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The overall structure of a SoundFont description:

The Preset is the feature that is visible to the outside. Presets are combined into Banks. Each Bank can hold 128 Presets and these are numbered either from 0 to 127 or 1 to 128 (in SynthFont 0-127).

There can be 128 Banks (numbered 1-128 or 0-127). Hence the total number of Presets in a SoundFont file is large enough. Very few SoundFonts have more than a few Banks in use. Usually these are "variation banks", .i.e there may be a slightly different Acoustic Piano in Bank 1 Preset 0 (1:0) than in 0:0.
A SoundFont contains "Presets", "Instruments" and "Samples".

Presets are visible to the outside and can be used for the MIDI Program. A Preset may comprise several Layers. The minimum is 1. There can also be a Global layer having data to be used when it is missing in the other layers.

Instruments are used by the Presets and are NOT visible to the outside. An Instrument may comprise several splits. The minimum is 1. There can also be a Global split having data to be used when it is missing in the other splits. Each split makes use of one and only one *sample*.

Samples are normal audio samples but they are always monophonic. Thus, for a stereophonic instrument you will need two samples and two splits, panned left and right.

A **Preset** may have one or more Layers. In the simplest case there is only one Layer, which then has to cover the whole key range and also the whole velocity range. The sound data used for a Layer is called an Instrument. The Instrument structure usually contains all the information needed to create the sound. Hence, in the simplest case, the Preset has only one Layer, referring to one single Instrument. NOTE: Instruments are pooled, meaning that several Presets may share the data in the same Instrument. This is cost effective but also a risk. When you edit an Instrument, be sure to check what happens with ALL Presets making use of this Instrument.

A **Layer** may contain parameters (usually called "generators") that can alter the sound of an Instrument. So, although two Presets may share one single Instrument, they may sound differently due to the Layer's data.
Layers are often used to separate key and velocity ranges, but this is no rule. Many Presets are "artificially" created by layering several Instrument sounds on top of each other. Another very common use is to add stereo to the sound with Layers. The wave data used in a SoundFont file is always monophonic. A stereophonic wave is hence usually split up into two different waves (labeled e.g. "Horn (L)" and "Horn (R)") and two Instruments have two be created for this horn sound. In the layers, these two horn Instruments are then included on top of each other, but panned hard left and right. Artificial stereo may be created in the same way by having one instrument in two layers slight tuned up and down (and panned, of course).

Instruments, again, are structured in Splits. Usually, a Split is used for a certain key and/or velocity range. A split always uses one single Waveform for the sound and has generators that can alter the sound. Instruments often need to make use of several splits and waveforms for a particular sound. For a real world instrument, the pitch range is so large that it cannot be recreated in a synth just be manipulating one single waveform. Hence, many waveforms are recorded and assigned a root note. Typically one waveform can cover a key range equal to root note ± 5 notes. Velocity splits are also common. Typically the same waveform is used, but different attenuation level, frequency filter and attenuation envelope.
One Waveform may be used by many Splits and Instruments. This is normally the case. Again, this is cost effective but potentially a risk. If you replace one Waveform with another then it may have unexpected side-effects.


All in all, it is important to understand that there are MANY parameters (usually called "generators") that are involved when creating ("rendering") a Preset sound, and that the rendering process may be a very CPU power consuming task
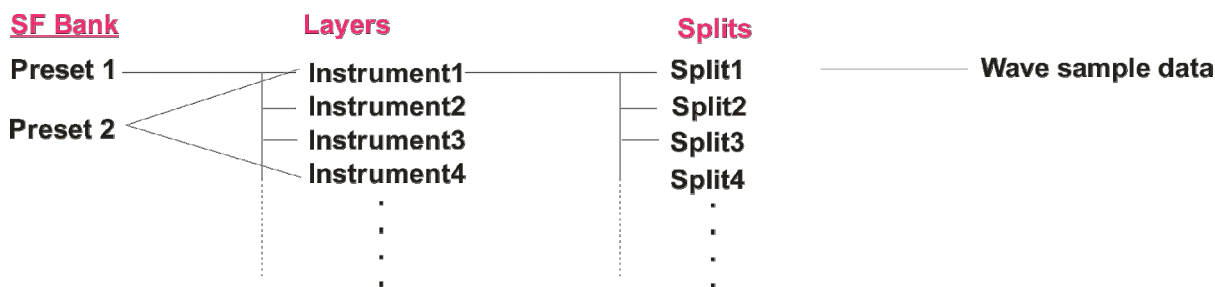
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Summary: A SoundFont bank has Presets visible to the outside. Each Preset makes use of a number of Instruments through their Layers. One Instrument can be used by many Presets. Each Instrument makes use of several Samples through their Splits. One Sample can be used by many Instruments.

Viena main window
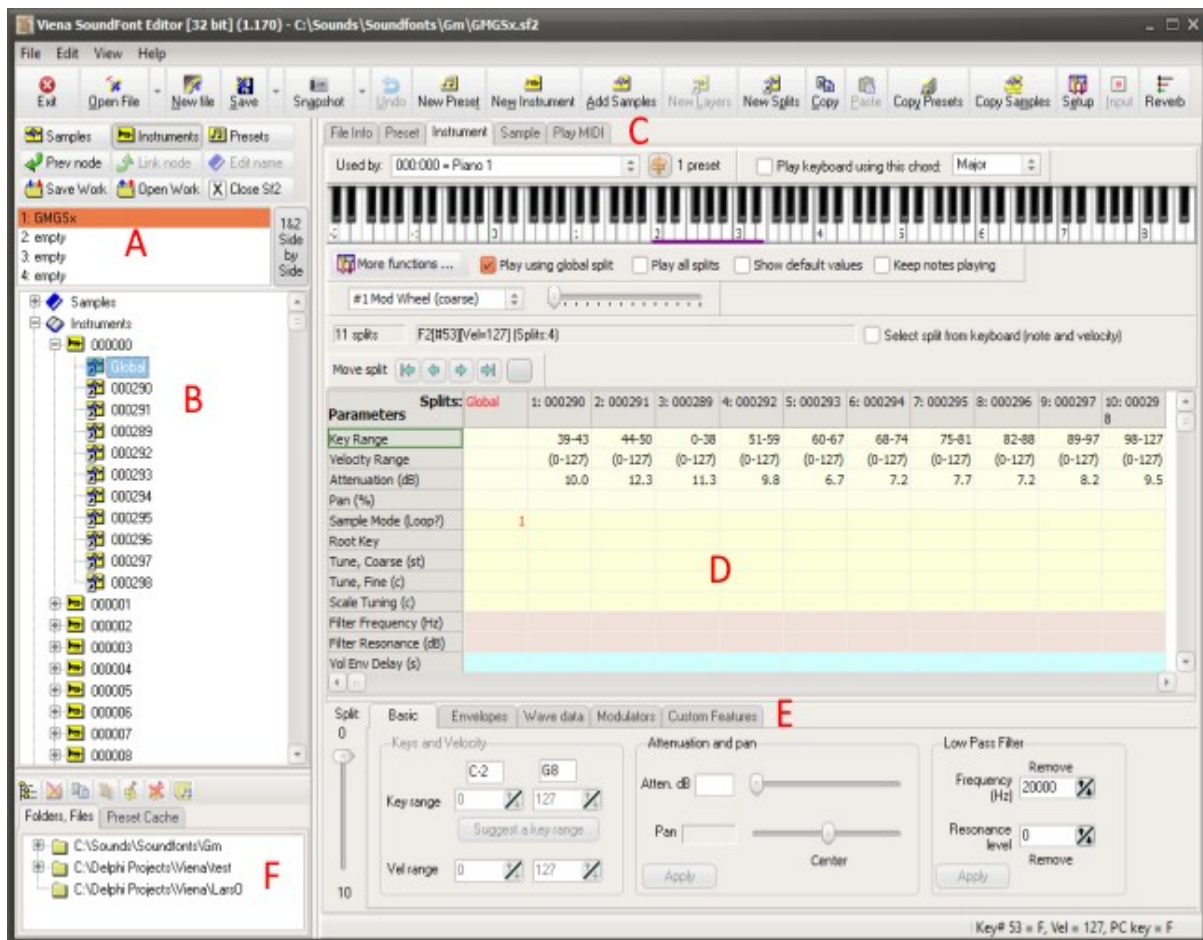
A: This list can contain up to four SoundFonts in four "slots". Thus you can work on four SoundFonts at the same time. To open a SoundFont into the list, at first select an empty slot and then use either the "Open" button or drag a file from the favorite "Folders, Files" in **F** (or use double click). To the right of this list is a button that lets you compare the two first SoundFonts side by side.

B: Select a SoundFont from the list in **A** to show the contents in this tree view. There are three main branches: Samples. Instruments and Presets (See "The overall structure of a SoundFont description" at the top)..

C: Here are five tabs for five "pages" for five different task. The first page I called "File Info". Here you can see and edit some general information for the selected SoundFont. This page also contains four buttons for helping you create or edit a SoundFont. The second page is "Preset". It shows the Layers in a table format for editing. The third page is "Instrument", shown in the image above as section **D**. This is the most important page as most editing work is done here. The fourth page is Sample and here you can edit some aspects of a Sample. The last page, Play MIDI, is not for editing but for listening to your SoundFont in a MIDI file.

D: This page displays various items depending on what you have selected in the tree view **B** or in the page selector **C**. If you have selected a Sample you will see the Wave Editor. The Wave Editor comes in two "flavors". If you have selected a Sample from the "Samples" item you will see only data related to the sample itself. The other flavor additionally shows data related to the instrument split using this

sample. This can be shown when you are editing the splits wave data in **E,** see below. If you select a **split** in the instrument, the split generator table will be displayed, as in the image above. This table has all splits listed side by side for easy navigation, comparing and editing of generators. You can edit the split data directly in this table, or by using the tool now displayed in **E** below the table.

F: Here you have two tabs. One contains a list of favorite folders and SoundFont files and the other tab is a Preset Cache. Here you can store, for easy retrieval, your favorite presets. Note, that this is merely a link to a file so that if you move the file, the cached preset item will be invalid.

E: This contains tools for editing instrument split generators. You can edit generators either with this tool or directly in the table in **D** above. Modulators can only be edited with this tool.

Viena main functions

Toolbar buttons:


```
1    2    3    4    5    6    7    8    9   10   11  12 13  14      15    16 17 18
```
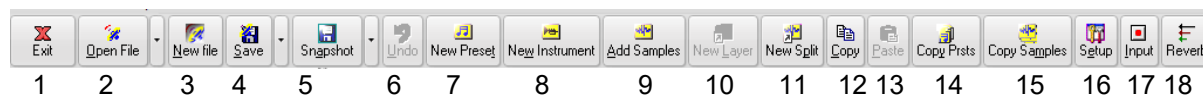
[1] Press to Exit Viena

[2] Open a SoundFont file. The file will be opened into the current position in the list **A**. Use the drop down list to pick a SoundFont from the history.

[3] Create a new SoundFont in memory. Give a name to it. At this moment no actual file will be created on the disk.

[4] Save the SoundFont file. In the dropdown menu you can find a "Save As..." command.

[5] Save "Snapshot". Use to create intermediate and temporary version of the SoundFont you are working on. Viena can continue from there later on.

[6] Undo the last edit changes

[7] Create a new preset. A dialog will open. In this dialog you can select bank, program number and name for the preset. Then you can select from which SoundFont you want to take the instruments, and finally select the instruments. Each instrument will create one layer in the preset.

[8] Create a new instrument. A dialog will open. In this dialog you can give a name to the instrument. Then you can select from which SoundFont you want to take the source material. You can select two different kinds of sources: audio samples, to create new splits, or existing splits if you want to copy splits from another instrument (in the same or another SoundFont). Finally select the samples or splits.

[9] Add audio samples to your SoundFont. You add a new audio sample by importing a WAV file from the disk. Note that audio samples are always monophonic so if you import a stereophonic file, Viena will create two new audio samples. At the bottom of the file open dialog you may find two checkboxes to let Viena immediately create an instrument for these new samples and optionally a preset using this instrument.

[10] Create new preset layer. This button is enabled only when you have selected a preset. In the dialog box, select the SoundFont source and the instruments you want to use. If the instruments are in another SoundFont, all the necessary audio samples will be copied as well. Each layer in a preset references one instrument. Layers can overlap, both in the key range and in the velocity range. Typical use of layers is to pan one to the left and the other to the right for a stereophonic sound. Layers can also be used to create completely new sounds out of a few instruments.

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[11] Create new instrument splits. This button is enabled only when you have selected an instrument. In the dialog box, select the SoundFont source and whether you want to use (copy) existing splits or create new splits from audio samples. If the splits are in another SoundFont, all the necessary audio samples will be copied as well. Each split in an instrument references one audio sample. Splits can overlap, both in the key range and in the velocity range. Splits can be used in the same way as layers (above). Please note that one instrument may be used by many presets!

[12] Copy item and [13] Paste item. Any item in the tree view can be selected and copied (except from the top level nodes). The copied item can then be pasted into the same or another SoundFont.

[14] Copy and Paste presets. This is a handy tool for copying presets, with all associated instruments and audio samples, from one SoundFont to paste it into another SoundFont.

[15] Copy and Paste samples. This is a handy tool for copying samples from one SoundFont to paste it into another SoundFont.

[16] Press for Setup and Options.

[17] Activate Input if you have an external MIDI keyboard connected to your computer and want to use it to audition instruments and presets in a SoundFont (instead of using the inbuilt virtual keyboard)

[18] Use the inbuilt Reverb to check how your SoundFont Presets may sound with reverb.

Additionally, above the SoundFont tree views there are these buttons:

Use the buttons in the first row to navigate between the three "pools" in the SoundFont tree. You can also use these buttons for the same pupose:
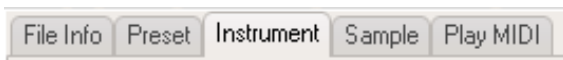
"Prev node" means "go back to previous level". This is a navigation tool. For example, if you double-click on a layer in a preset, you will be taken to the corresponding instrument (as a layer is a shortcut to the instrument). Then you can use this button to get back to the preset layer.

"Link node" will take you to the node used by a layer (i.e. an instrument, as described above) or a sample if you have a split in an instrument selected.

"Edit name" can be used to change the name of an item in the SoundFont.

"Save Work" means Save Workspace. Press to save the configuration of SoundFonts you have in the four tabs.

"Open Work" will open the last saved Workspace.

"Close Sf2" will close the SoundFont in the current tab.

How to create a new SoundFont from your own samples

Start by selecting which slot in area **A** you want to use for this SoundFont. Remember that you have four slots and tree views at your disposal. Press the button [3] and give the SoundFont a name. At this moment, the disk file is not yet created. The SoundFont is still empty.

First step: add audio samples

Press the button [9] and navigate to the folder where your samples are. Select as many samples as you like in the file list and press Open. Samples are imported into the Audio Samples pool and the wave editor is displayed in area **D**. In the wave editor you should optionally set the root key and the loop points.
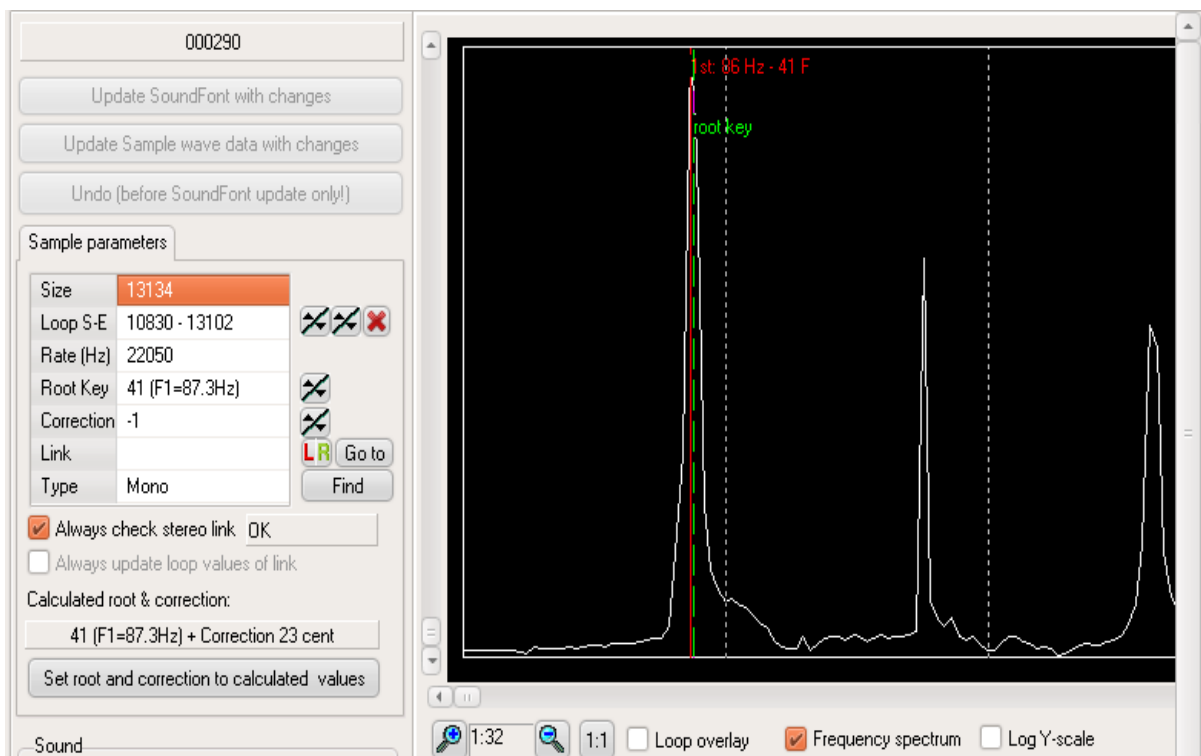
To set the root key and correction to the values found by Viena through spectrum analysis, you can press the "Set root and correction to calculated values" button in the section "Calculated root & correction". To set the "Loop S-E" points (S=Start, E=End) you can use the following method. Starting now with "0-0", press the right down button (in the up/down just to the left of the button with a red cross) so that the end loop value wraps around. Now you have defined a loop comprising the whole wave data, which is probably not what you want although this will work with some samples. To move the Start loop point to somewhere closer to the end of the data, press the left down button. Now you have a loop area comprising some amount of samples at the very end. This is still not what you want. You may now need to change the wave data zoom and also toggle the loop overlap on/off:
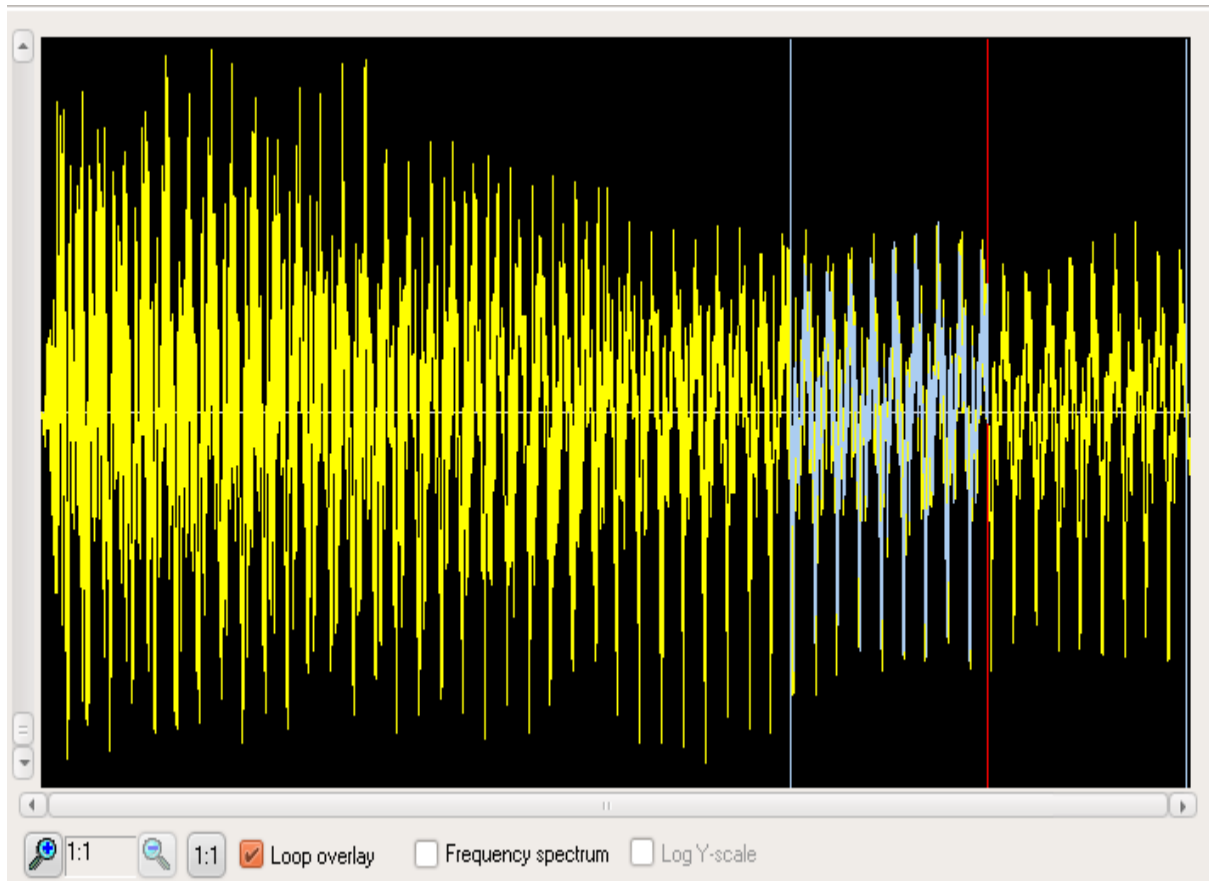
You can use the mouse pointer in the wave data area to set the loop points. Press the left mouse button somewhere to define the Start point, and the right button to define the End point. Finally you need to audition the loop:
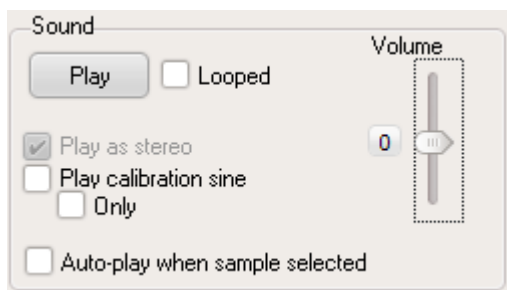
Note that you can continue to move the loop points while you listen.

If you find the you cannot define a set of loop point that do not causing a "click" everytime the playback loops, you may try the "Smooth loop" tool which you find in the section "Tools":
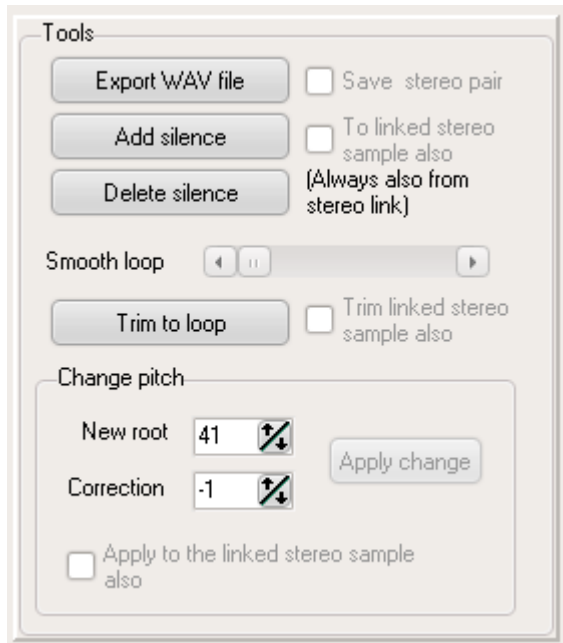
When you are satisfied, update the SoundFont with the data!

Note that you can any time edit the name of the audio sample in the tree view in **B**. Press F2 to activate the in-place editor.

2nd step: create instruments

Press the button [8] to display a dialog for entering data for the first new instrument. In this dialog you must select a name for the instrument. You must also select the source SoundFont. This can be any SoundFont open in Viena, i.e. you can now copy splits and audio samples from another SoundFont. But, in this tutorial we will not copy anything from another SoundFont, so select the "SELF" SoundFont. You must then select whether you want to use existing splits or create new splits from samples. As you have no splits ready at this moment you must select Create new Splits. Finally, in the list of samples, check all samples you want to use in this instrument. Each sample will result in one split. Press OK. In the tree view **B**, expand the instrument (click the '+') and select any of the splits. Area **D** will now show the splits table, with all splits arranged side by side. Please note that Viena will always display a Global split, even if it is not defined. It becomes defined as soon as you enter any data in it. Next you can set the generators for the splits you created. If you click on any split, the table in area **D** will reflect the selection. You can now either enter data directly in the table, or use the editor in area **E**. Use the virtual keyboard at the top to listen to the instrument or the splits. Select the Global split or turn on the "Play all splits ' button to listen to the instrument with all splits layered (as needed).

Note that you can edit the instrument name directly in the tree view **B**. Press F2. You cannot edit the name of a split as the name refers to the audio data. Don't forget to periodically save the file (you use the Snapshot feature)!

Final step: create a preset

Press the button [7] to display a dialog for entering data for the first new preset. In this dialog you must select a bank and program number and name for the preset. You must also select the source SoundFont. You can thus also copy instruments across SoundFonts in this way. But, in this tutorial we will not copy anything from another SoundFont, so select the "SELF" SoundFont. Press OK. Now you can expand the preset to edit the layers. Typically you would create two layers for a stereophonic sound, in which case you need to set the pan values to -50 and +50. Use the virtual keyboard at the top to listen to the preset or the layers. Select the Global layer or turn on 'Play all layers' to listen to the preset with all layers in use (as needed).

Note that you can edit the bank and program number, and the name of the preset in the tree view **B** . Press F2.

How to edit split generators

In the tree view in are **B**, navigate to the Instruments pool. Select an instrument and expand it into its splits. Select a split. In area **D** you now have a list of the most common generators and their values. Some cells are empty because no values have been defined. Viena does not display the default values in the table. To see which value will be used as default you can check the box "Show default values". To change a value, select the cell and key in the new value on the keyboard. Press <ENTER> to finish editing. The new value will immediately be written to the SoundFont in memory, but not to the file, of course.

For editing, you can alternatively use the editor displayed below the table in area **E**. It is up to you which way you find most convenient. When you change something here the new value will not always be sent to the SoundFont until you press Apply. Please note: if you want to edit the wave data while viewing the splits, you must use this editor. Go to the "Wave data" tab and toggle the "Show wave editor" box. Here is also the only place where you can change which audio sample the split uses (Reassign).

How to add a folder to the Favorite Folders and Files view

Below the area **B** you find area **F** which is a tool to help you find and organize SoundFonts and presets.
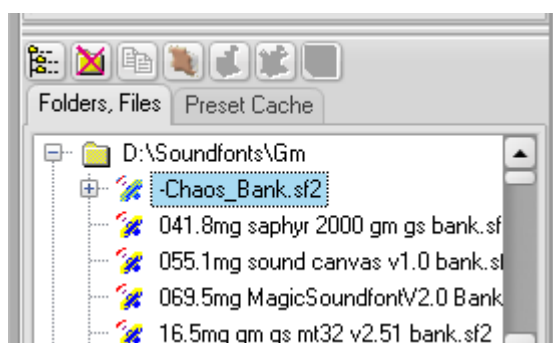
"Folders, Files" buttons (left to right):
1. Add folder (to this list)
2. Remove folder (from this list, nothing is removed from the disk!)
3. Copy preset
4. Open SoundFont in Viena

5. Pin preset in cache
6. Remove preset from cache
7. Add cache group

In area **F** click on the "Folders, Files" tab to display the tree view. It may be empty or not. Viena will initially fill this view with folders you have chosen as favorites in a SoundFont file open dialog. To add a folder, press the first button on the toolbar above, or use the right mouse button to pop up a context sensitive menu. Viena will scan through the folder and list all SoundFont files. To look into a SoundFont, click on the name to expand it into its presets:

You can now audition the preset by playing with your mouse on the virtual keyboard in area **D**. You can also add the preset to the preset cache by pressing button #5. You can also copy a preset and paste it into a SoundFont open in one of the slots in area **A**.

How to use the Preset Cache

To add a preset to the cache you must at first have the SoundFont listed in "Folders, Files". Click on the first tab to display the "Folders, Files" tree view. To look for a preset in an SoundFont, click on the SoundFont name to expand it. You can now add a preset to the preset cache by pressing button #5. A dialog box will appear that lets you choose to which cache group you want to add. You can also now create a new group.

Remember that cached presets are stored as a pointer to the SoundFont file, so it will become invalid if you move the file or change its name.

How to build a SoundFont using the "Soundero" tool

The Soundero tool can be use to create a new SoundFont or for editing an existing one.

We will now create a new SoundFont. Start here: Go to the page "File Info":
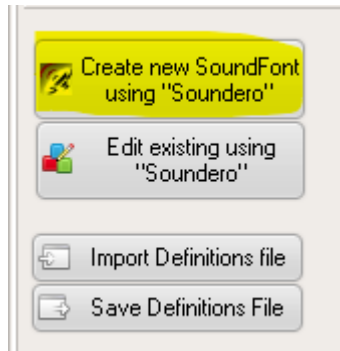
Press the highlighted button. You can also use e menu item im main menu "File". The new SoundFont name editor opens up at first and you can give the SoundFont a name you like, but keep in mind that as this file be a file name, some characters are not allowed.

The Soundero tool opens up but is empty. Add samples:
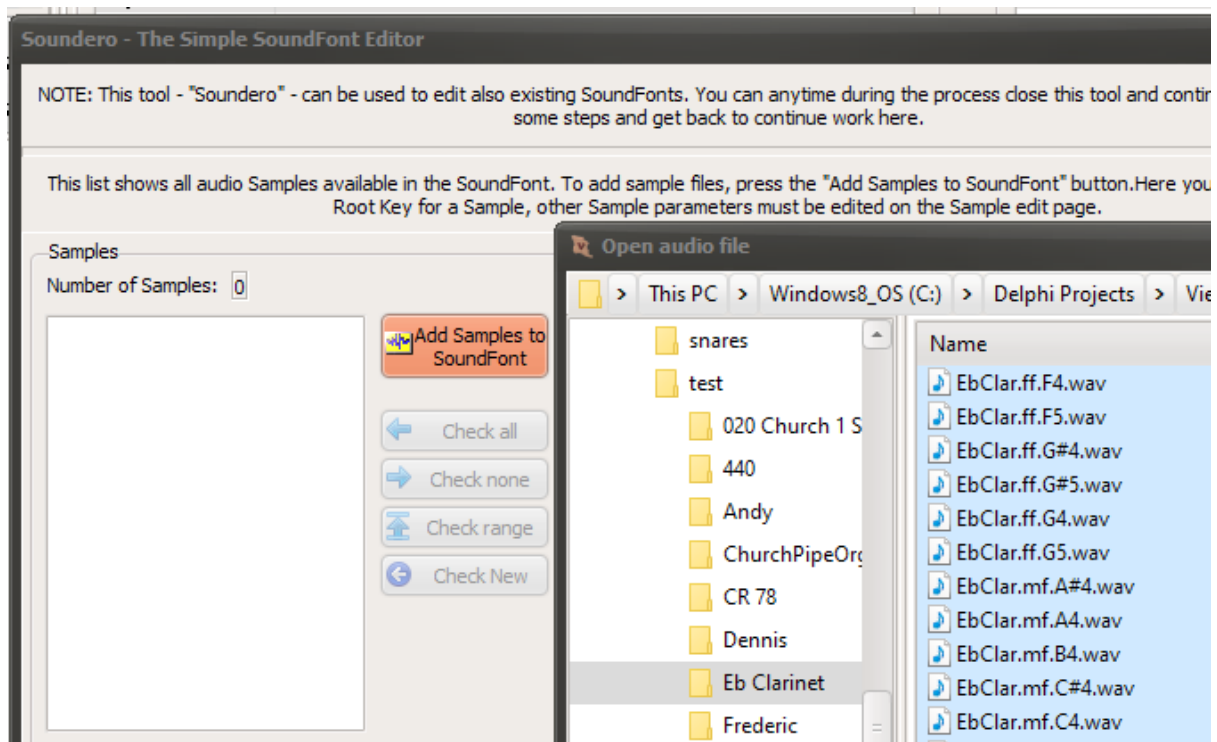
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Next step could be to see what root keys may have been defined:
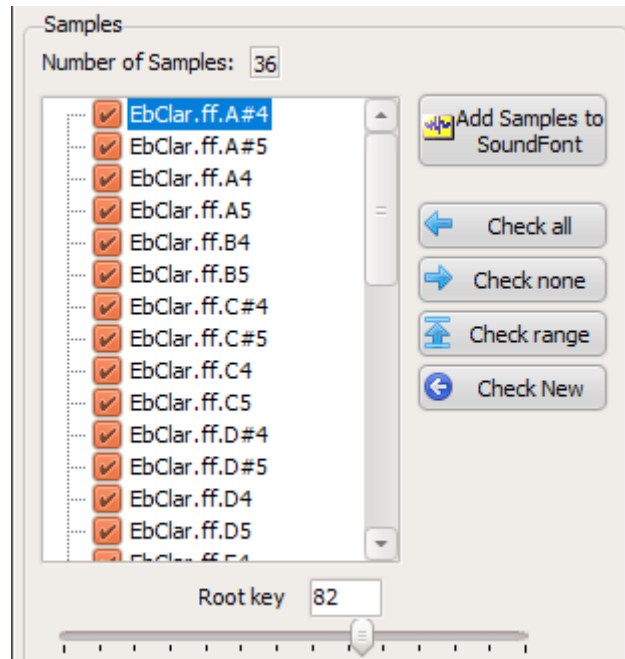
When you click on a sample in this list, the sample will be shown in the main window also:
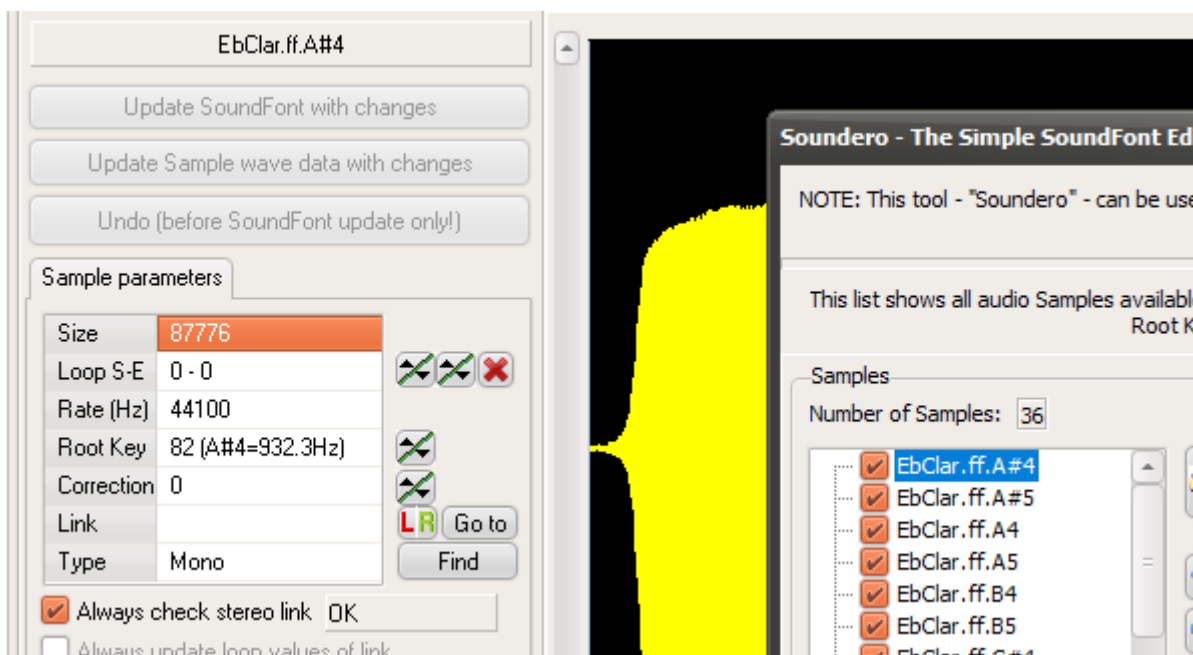
Note, if the sample file you add is stereophonic, two samples will be created and will be together in the list, like this:
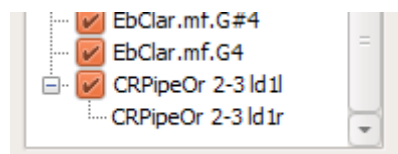
The last character, "l", stands for Left and "r" for right. You cannot choose one without the other.

Next you can set the key width for the samples. All samples will be assigned the same with, but you can change this later.

Next, create an Instrument:
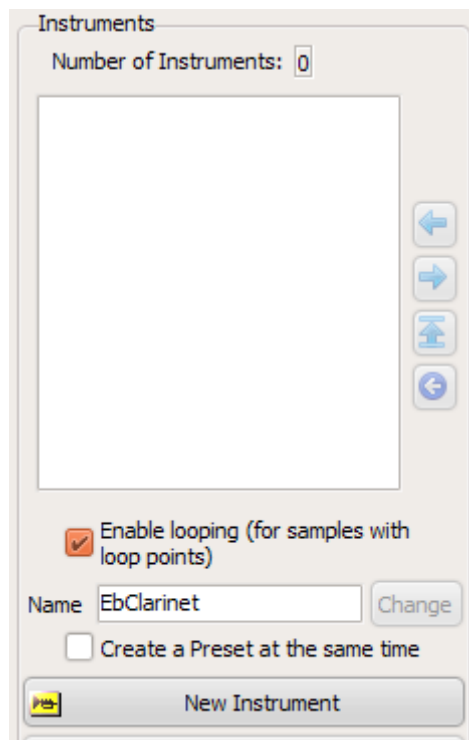
First you should choose the Name (although you can change it later). By default "Enable looping" is checked. There is really not much reason for NOT having it checked. You could choose to also create a new Preset for this instrument at the same time. Press "New Instrument".
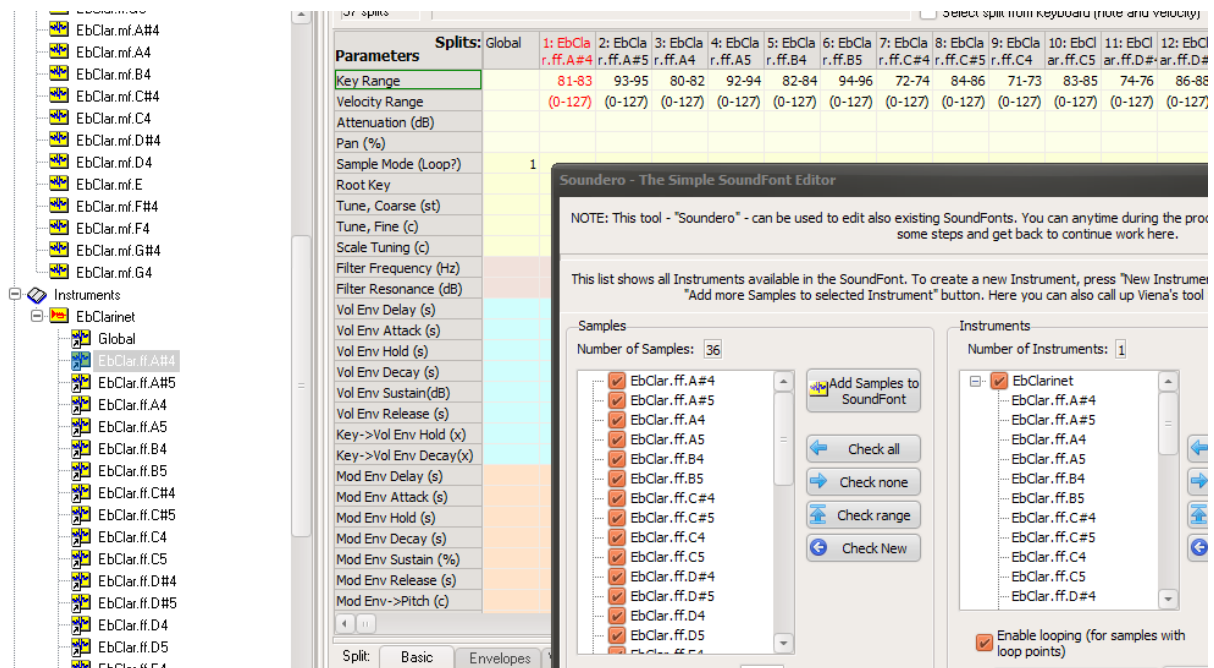
A new Instrument will be created. Note that the splits table in the main window reflects this new addition. Also note that the parameter "Sample Mode (Loop?)" has been set to "1" for the Global split due to the checkbox being checked.

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The final step now is to create a Preset:
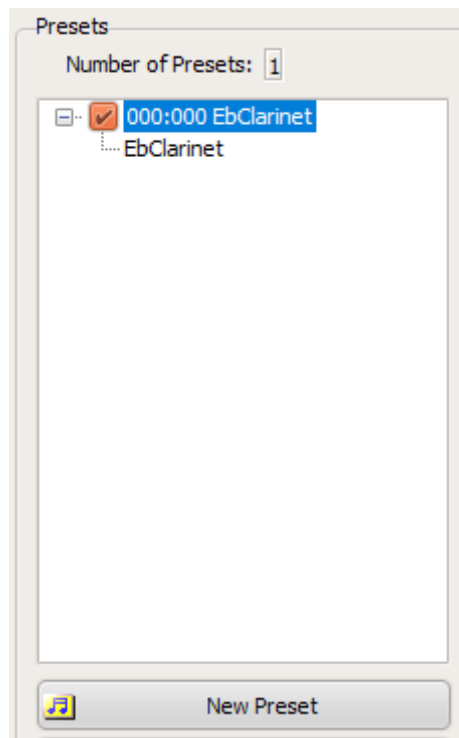
Press the button New Preset and a new Preset will be created using the single Instrument available.

Now you can press Save to save the SoundFont, or press Close to continue editing.
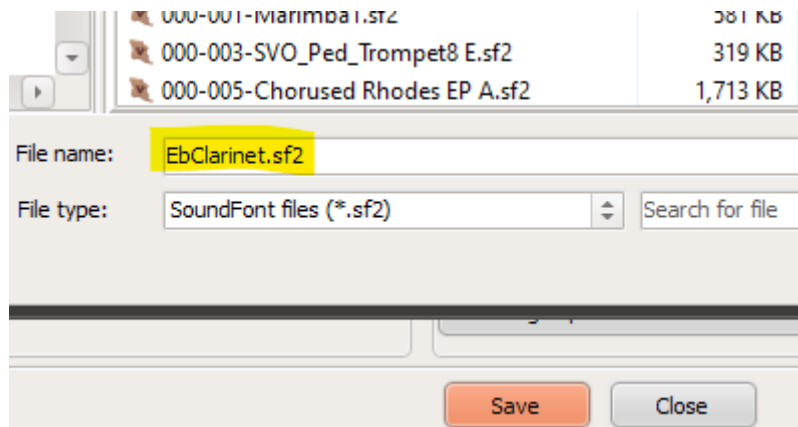
Save will call up a "Save as…" dialogue box, so you can change the file name now also.

You can any time late go back to "Soundero" to continue editing the SoundFont:

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