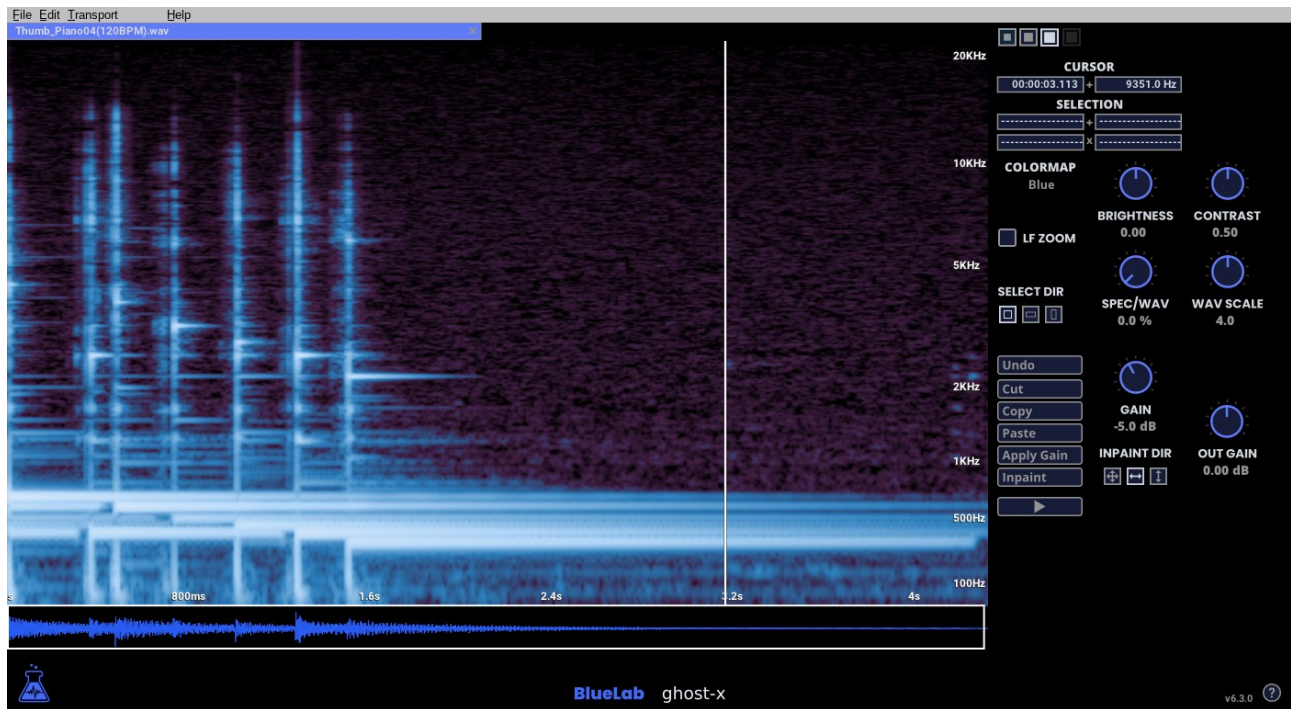**BlueLab** ghost-x

DESCRIPTION

Ghost-X is a powerful spectrogram visualization and editing software. It is available as a plugin and standalone application.


FEATURES

Ghost-X provides a full set of features for visualizing and editing spectrograms:

- Powerful and intuitive zoom, with adaptive level of detail
- Possibility to select any region of the spectrogram, and to play this region only
- File opening and saving (.wav, .aiff and .flac)
- Real time view mode, with scrolling spectrogram
- A complete set of 8 colormaps
- Brightness and contrast
- Options to display the corresponding waveform in addition to the spectrogram
- Choice between 3 interface sizes, from small to big
- Interactive mini view of the overall sound file
- Editing tools: copy, paste, cut
- Editing tool: gain increase or decrease of the selected region
- Editing tool: powerful inpaint tool for replacing a region by the expected background
- Undo mechanism

USAGE AS STANDALONE APPLICATION

When used as standalone application, **Ghost-X** will be used to load, save, view, play and edit sound files.
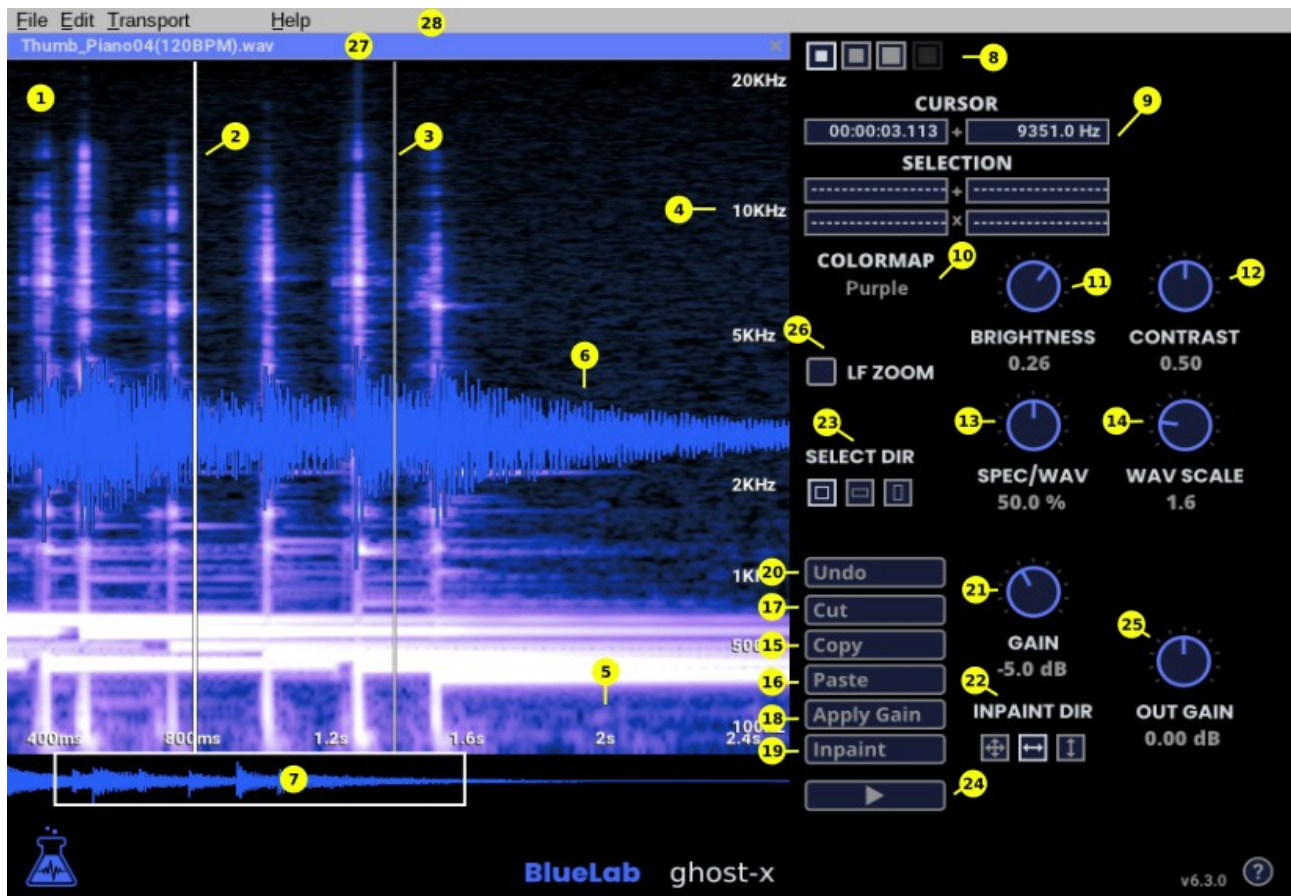
The **SPECTROGRAM VIEW (1)** displays the spectrogram of a loaded sound file, as well as the corresponding **WAVEFORM (6)**. The **TIME AXIS (5)** display the time scale in seconds and milliseconds. The **FREQUENCY AXIS (4)** display the frequency scale until 20KHz.

Mouse wheel, zoom gesture, or **alt + mouse drag** is used for **ZOOMING** on the spectrogram. The center of zoom is the position of the mouse pointer. The data analysis accuracy increases as the zoom increases to keep a good level of detail for each zoom factor.

A **MINI-VIEW (7)** shows the entire file and the current position in the file. For translating, do a mouse drag in the mini-view or **cmd/ctrl + mouse drag** in the **SPECTROGRAM VIEW (1)**. The view is reset by double-clicking on the **MINI-VIEW (7)** or by pressing the **return key** (or **ctrl + return** on Windows).

NOTE: As the level of accuracy changes when the zoom factor changes, the data is recomputed only when stopping zooming or translating. While zooming or translating, a low accuracy version of the data is displayed. Just after stopping zooming or translating, the data is recomputed and displayed with a maximum level of accuracy.

The **POSITION BAR (2)** defines the start position of the playback. It is set to a given point of the spectrogram with left mouse click. The **PLAY BUTTON (24)** starts the playback of the sound. The **PLAY BAR (3)** is a moving bar corresponding to the current position of the sound currently playing.

Left mouse drag to **SELECT** a region in the **SPECTROGRAM VIEW (1)**.
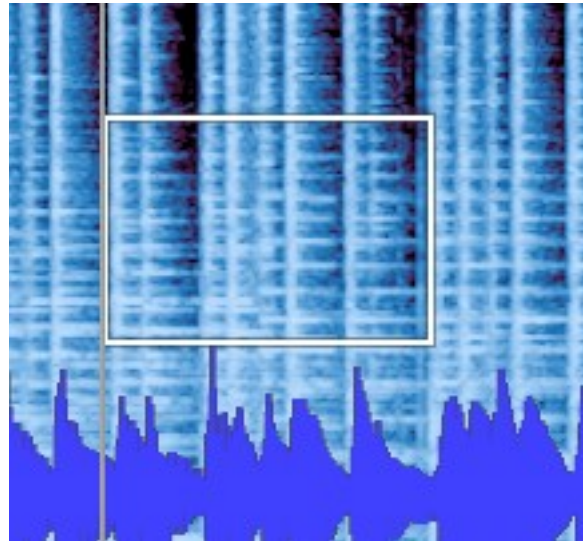
The **SELECTION** of a region can be modified by dragging the borders or the corners of the selection. When dragging from the inside of the selection, the whole selection is moved.

When a **REGION** is selected, the sound that is played is the sound inside the region only. The sound is played looped.

NOTE: To listen accurately to some details of the sound, just define a region and drag it while the sound is playing. The sound will then change according to the selection changes.

The **SELECT DIR BUTTONS (23)** allows to choose to define rectangular, horizontal only or vertical only selections.

The **SIZE BUTTONS (8)** are used to change the size of the window.

The **METERS (9)** display the time and the frequency values under the mouse cursor, and the beginning and the size of the selection. By clicking on the meters, units can be toggled from Hz to bins and from time values to sample values.

The **COLORMAP (10)** menu let choose the colormap to apply to the spectrogram data. There are several colormaps provided, with different color schemes and contrasts.
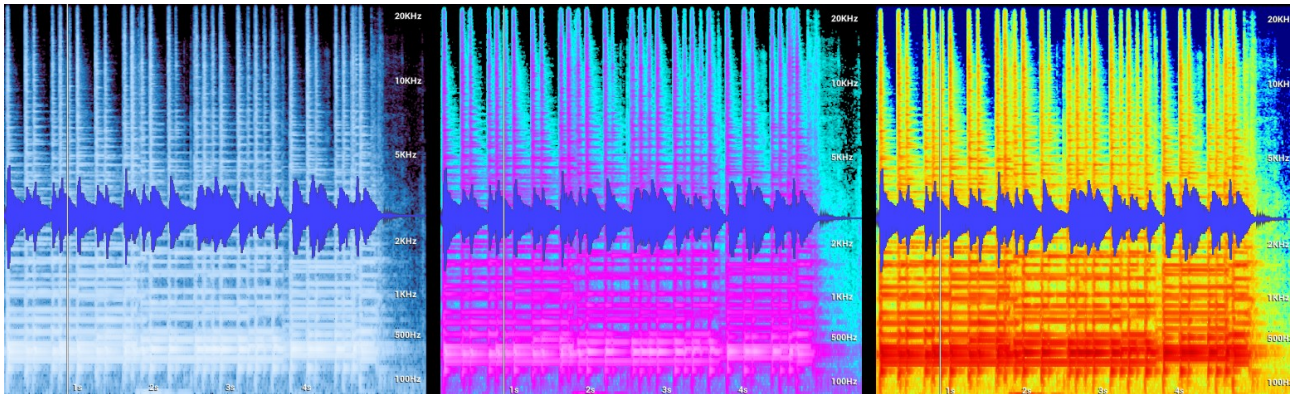
A same sound file spectrogram visualized using different colormaps.

The **BRIGHTNESS (11)** and **CONTRAST (12)** parameters define how the current colormap is applied to the spectrogram data. By changing these parameters, some details of the sound are visually increased, or at the contrary the global readability of the spectrogram is increased.

The **SPEC/WAV (13)** parameter chooses if we display either the spectrogram, or the **WAVEFORM (6)**, or a mix of both.

The **WAV SCALE (14)** parameter defines the visual scale of the **WAVEFORM (6)**.

To copy a region and paste it to another place, select the source region, use the **COPY (15)** button (or **cmd/ctrl + c**). Then select the destination region and use the **PASTE (16)** button (or **cmd/ctrl + v**).

To cut a region and fill it with silence, select a region and use the **CUT (17)** button (or **cmd/ctrl + x**).

To increase or decrease the gain of a region, select a region, choose the **GAIN (21)** value to apply, and use the **APPLY GAIN (18)** button (or **cmd/ctrl + b**).

The **INPAINT (19)** button makes possible to replace the content of a region by a relevant background, by "painting" progressively the selected region using the colors of its borders.
To use **INPAINT**, select a region by defining carefully its borders (the new colors of the region will depend greatly on the exact colors of the borders), and use the **INPAINT (19)** button (or **cmd/ctrl + n**).

The **INPAINT DIRECTION (22)** lets choose if we take the horizontal borders, the vertical borders, or both as source of inpainting.
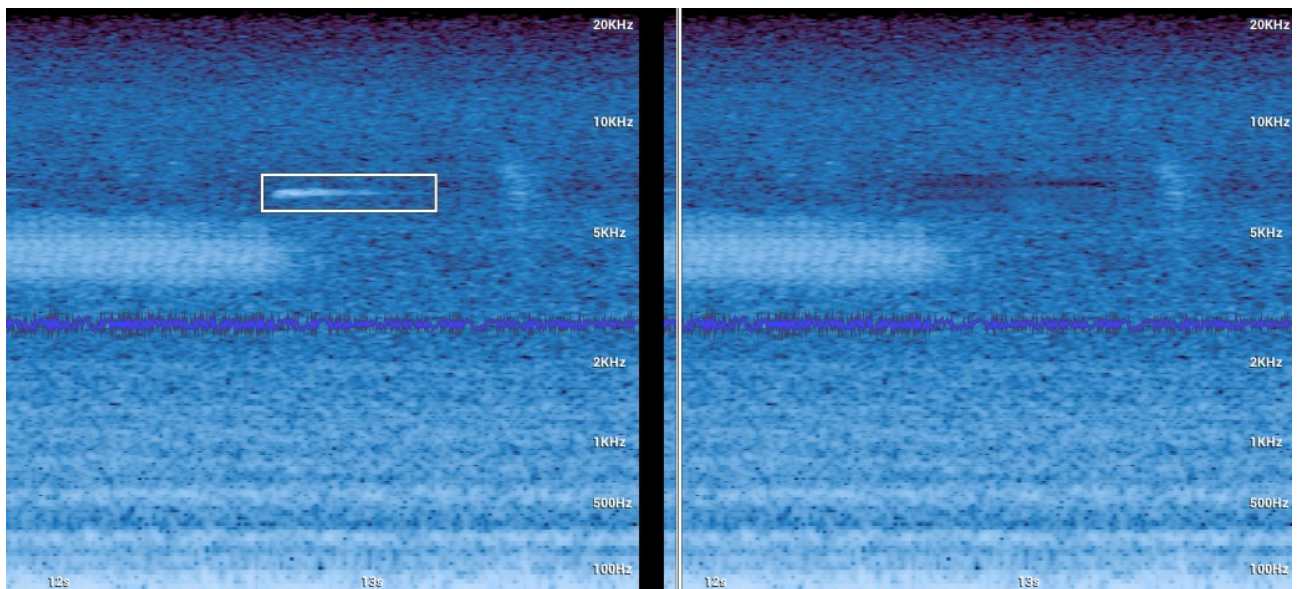
We want to suppress the selected sound element i.e. replace it by a consistent background. Left: the region to inpaint. Right: the spectrogram after inpaint over both directions.
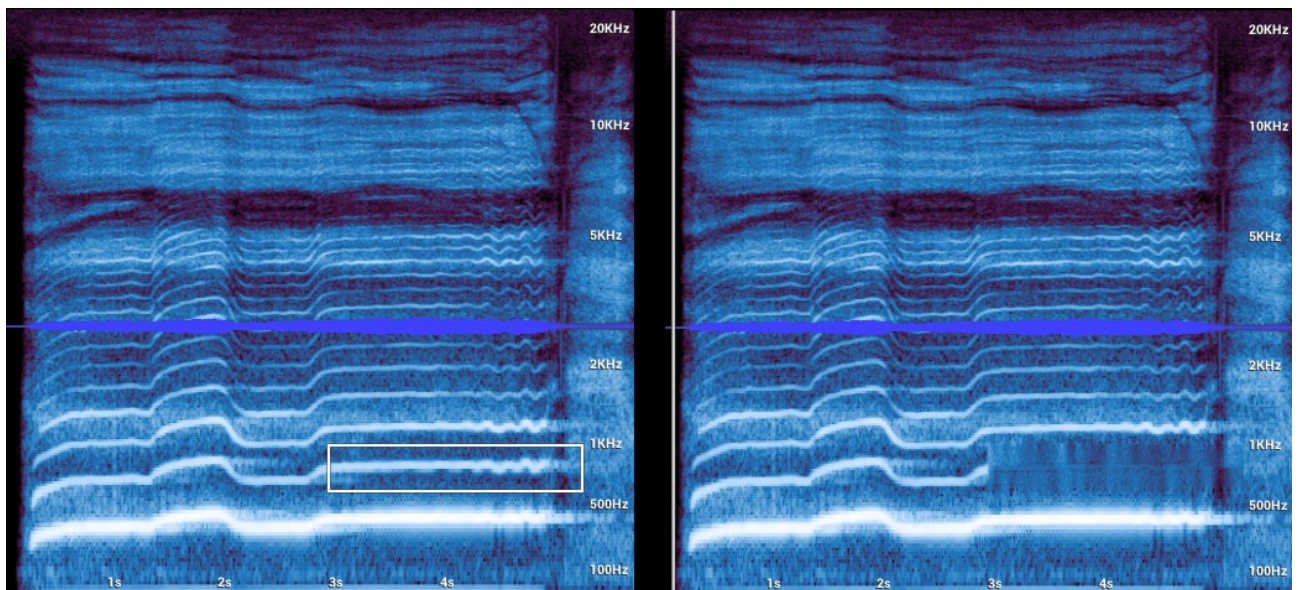
We want to suppress a part of a singing voice.
Left: the region to inpaint. Right: the spectrogram after inpaint over vertical direction only.
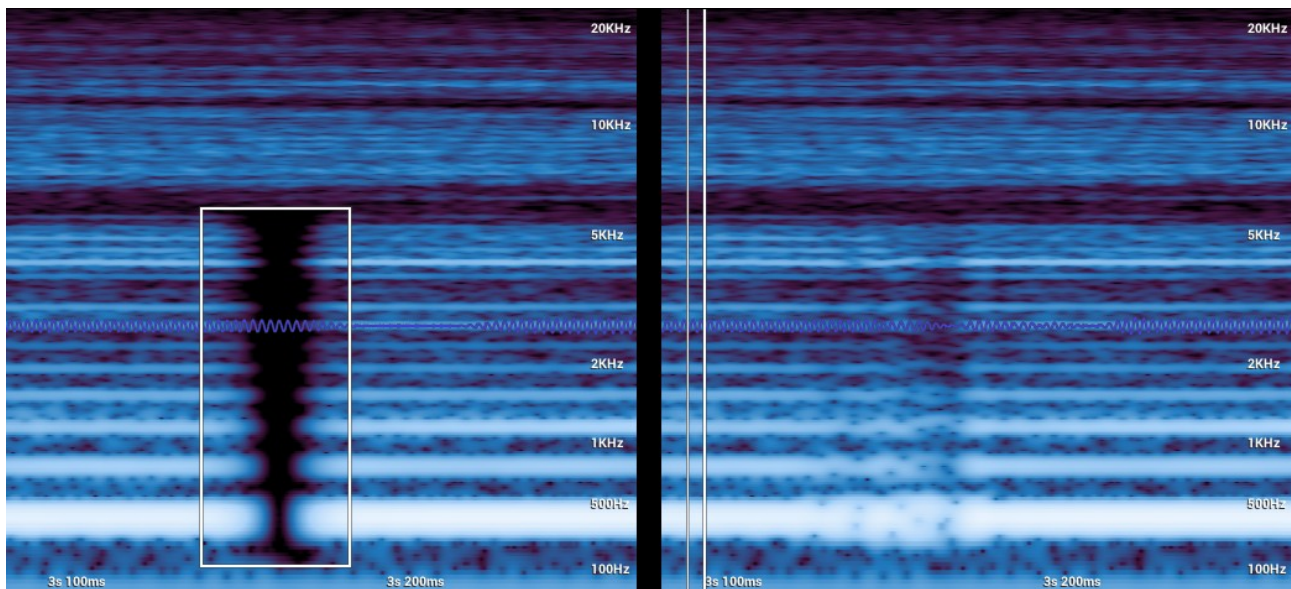
We want to fill a "hole" in the sound (a part of silence).
Left: the region to inpaint. Right: the spectrogram after inpaint over horizontal direction only.
The inpaint algorithm has taken the left and right borders, and connected them to fill the hole.

NOTE: INPAINT can be applied several times on the same region, to have a stronger result. To do this, select a region once and click on the **INPAINT (19)** button several times.

NOTE: The **INPAINT** algorithm is designed to be applied on small regions (short regions in time, and small range of frequencies). The results will be better if it is applied on small regions.

Finally, all the editing operations (paste, cut, inpaint…) can be reverted using the **UNDO (20)** button (or **cmd/ctrl + z**).

The **PLAY BUTTON (24)** (or **cmd/ctrl + space**) starts and stops the playback of the current selection or plays from the bar if no selection is defined.

The **OUT GAIN (25)** knob sets the output sound volume. It does not change the file data, it only changes the sound level when playing the sound inside the **Ghost-X** application.

The **LF ZOOM (26)** buttons zooms on the low frequency. This visual zoom can be useful to edit low frequencies more accurately.

There is a system of **TABS (27)**, to have multiple files opened at the same time.

There is a **MENU BAR (28)**, with some additional features: **open file**, **save file**, **export selection to file**, **reload file from disk**… This menu also contains an **Audio Settings** section, to configure the **Ghost-X** application with the right audio interface and the right sample rate.
Note: When loading a sound file, it is automatically resampled to the **Ghost-X** application current sampling rate. And when changing the sampling rate in **Audio Settings**, all the data of the tabs is automatically resampled.

USAGE AS PLUGIN

When used as plugin, **Ghost-X** will be used on the current track, to visualize in real time the corresponding spectrogram during the playback of the track, or to capture, edit, and render a selected part of the current track.
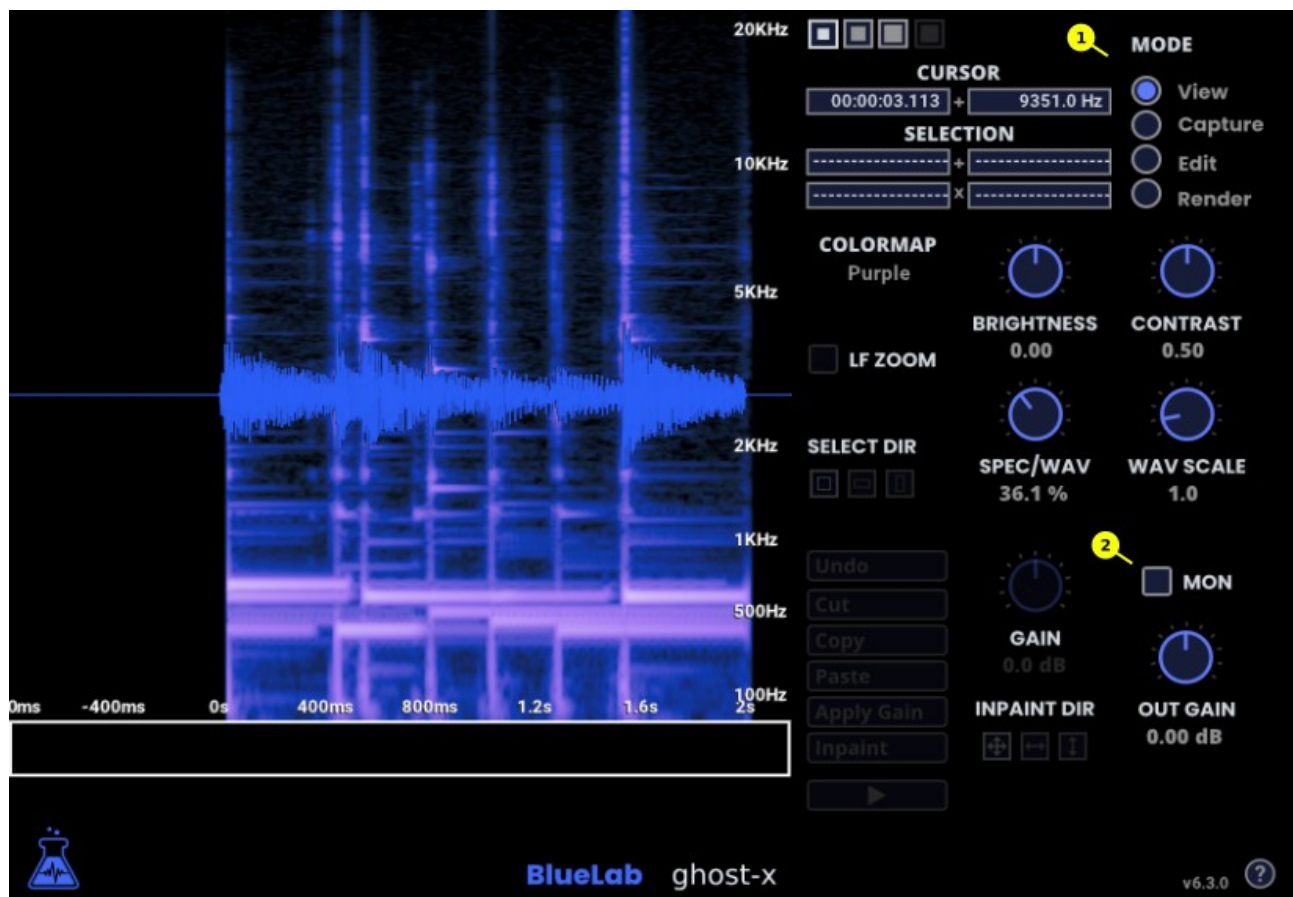
When **Ghost-X** is used as plugin, the interface is almost the same.

There is a **MODE (1)** selector, a **MON (2)** option, and no menu bar.

NOTE: in plugin mode, the keyboard shortcuts in **Ghost-X** are disabled, in order to not interact with the DAW.

Set the **MODE (1)** to **VIEW** to display in real time the spectrogram of a playing track. The display will scroll horizontally as long as the track is playing. In this mode, all the **EDIT** options and selection features are disabled.

To view in real time the spectrogram modifications of the sound of another effect, one instance of the **Ghost-X** plugin can be inserted before, and a second instance can be inserted after the given effect in the plugin chain.

When **Ghost-X** is used as plugin, it can also be used to capture, modify, then replace a selected part of a track (if the DAW enables this possibility).

To do so, select a part of the track, and disable the loop mode for playback. The part of the track must be played juste once, and the playback must stop just at the end of the selected part (setup the DAW to do so).

In **GHOST-X**, set the **MODE (1)** to **CAPTURE**. Then play the loop once. The sound data will be accumulated in the plugin, and the accumulated data will be displayed as spectrogram progressively. Once the data of the selected part has been captured in the plugin, be careful not to delete or modify the selection in the DAW.

NOTE: If the region to capture is long, a "fake" bounce can be done, in order to make play (and then capture) the whole region more quickly.

NOTE: When used with Protools, it is highly recommended to make a "fake" bounce in order to capture. Otherwise, if capturing in real time by simply playing the sound, the captured signal could be abnormally slightly shifted in time.

Once the data corresponding to the selected part of the track has been captured, switch the **MODE (1)** value to **EDIT**. The spectrogram data can then be edited and played as described in the previous part of this document: **USAGE AS STANDALONE APPLICATION**.

NOTE: for playing the spectrogram sound with **Ghost-X** used as a plugin (in **EDIT MODE**), some DAWs will require that the track is currently playing. When used in this case, as expected, the output sound will not be the sound of the track played in the DAW, but the sound of the spectrogram playing from **Ghost-X**.

When the editing of the spectrogram is satisfying, the **MODE (1)** can be set to **RENDER**, in order to write the result to the selected part of the current track. The options to be selected in the DAW to write to a track, when possible, vary depending on the DAW (see **APPENDIX I** for details).

The **MON (2)** button makes possible to process even when the DAW's transport is not playing. This makes possible to use it when the DAW is in monitor mode without playing.

EXAMPLES OF USE

Suppressing some particular sounds in a sound file (and keeping the rest untouched)
Ghost-X can be used to smartly suppress particular sounds in a sound file. For example people speaking during a sound recording, and accidentally recorded with it. To do this, the speaking voices will be selected in the spectrogram, and erased either using inpaint, or cutting, or decreasing the gain, or even pasting another part of the spectrogram over them.
Spectrogram editing is particularly well designed for this task, and will avoid suppressing interesting frequencies while suppressing speaking voices frequencies. Moreover, with spectrogram visualization, the speaking voices will be identified instantly in the recorded file.

View the modification of the sound of another effect in real time
To view in real time the spectrogram modifications of the sound of another effect, one instance of the **Ghost-X** plugin can be inserted before, and a second instance can be inserted after the given effect in the plugin chain.

Detect particular audio events in a long sound file and save them to disk
When inspecting a long audio file, spectrogram visualization can be very useful to detect particular events, without having to listen to the whole sound file. Once the interesting sound events have been detected in the long sound file, they can be selected and directly saved to disk.

FAQ

What is the maximum supported sound file length?

It depends on the memory and CPU capacity of the computer that is used. On a "standard" computer, a stereo file until about 20mn length can be opened and edited.

With long files, the zoom and interaction with the spectrogram is slower than with short files

The waveform takes a large amount of power to be displayed in the current **Ghost-X** version. To fasten the display and the navigation, you can hide the waveform by setting the **SPEC/WAV (13)** knob to 0 to increase the navigation speed.

When playing the sound of the spectrogram, the sound sometimes crackles

If **Ghost-X** is launched as a standalone application, go to menu **File** (or BL-Ghost on Mac) → **Preferences…** and try to change the **IO Vector Size** parameter in the **Audio Settings**. A good value is 1024 for example. You can also try to change the **Driver Type** or the **Input** or **Output Device** in the **Audio Settings.**

If **Ghost-X** is launched as a plugin inside a DAW, you can try to change the buffer size in the DAW.

Particularly if the sound crackles under **Protools**, go to **Setup → Playback Engine**, and uncheck the option **Ignore Errors During Playback/Record**.

When capturing with Protools, the captured signal seems to have a small delay

When used with Protools, it is highly recommended to make a "fake" bounce in order to capture. Otherwise, if capturing in real time by simply playing the sound, the captured signal could be abnormally slightly shifted in time.

APPENDIX I – USAGE WITH SOME SPECIFIC DAWS

This appendix describes how to use **Ghost-X** directly inside some specific DAWs. If the DAW you are using is not listed above, you can try either to make a "bounce in place" on a track, or to launch the **Ghost-X** application from inside the DAW as a defined external editor.

PROTOOLS

Two methods are possible for using **Ghost-X** inside Protools:

Using Protools AudioSuite:

- Make a selection in Protools
- Launch AudioSuite→Other→BL Ghost-X
- In **Ghost-X**, select the **CAPTURE** mode
- Click the **Render button of AudioSuite**, in order to fill the spectrogram in **Ghost-X**
- In **Ghost-X**, select the **EDIT** mode and make modifications to the spectrogram (to be able to play the sound during editing in **Ghost-X**, the **Preview Processing** button must be **checked** in AudioSuite)
- When the modifications of the spectrogram are satisfying, select the **RENDER** mode in **Ghost-X**, verify that the **Preview Processing** button in **unchecked** in AudioSuite, and click the **Render button of AudioSuite**

Using Track Commit:

- Select a clip
- Make sure the playback will not loop
- Capture in **Ghost-X** (by making a "fake" bounce)
- Edit in **Ghost-X**
- Switch to Render mode
- In Protools, choose **Track→Commit** (Choose **Selected Track** in order to keep the other clips in the new track)

The result will be generated in a new track.

You can also start by making a copy of the playlist: **Playlist→Duplicate**, and then choose the option **Source Track→Delete**. In this way there will not be a duplicated track at the end, but a single new track containing the copy of the original track in one playlist, and the modified track in a second playlist.

NOTE: The **Ghost-X** plugin will not be present in the new track.

NOTE: With this method, operation can only be done on full clips, not on detailed selection inside a clip.

REAPER

Two methods are possible for using **Ghost-X** inside Reaper:

Using render tracks:

- Select a region
- Select **CAPTURE** in **Ghost-X**
- Make a "fake" bounce in Reaper to make the plugin capture the data
- Edit in **Ghost-X**
- Select **RENDER** in **Ghost-X**
- In Reaper, choose **Track→Render/freeze tracks→Render tracks to (mono/stereo) stem tracks**

NOTE: be careful to keep the same selection in Reaper after **CAPTURE** and until Render track.

NOTE: The operation can only be done on full region, not on detailed selection inside a region.

Using Ghost-X as external editor in Reaper:

In Reaper, the **Ghost-X** application can be used as an external editor, which will be launched inside Reaper to edit a specific region.

To define the **Ghost-X** application as an external editor for Reaper, do as follow: In Reaper, go to **Preferences→External Editors→Add**, and browse for the **BL-Ghost** application.

To use **Ghost-X** to edit a region of a track in Reaper, right-click on the region, choose **Open items in editor**, and then **Open items in BL-Ghost**. When the editing is finished, press **SAVE** in the **BL-Ghost** application and close it.

The modifications of the region by **Ghost-X** will be automatically transmitted to Reaper.

LOGIC PRO X

Two methods are possible for using **Ghost-X** inside Logic Pro X:

Using bounce in place:

- Select a full region
- Select **CAPTURE** in **Ghost-X**
- Make a "fake" bounce in Logic Pro X to make the plugin capture the data
- Edit in **Ghost-X**
- Select **RENDER** in **Ghost-X**
- In Logic Pro X, choose **Region→Bounce in place**

NOTE: The operation can only be done on full region, not on detailed selection inside a region.

NOTE: In order to play the sound in **Ghost-X** while in **EDIT MODE**, the track in Logic Pro X must be currently playing.

Using Ghost-X as external editor in Logic Pro X:

To define **Ghost-X** as external editor for Logic Pro X, do as follow:
In Logic Pro X, go to **Preferences→Audio→Audio File Editor→External Sample Editor**, and choose the **BL-Ghost** application.

To use **Ghost-X** as external editor in Logic Pro X, follow these steps:
- In Logic Pro X, double-click on a region to open the **Sample editor**
- Then choose **Edit->Open in BL-Ghost**
- Edit and save in **Ghost-X**

NOTE: Be careful that the sound file will be modified directly on disk.

NOTE: If the **External Sample Editor** option is not visible in Logic Pro X, go to **Preferences→Advanced** and check the **Audio** option.