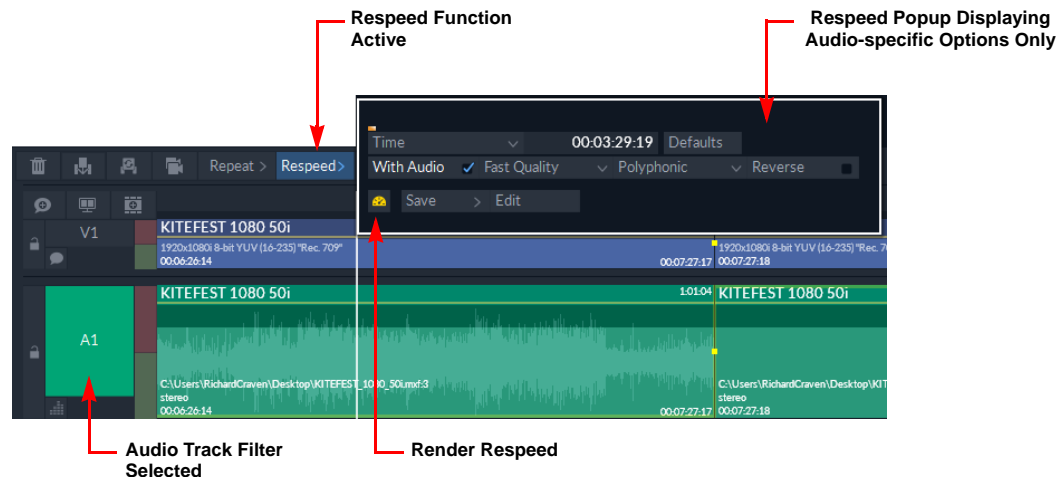


### 3.8 Re-syncing Audio Tracks Using the Respeed Popup

In the event that an audio track becomes out-of-sync with its source video track, the length of an audio track can be adjusted either together with the video track using the **Respeed** functions or independently, using the **Audio Stretch** functions. Audio tracks can be adjusted in order to sync with a video track, to match a specific frame rate or to fit a specific duration.


#### 3.8.1 Using Respeed to Re-sync an Audio Track

The **Respeed** tool allows the length of clips to be adjusted by a specific duration, speed or multiple of its original duration so that it can be brought back into sync with other associated tracks. The Respeed tool can be used to adjust video only clips, video and audio clips together or audio only clips. When an audio clip is selected for respeed, the video functions are excluded from the Respeed popup.




**Figure 75 Respeed Popup for Selected Audio Track**

To re-sync an audio track using the **Respeed** tool:

1. Select the target audio track filter.
2. Open the **Respeed** popup using one of the following methods:
  - Select **Respeed >** from the top-left toolbar above the timeline.
  - Open the **More** options menu  from a Floating Clip, then select the **Respeed** option.
3. A popup is displayed providing the available respeed options.


Note that this popup is different depending on whether the clip being stretched contains video tracks or not. Figure 75 features an audio only clip.

4. Set the required options.
5. Click the **render** box:  to render the audio clip using the new settings.
6. Select either **Save** or **Edit**.



**Audio can only be stretched between 50% and 200% of its original duration.**

#### 3.8.2 Overview of the Respeed Options

The options displayed in the **Respeed** popup menu allow the desired respeed parameters to be selected. To close the popup, press  at the top-right corner of the popup.

### 3.8.2.1 Respeed Mode

Use the **respeed mode** scroll box (displays **Time** by default) to select the appropriate method to respeed the clip from the following scroll menu options:

Respeed Mode	Description
<b>Time</b>	<b>(Default)</b> Respeeds the clip to a target duration in the format: hh:mm:ss:ff (e.g., 00:00:00:00).
<b>Speed</b>	Respeeds the clip based on a percentage of the original speed. For example, a setting of 50% will respeed the clip to half the original speed, conversely, a setting of 200% will double the speed of the original.
<b>Multiple</b>	Respeeds the clip based on a multiple of the original duration and defines by how many times the respeeded clip is longer or shorter than the original. The higher the multiple, the slower the speed of the rendered clip, for example, a multiple of 2 will render a clip twice as long as the original and a multiple of 0.5 will render a clip half as long.

Changes to the selected Respeed modes are automatically reflected in the other Respeed options where appropriate.

### 3.8.2.2 Quality

The **Quality** scroll box (**Fast Quality** is selected by default) allows the quality of the audio conversion to be selected. Quality can be determined by selecting one of the following options from the scroll box:

Audio Quality Option	Description
<b>Fast Quality</b>	<b>(Default)</b> Lower quality output to allow faster audio conversion.
<b>Good Quality</b>	Medium quality output to optimize quality and audio conversion speed.
<b>Best Quality</b>	Highest quality output, that may extend audio conversion speeds.

### 3.8.2.3 Audio Type


The **Audio Type** scroll box, in which **Polyphonic** is selected by default, allows the appropriate type of audio re-sampling and pitch correction algorithm to be selected from the following:

- **Polyphonic:** Typically used for music audio tracks.
- **Monophonic:** Typically used for voice audio tracks.


### 3.8.2.4 Reverse

Select the **Reverse** checkbox to reverse the order of the frames to produce a clip that plays backwards. It can be stretched to a new duration as part of the reversing process or it can retain the original duration.

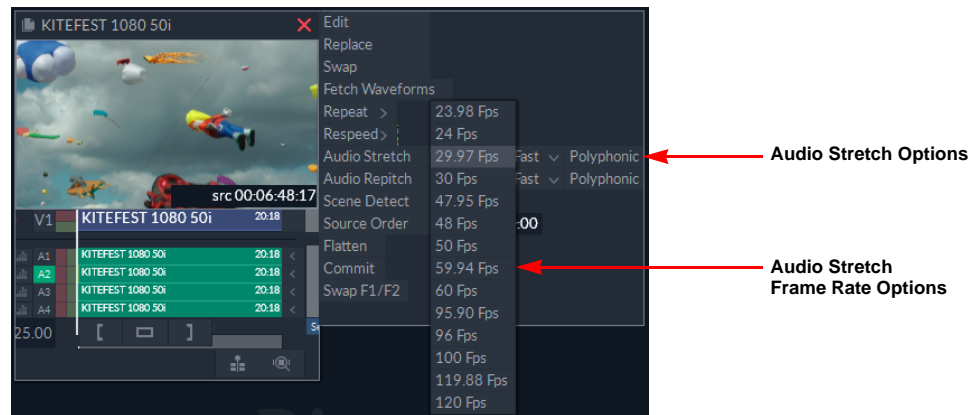
## 3.8.3 Using Audio Stretch to Re-sync an Audio Track

The **Audio Stretch** tool is designed to stretch an audio clip to a specific frame rate. **Audio Stretch** is available from the **More** options menu  of a Floating Clip.

To stretch an audio track using **Audio Stretch**:

1. Click  to open the More options menu from a Floating Clip.

The available audio stretch options are displayed to the left of the **audio stretch** box.



**Figure 76 Audio Respeed Function in More Options Menu**

Do not click **Audio Stretch** until the required settings are specified.

2. Specify the required settings for frame-rate, quality and audio type.
3. Click the **Audio Stretch** box to start the stretch process.

When complete the resulting clip maintains the original video frame rate but contains the new stretched audio tracks.

### 3.8.3.1 Overview of the Audio Stretch Options

The audio stretch process has a number of options available to suit the type of audio material being stretched and the desired level of accuracy, see Figure 76.

Option	Description
<b>FPS</b>	The FPS (frames per second) scroll box allows the target audio frame rate to be selected (e.g., <b>23.98, 24, 25, 29.97, 30, 47.95, 48, 50, 59.94, 60, 95.90, 96, 100, 119.88</b> or <b>120</b> ).
<b>Quality</b>	The Quality scroll box allows the quality of the stretch to be selected from <b>Fast, Good</b> or <b>Best</b> .
<b>Type</b>	The Type scroll box allows the appropriate type of audio re-sampling and pitch correction algorithm to be applied. Typically <b>Monophonic</b> is used for voice and <b>Polyphonic</b> for music.



**When using the Audio Stretch function the track filter boxes cannot be used to protect/enable specific audio tracks. All audio tracks are affected.**

### 3.9 Adjusting Pitch using the Audio Repitch Functions

The pitch of audio tracks can be raised or lowered, or the pitch of an audio track that has been respedeed can be retuned using the **Audio Repitch** tool.

#### 3.9.1 Repitching an Audio Track

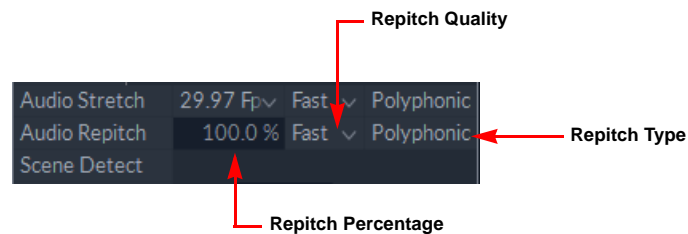
To repitch the audio:

1. Access the **More** options menu by hovering directly outside the top-right corner of the Floating Clip.
2. The available audio repitch options are displayed to the left of the **Audio Repitch** box.  
Do not click **Audio Repitch** until after specifying the required settings.
3. Specify the required repitch settings.
4. Click the **Audio Repitch** box to start the repitch process.

When complete, the resulting clip maintains the original video frame rate but contains the new repitched audio tracks.

#### 3.9.2 Overview of the Audio Repitch Options

The audio repitch process has a number of options available to suit the type of audio material being repitched and the desired level of accuracy:

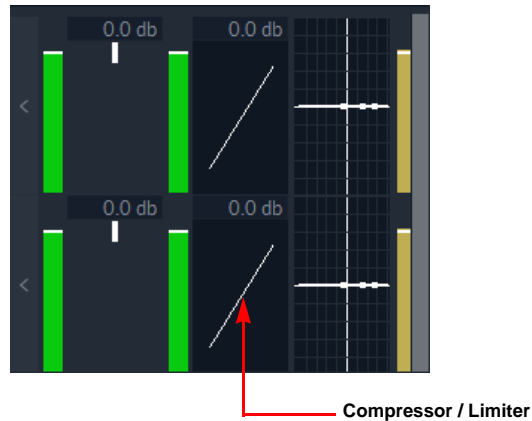


**Figure 77 Audio Repitch Function in More Options Menu**

Option	Description
<b>Percentage</b>	Use the Percentage box to raise or lower the pitch of the audio based on a percentage of the original.
<b>Quality</b>	The Quality scroll box allows the quality of the repitch to be selected from <b>fast</b> , <b>good</b> or <b>best</b> .
<b>Type</b>	The Type scroll box allows the appropriate type of audio re-sampling and pitch correction algorithm to be applied. Typically <b>monophonic</b> is used for voice and <b>polyphonic</b> for music.

### 3.10 Using the Audio Compressor/Limiter Tools

The Audio Compressor/Limiter tool is available from the hidden audio menu to the right of the timeline.



**Figure 78 Audio Compressor / Limiter**

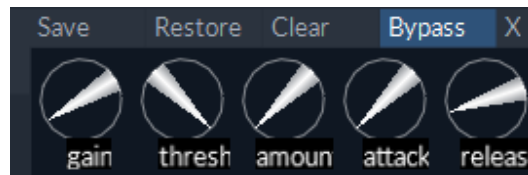
The Compressor/Limiter tool is located to the right of the Track Level control. It can be accessed by clicking on the diagonal line shown in the screenshot.

The Compressor/Limiter tools control the currently selected segment only, but the settings can be transferred from one segment to another.

The compressor provides a form of automatic level control. It attenuates high levels by reducing the dynamic range, making it much easier to control signals and set appropriate audio levels. Limiting is an extreme form of compression, where the output signal is sharply attenuated so that it cannot exceed a particular level.

#### 3.10.1 Adjusting Audio Using the Compressor/Limiter Controls

When the Compressor/Limiter menu is opened five rotary dials are displayed. These can be controlled directly using the cursor or by clicking on the dials to display numeric boxes.

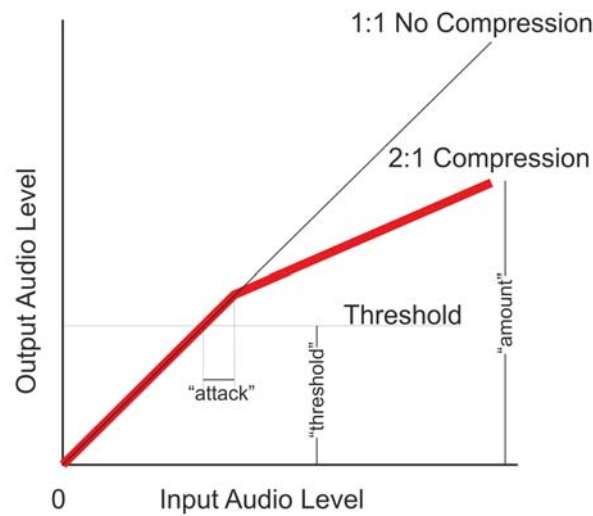


**Figure 79 Audio Compressor / Limiter Controls**

The function of each dial is as follows:

Dial	Description
<b>gain</b>	Sets the overall output audio level to compensate for any apparent loss due to the compression of audio with a large dynamic range.
<b>thresh(old)</b>	Sets the level above which compression starts.
<b>amount</b>	Sets the compression ratio value.
<b>attack</b>	Sets how quickly the compression takes place after the audio level has exceeded the threshold level.
<b>release</b>	Sets how quickly the compression is turned off after the input audio level has dropped below the threshold level.

Compression is displayed as a ratio which defines how much of the output audio level is produced for any given input level. A ratio of 1:1 means that the audio is unaffected by compression.



**Figure 80 Graph of Output Audio Level vs Input Audio Level Showing Compression**

The following menu options are displayed above the compressor/limiter dials and their functions are as follows:

Option	Description
<b>Save</b>	Saves the current settings in a buffer so that they can be applied to other tracks/segments.
<b>Restore</b>	Applies the settings currently held in the buffer to the currently selected segment.
<b>Clear</b>	Clears the settings of the currently selected track.
<b>Bypass</b>	Disables the effect of the compressor/limiter for the selected segment.

### 3.11 Using the Graphic Equalizer Tools

A three-band graphic equalizer is provided for each audio track on the timeline. The Graphic Equalizer tool is accessed from the hidden menu at the right of the timeline.

Located to the right of the Compressor/Limiter tool, the Graphic Equalizer is accessed by clicking on the graph area to open the graphic equalizer panel.

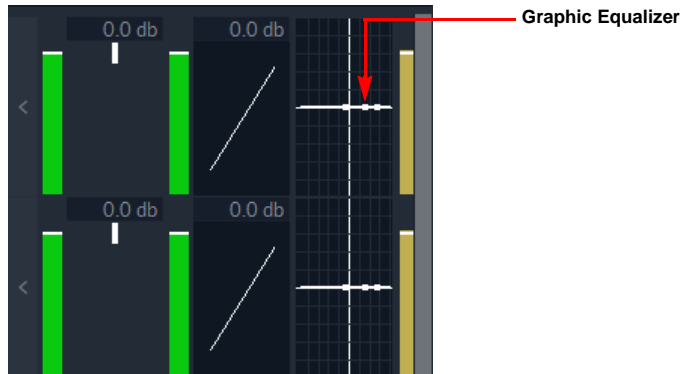


Figure 81 Graphic Equalizer

#### 3.11.1 Adjusting Audio in the Graphic Equalizer

The graphic equalizer graph plots gain on the vertical axis against frequency on the horizontal axis.

The frequency response of the graphic equalizer is shown by the white curve intersecting the three white, square nodes. The nodes represent the three frequency bands: low, mid and high.

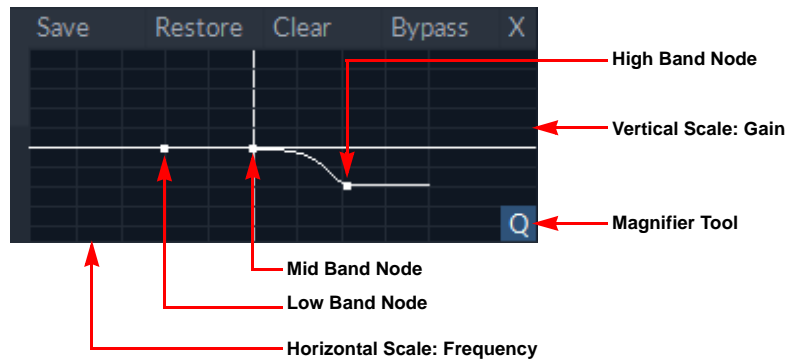



Figure 82 Graphic Equalizer Components

The center frequency and gain/attenuation for each of the three bands (low, mid and high) can be changed by selecting the individual white nodes on the graph and dragging. Hovering the cursor over the white nodes displays their current values.

Dragging a white node left or right decreases or increases the center frequency for that band. Dragging a white node down or up attenuates or amplifies the frequencies in the band.

The nominal width of each of the 3 bands is 1000 Hz, but each band can be adjusted between 100 Hz and 4000 Hz by selecting the magnifier box  and sliding a white node up or down.


Create high pass, low pass and mid band stop filters for the audio, by moving the white nodes closer together.

Reset the graphic equalizer settings by holding the <Shift> key on the keyboard and clicking on the graph with the cursor.



**To hear the effect of the 3-band equalizer during setup it may be necessary to mute or solo individual audio tracks on the timeline.**

The following menu options are displayed above the graph and their functions are as follows:

Option	Description
<b>Save</b>	Saves the settings of the currently selected graphic equalizer in a buffer.
<b>Restore</b>	Applies the settings currently held in the buffer to the currently selected track graphic equalizer.
<b>Clear</b>	Clears the settings of the currently selected track graphic equalizer
<b>Bypass</b>	Deactivates the effect of the graphic equalizer.
	When activated and then selecting a node on the graph, allows the size of the frequency band to be adjusted.

### 3.12 Using an Audio FX Loop



**Figure 83 Audio FX Loop Popup Menu**

This is applicable for hardware seats only when audio needs to be processed externally, e.g., through a mixer or graphic equalizer. An FX Loop can be set-up to do this. The line output from a Soundblaster card can be connected to the input of an external device with the output of the external device connected back to the line input (or other Soundblaster input selected in the <F1> Configuration Window).

The audio track to be processed is selected using the **Solo** button to the left of the timeline. When the **FX Loop - Record** box is clicked the clip is played from the current frame on the timeline and the selected audio track is routed through the external device; a new audio track is created. Clicking the **Record** box again stops the process. The clip continues to be played and subsequent selections of the **Record** box places the processed audio on new audio tracks.

The value in the **delay n frames** box can be used to compensate for the static delay in the audio process path to avoid manually matching the new audio position with that of the original.

If the **Bin** box is selected before **Record** is clicked, a copy of the processed audio is automatically saved in the Clips Bin (with the title **FX loop clip**) as well as on the timeline.



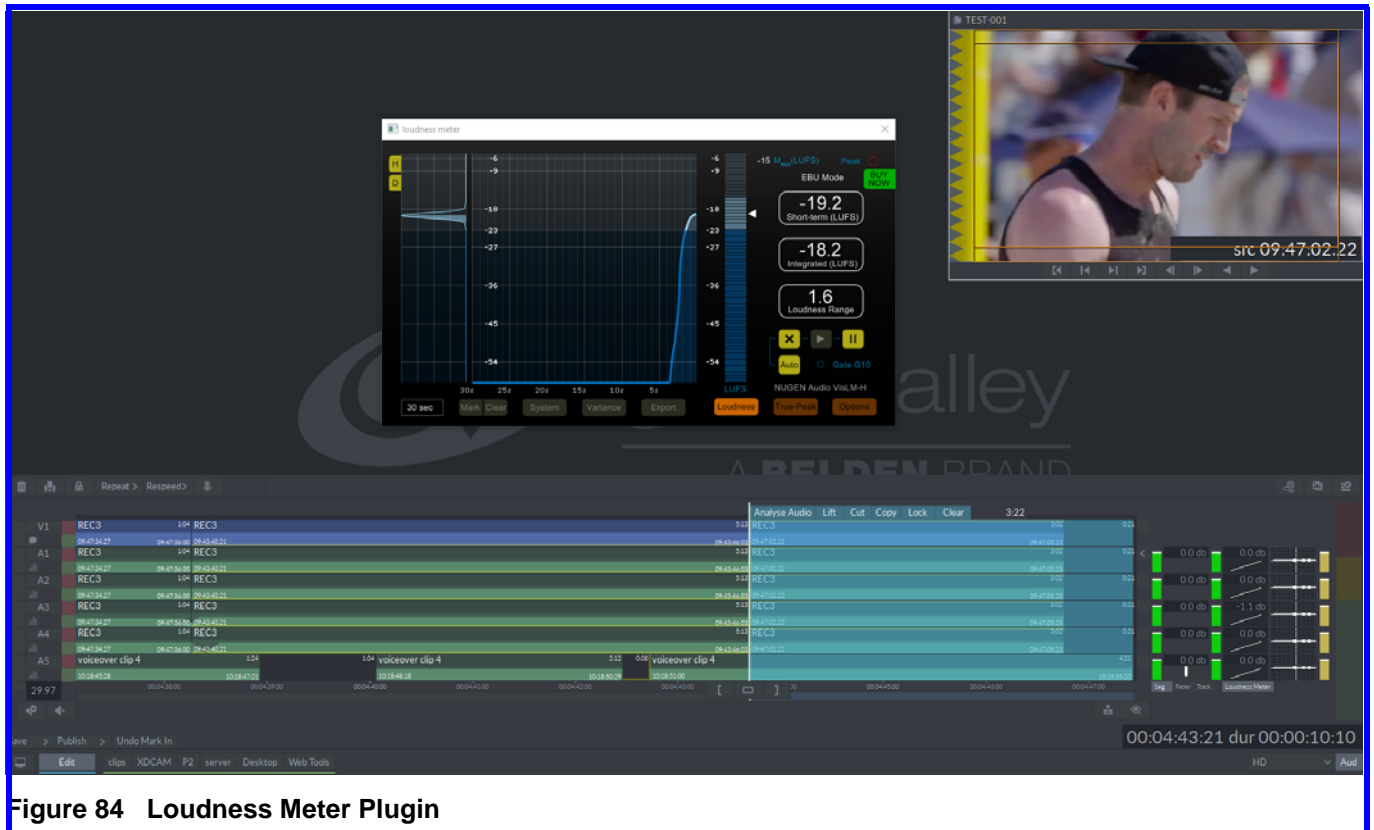
**When a publish is performed on an sQ Seat, an audio mix-down is started as part of the publish process to ensure that the audio track is processed in a playable format.**



## 4. Loudness Metering Plugin Option

### 4.1 NUGEN VisLM Loudness Metering Plugin

The NUGEN VisLM loudness meter is an ITU, ATSC and EBU standard compliant loudness meter. It provides broadcasters and post houses with a way to measure, compare and contrast loudness during production, broadcast and post production.



**Figure 84 Loudness Meter Plugin**

VisLM is available in two versions, VisLM-C (compact) and VisLM-H (history), which are both supported.

VisLM provides several essential parameters for loudness measurement:

- True-Peak Level Metering – the maximum level of the signal.
- Loudness Range - to help decide if and how much dynamic compression to apply.
- Momentary - ‘instantaneous loudness’ for mixing by ear.
- Short Term Loudness - 3 second time window.
- Program Loudness - long term integrated loudness measurement.



**In order to run the VisLM a license is required which can be obtained directly from NUGEN Audio.**

### 4.1.1 Using the Loudness Meter

If the loudness meter is installed and the configuration set up correctly, then the hidden audio controls to the right of the timeline include a box for launching/hiding the loudness meter window.

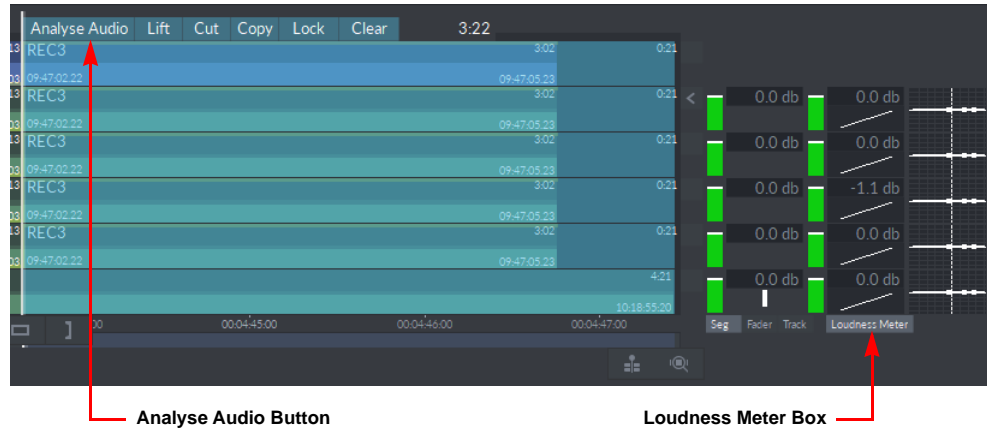


Figure 85 Accessing the Loudness Meter

The box is labeled **Loudness Meter**. Selecting this button opens the Loudness Monitor plugin in a Windows style window, initially at the top left corner of the UI. The window can be dragged to a new position or moved to a second monitor if necessary.

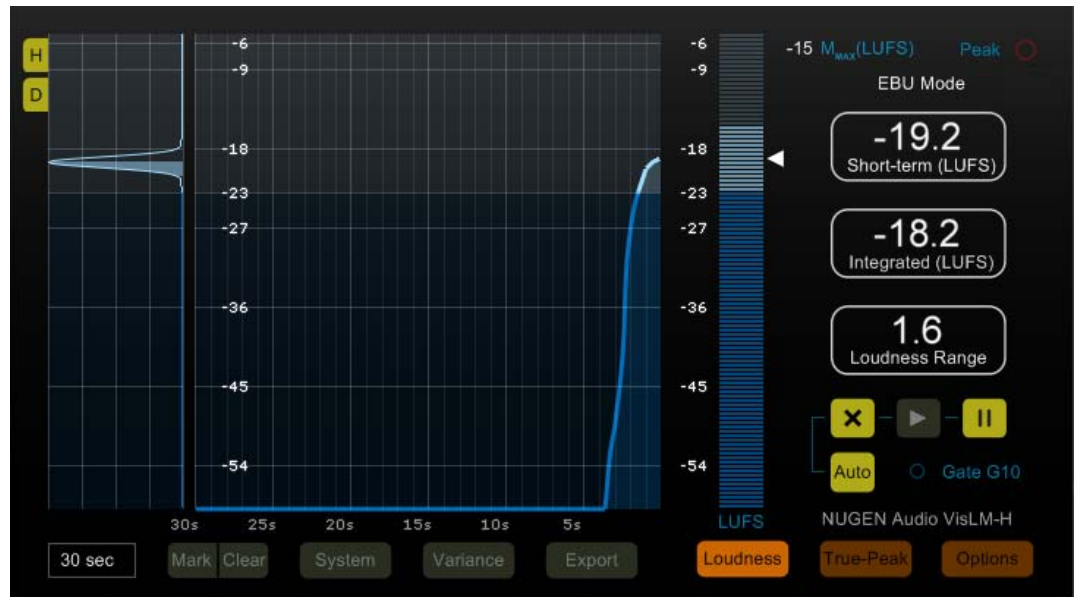
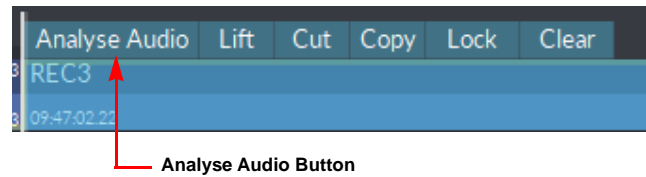


Figure 86 Loudness Meter User Interface

Figure 86 shows the NuGen VisLM loudness meter. As the audio on the timeline is played, the graph and meter change according to the loudness of the audio at that point in time. If the play button on the plugin is pressed, it records the loudness and provides an integrated loudness over the period of time until it is stopped.

Deselecting the **Loudness Meter** box in the hidden audio menu then closes the loudness meter window.

When a VST plugin is installed, a new button - **Analyse Audio** - is available in the Lift Menu when an audio segment is selected.



**Figure 87 Analyse Audio Button in Timeline Lift Menu**

Selecting the **Analyse Audio** box, does the following:

- Launches the Loudness Meter window if it is not currently visible.
- Resets the integrated loudness value in the Loudness Meter.
- Starts integrated loudness monitoring in the Loudness Meter plugin.
- Pushes the selected audio at faster than real-time.
- When all the audio has been pushed through the plugin, the integrated loudness monitoring is stopped, leaving the loudness meter displaying a loudness value for the selected section of audio.

In order to accommodate different loudness meters, entries have been added into the **Custom Settings\Config** section of the registry for the VSTPlugins project.

The registry entries for the NuGen VisLM plugin are:

- **VST Play Parameter**
- **VST Reset Parameter.**

Set these parameters to **Int Play** and **Int Reset** respectively.

If a different loudness meter is used, the registry must be modified according to the parameter definitions in the plugin. A list of available parameters is printed in the seat log when the plugin is instantiated.