

VirtualEx

Manual

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Introduction to VirtualEx

VirtualEx is a software created by Thomas Hummel at the EXPERIMENTALSTUDIO des SWR over about 15 years. It is a classical MaxMSP patch for live-electronics. It translates many commonly used effects of the studio into a single user-friendly patch. It's been basically made for live-audio-transformations rather than sample-based usage.

One main problem within MaxMSP is it's static structure while being used as a live-electronics setup. VirtualEx resolves this issue by bringing the option to arrange a set of miscellaneous programs and to switch quickly and click-free between them. Therefore the patch is providing an extendable standard assembly kit with a large number of different algorithms which transform, record, play or spatialize sound (also including the famous Halaphon of the EXPERIMENTALSTUDIO).

The patch was programmed to

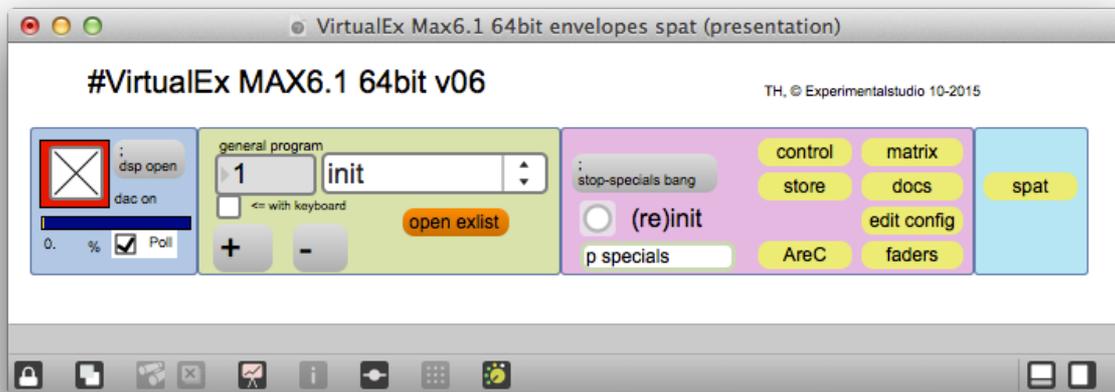
- be most user-friendly.
- be able to rapidly set up a live-electronic environment with a large number of transformation algorithms.
- have a rapid and simple as feasible handling
- be able to easily edit live-electronic sequences.
- require as few as possible MAX patching work.
- allow click free transitions between live-electronic situations/programs.
- avoid CPU surcharge and only activate audio modules when they are needed.
- only load audio modules into RAM when they were already used before.
- be understandable even for users with less technical experience, but simultaneously to be as versatile as possible.

Layout

Main window

The main window of VirtualEx is separated into four different sections:

- I. The ‚power switch‘ section (blue)
- II. The program-use section (green)
- III. The management section (pink)
- IV. The spatialization section (light blue)



Main window with its four sections

Power Switch Section

Here's where the DSP can be switched on and CPU-Usage be polled.
(See ‚Getting Started‘)

Program-Use Section

All of the different Programs can be inserted and edited here (‚open exist‘-button). Click-free switching between for concerts those is also possible in this section (‚+“ and ‚-“ buttons or via drop-down menu).
(See ‚In Rehearsal and Concert‘)

Management Section

Here's where the the configuration is set and edited (edit config-button), all the compiling (control-button) and storing (store-button) of programs and optional extended programming (p specials-patch) is done.

In this area you have also access to the matrix (matrix-button), the AreC-control window (AreC-button) and the fader section (faders-button).

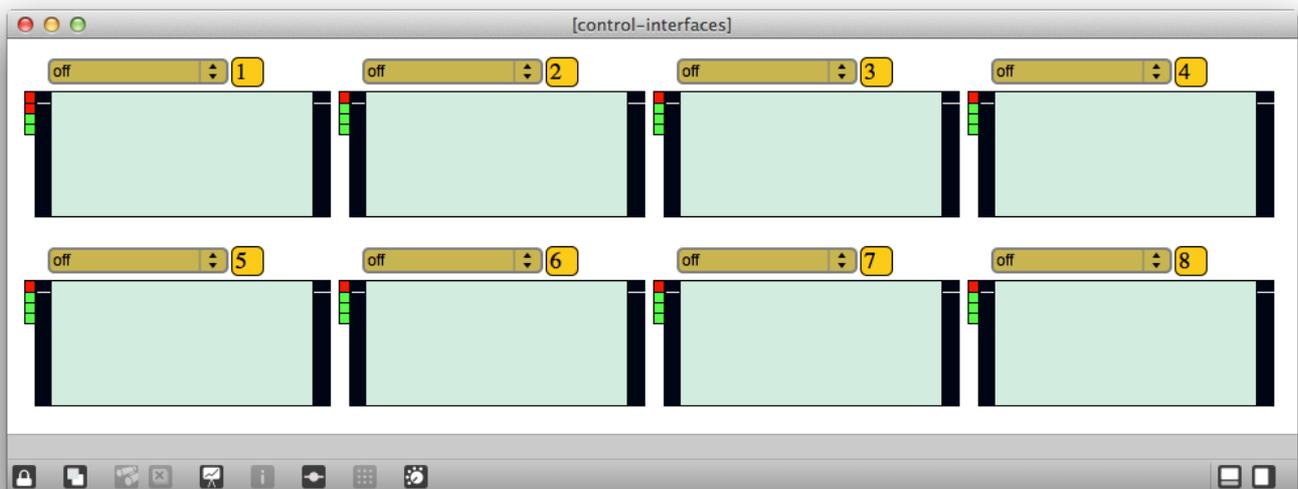
(See ,Using VirtualEx')

Spatialization Section

This section is for setting and adjusting the halaphon, IRCAM's spat and ambisonics (if configured).

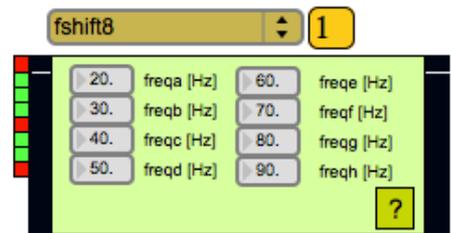
Machines and Algorithms

VirtualEx provides a standard set of algorithms to transform, record or play sound. To load these sometimes very complex algorithms into your patch can easily end in a confusing chaos. Therefore VirtualEx provides a window with a configurable amount of so called machines.



Empty machines.

A machine is like an empty container, waiting to be filled with an algorithm. Each machine is fixed in its layout and each of the available algorithms is exactly matched to fit into the machine and to only show what's necessary for the user.



This makes handling and choosing between those algorithms much clearer, faster and easier.

Machine with loaded Algorithm.

Using VirtualEx

Getting Started

Before you can start VirtualEx you have to set the path of the file preferences so that MaxMSP knows where to find all the additional data that is needed in order to run the patch properly. To do so simply click on 'Options' → 'File Preferences...' and a new window will pop up. By default there are already two paths set: 'Patches' and 'Examples'. You can now create a new 'userpath' by clicking on the '+'-sign in the bottom left corner or use one of the existing if there is already one there.

Then click on the grey button 'choose'. Max will ask you, which folder you want to set. Choose the complete folder called 'sub' of the VirtualEx package. Then click on open. You will now see a path to the folder written beneath your chosen path. The file preference is now set and open the VirtualEx patch (or restart, if it had been already open).

To begin with using the VirtualEx patch audio must be switched on. In the 'power switch' section you find a big red toggle to activate the DSP. If clicked it also activates the toggle to poll the usage of the computer's CPU. It can be deactivated by clicking on it.

Tip: Click on the grey „dsp open“-button to change the audio settings (e.g. input and output devices, sample rate, etc.).



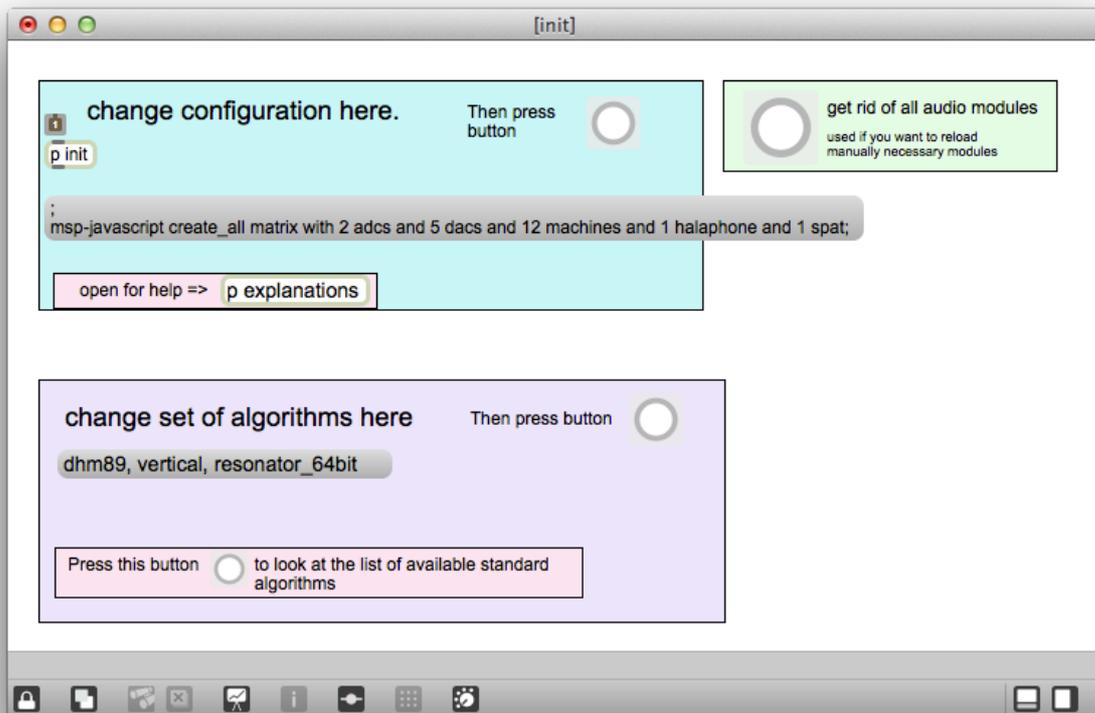
*Default: Audio turned off
(White toggle)*



*After clicking: Audio turned on
(Toggle crossed)*

Setting your configuration

To proceed, the configuration of the patch needs to be set. It can easily be adjusted to the needs of any project. To do so, click on the „edit config“-button in the management section. A new window will pop up.



This is where the configuration is set.

To adjust the standard setting to your needs, first click on the lock symbol in the bottom left corner of the Max window. This patch window is now unlocked and can be edited. In the turquoise configuration box double click on the text in the grey bar and adjust the settings. After doing so lock the patch (lock symbol, bottom left corner) and then click on the button in the top right corner to approve the changes.

VirtualEx provides two main options for setting up your matrix: You can either use the internal matrix of MaxMSP, which the VirtualEx patch will create after your needs or you can implement an external one (like LCS, D-Mitri, etc.) by connecting the adcs and dacs.

Note: Depending on the settings you make the spatialization section in the main window of the VirtualEx patch will change in its appearance.

Tip: For further explanations you can double click the button on the bottom of the turquoise configuration box.

Assembling your set of algorithms

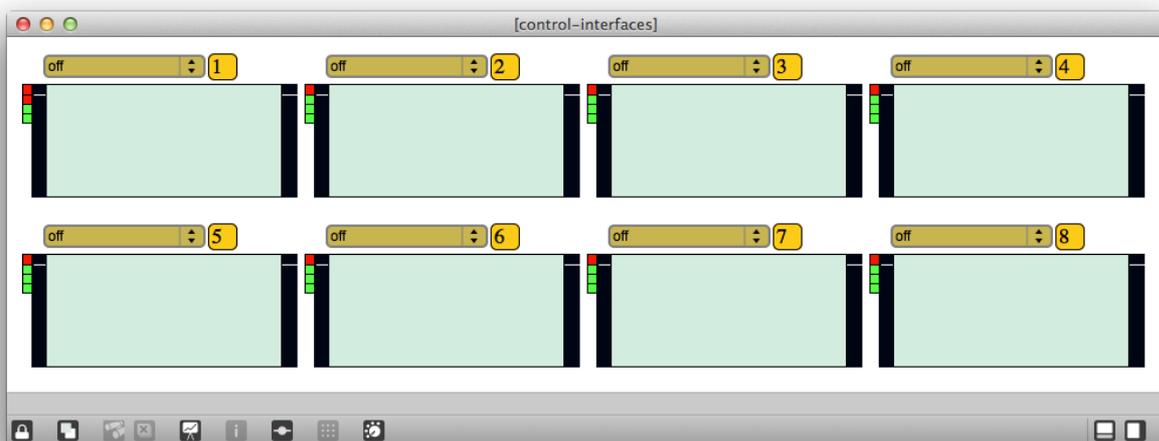
To economize additional RAM and CPU the VirtualEx patch will only process and load the algorithms that are demanded and needed. In the same „edit config“-window the patch can be told which algorithms should be kept available. This time go to the lilac box on the bottom of the window. Again, click on the text in the grey bar and just list all algorithms needed, but don't forget to make sure that the patch window is unlocked. After doing so, lock it again and then click on the button on the top right corner of this box.

Tip: For a list of available standard algorithms click on the button on the bottom of the lilac box.

Note: All of the settings in the „edit config“-window (configuration and set of algorithms) can still be changed later. However, if it will be changed, all of your adjustments in the control-window (-> see next chapter) will be set back to default.

Choosing and adjusting your effects

Next up go back to the management section of the main patch and click on the „control“-button. A window with your previously set amount of machines will pop up.



Adjustable with all previously selected algorithms.

Each machine is represented by a rectangle with two level metering bars, one on its left side (input) and one on its right side (output). On the top there is a drop down menu offering your previously selected set of algorithms.

Right to it is a box with the number of each machine, numbered consecutively from first to last.

Beside the left metering bar of each machine you can see a set of small colored squares. Each square symbolizes one algorithm, organized from top to bottom in the same way the algorithms were determined (and the same way they are being sorted in the drop down menu).



Green color means that the algorithm is known to the patch (as selected before) but it is not yet loaded into the RAM of your computer.



Red color means that the algorithm is already loaded into the RAM and can be selected.

If a square appears red it is not necessarily using CPU, only when selected from the drop down menu and appearing visibly in the machine.

Note: When used in concert, every algorithm that is being needed has to be previously loaded into the RAM (thus appear as a red square in the particular machine), otherwise there will be clicks when loading while simultaneously playing audio!

Most of the algorithmic environments that will appear inside of the machines if selected consist of number boxes with different possible values. To change these values they can either be clicked on and dragged or clicked on and then overwritten by typing the requested result.

Tip: For further instructions on what each value does and how to use each algorithm simply click on the question mark that will be placed somewhere in its environment or point your mouse on the boxes for hints.

Extending the algorithms

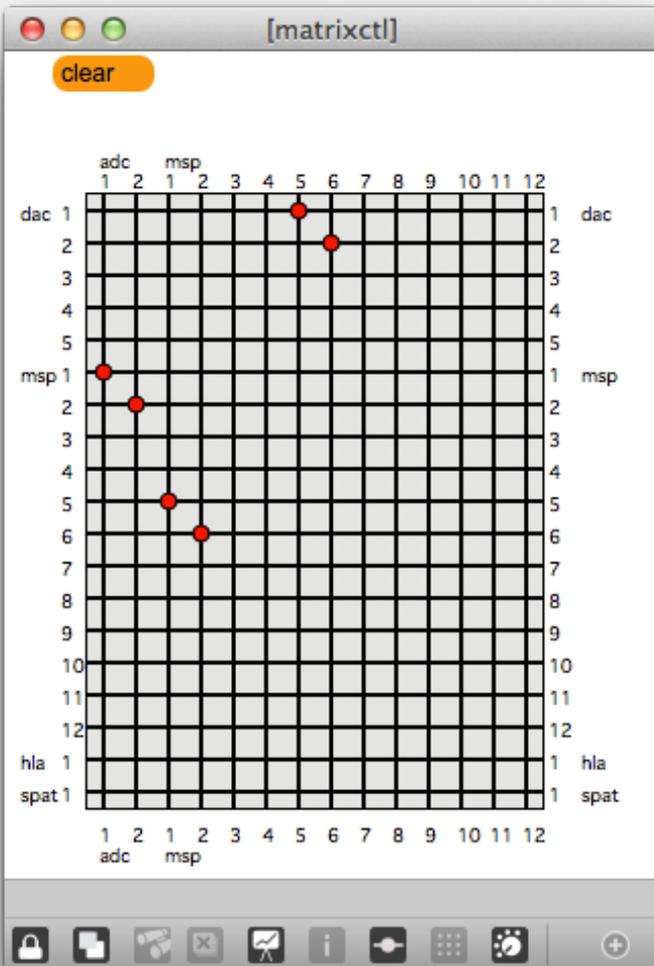
More experienced Max users will possibly want to extend the default algorithms with their own patching. For example adding an oscillator to a value box and change it constantly this way. To that end VirtualEx provides the „specials“-patch within the management section. By default it is an empty window, ready to be used.

If you decide to insert non-standard programming into the VirtualEx patch be sure to integrate a receive object called „stop-specials“ (r stop-specials picture) that, when receiving a bang, will stop all your additional programming. This is necessary if you want to guarantee switching between different programs without the special programming continuing throughout

them. Further you have to implement the „stop specials“-message into your program code. For more information on the implementation go to chapter „Storing a program“.

Using the matrix

If you previously configured a matrix into your patch (see ‚setting your configuration‘) it will be available in the management section. Click on the „matrix“-button to open it.



The matrix is generated automatically (including labels on the left, top and right side) based on the data you set before. You can define audio paths by clicking on the intersecting lines of the grid. A red dot will appear as crosspoint and the connection has been made. If you want to delete a connection, simply click again on the crosspoint. Vertical lines stand for input, horizontal lines represent output. On top of the matrix window there is also an orange „clear“-button which will, if pressed, delete all connections at once.

Tip: If you want to set multiple paths at once, you can click and drag your mouse across the matrix, which will automatically set crosspoints on the intersections of lines already being set. Same for deleting dots: Click again on a connection and keep your mouse pressed to drag it across the matrix and delete multiple connections at once.

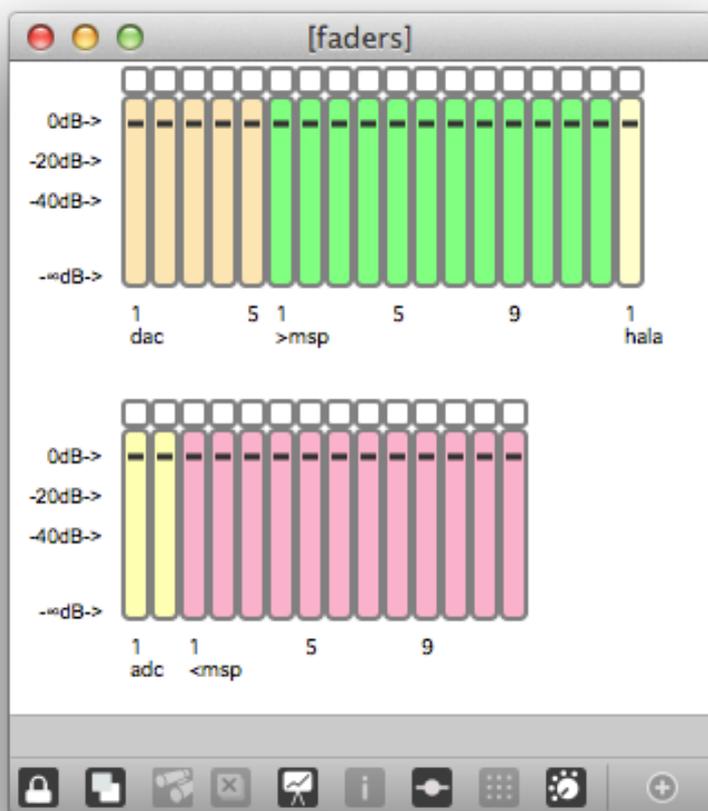
Adjusting the levels

In the fader window (click on the „faders“-button in the management section) you can control all of your levels. Just like the matrix the fader window will be generated and labelled by itself depending on your configuration.

On the top section there are the dac level faders, the faders of the levels *going to* (>) MaxMSP and your spatialization level faders.

On the bottom section there are the adc level faders and the faders of the levels *coming from* (<) MaxMSP.

Fader window



You can control those faders by either simply clicking and dragging or via external MIDI controller. For information on the latter see next chapter „Configuring external MIDI devices“.

Configuring external MIDI devices

VirtualEx implicates a rapid and easy way of finding and configuring external MIDI devices to serve as mixer by controlling the faders. To do so, follow these step by step instructions:

1. Make sure your MIDI device is connected to the computer and switched on. Check whether necessary drivers for the MIDI interface are installed.
2. Go to the fader window (management section -> „faders“-button).
3. Click on the toggle (white square) above the fader you want to assign to a fader of your external device. The toggle will be ticked off and a new window called „fader curve editor and MIDI viewer“ will pop up.
4. Now move the analog fader of your MIDI device (—> the one you want to assign to the virtual fader) up and down across its full range (in the grey text field of the „current MIDI message input“ section of the newly opened window you should see the name of your device and a movement of the MIDI-figures while moving the analog fader).
5. You can close the „fader curve editor and MIDI viewer“-window.
6. Click again on the toggle box above the virtual fader in the „faders“-window, so it won't be ticked anymore.
7. Move the analog fader. You should be able to see the movement transferred to your virtual fader in its whole range.
8. For every other virtual fader you want to assign to an analog fader of your MIDI device repeat steps 3 to 6.

Note: If you connect an external MIDI device to your computer while Max is already open, you might need to restart it for VirtualEx to recognize it. Don't forget to save your project when doing so.

Note 2: The same analog fader can be assigned to more than one digital fader. Nonetheless they have to be programmed successively.

Note 3: You can assign as many different external MIDI devices at the same time as you like. VirtualEx will automatically recognize the right one if you move the particular fader.

Tip: You have to make sure you hit the highest and the lowest points of your analog fader so VirtualEx can transfer the complete range on the virtual fader. An easy way to make sure you got this, is to watch the grey text field to reach the MIDI number 0 and 127.

Tip 2: Also it doesn't matter if you move the analog fader up and down more than one time, it's rather recommended since like that it'll be more likely to get a hold of the whole range.

Transferring your analog MIDI-fader breakpoints

It is very likely that dB labels of the analog MIDI levels and the digital levels will not coincide. However, if you need these labels to match, the VirtualEx patch provides a simple way to accommodate.

In the previous chapter „Configuring external MIDI devices“ stop after step 4 and continue with this:

1. When you moved your analog fader and see it appear and move in the grey text field, look at the block that says „set fader curve breakpoint“ (still in the „fader curve editor and MIDI viewer“-window).
2. To now accommodate the analog labels with the digital ones simply pick one of the dB level values from the box and move your analog fader to this very level on your MIDI devices readout.
3. Then click at the dB level value you chose. This is to tell VirtualEx, that your MIDI fader's position is now the same as the one you clicked.
4. Repeat steps 2 to 3 until you clicked on every dB level value (there are 6 in total: +10 dB, 0 dB, -10 dB, -20 dB, -30 dB and -80 dB).
5. You can close the „fader curve editor and MIDI viewer“-window.
6. Click again on the toggle box above the virtual fader in the „faders“-window, so it won't be ticked anymore.
7. Move the analog fader. You should be able to see the movement transferred to your virtual fader in its whole range and the metering levels should be referring to equal values at all positions.

***Note:** If done once, the „envelope“ you created for translating analog do digital fader levels will be adapted automatically to every following fader you connect until you create a new one.*

Storing a program

All the settings you made in the management section can be stored as a program which can be recalled at any time. To store a program simply click on the store button (also in the management section). A new window will pop up, consisting of a huge grey text field and a big „store“ button. In the top left corner there is also a short explanation on how to store.

1. Press the store button. The text in the grey box will most likely change directly.
2. Now unlock the patch by clicking on the lock in the bottom left corner.
3. Double click on the grey box and copy *all* of its content.
4. Lock the patch again and close the „store“-window.
5. On the main window, program section, click on the red button „open exist“. A new window with the previous exist will pop up.
6. Scroll down to the bottom and write „programe #;“ (#= name your program as you like)
7. *Optional: If you programmed extra content into your patch, you have to write „stop-specials bang;“ between „programe #;“ and the copied code.*
8. Paste the copied code below.
9. Write „endprog;“ into the next line.
10. Close the exist and check, whether the name of your new program shows up in the drop down menu.

If you now choose the program to be loaded again, all your settings of the management section will reappear: From matrix crosspoints, to values in algorithms, to algorithms in machines and so on.

Tip: If you only want to change certain things from one program to the next you can also copy just the things you need from the store window box and paste them into your exist (nevertheless with the additional code at the beginning and end).

Docs

The „docs“-button in your management section provides an additional source of information. Click on it to get a small window with toppings to choose (by double clicking them):

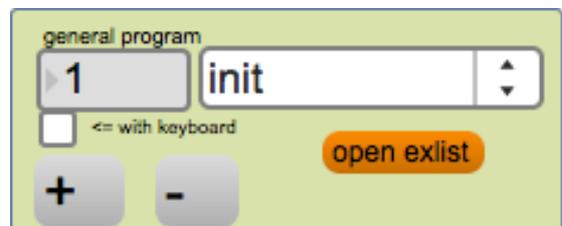
- *general*: here you get some universal information about the VirtualEx patch
- *all-algorithms*: there's a list of global categories and if you double click any of those, you'll be given a window with the names of all algorithms of that category and a short description of their function
- *VirtualEx_and_AreC*: description for setting up, naming and assigning the AreC mixer
- *direct_audio_and_fader_messages*: here's the information for accessing your audio in and outs of the modules directly
- *spat*: information on integrating IRCAM's spat into VirtualEx

In Rehearsal and Concert

When you assembled a list of different and sorted programs you probably want to use and switch between those in a rehearsal or in concert. For this, VirtualEx provides different options:

- Buttons (Main window, program-use section):
By clicking on the ,+'-button you directly switch to the next program in your exlist.
By clicking on the ,-'-button you'll go back to the previous program in your exlist.

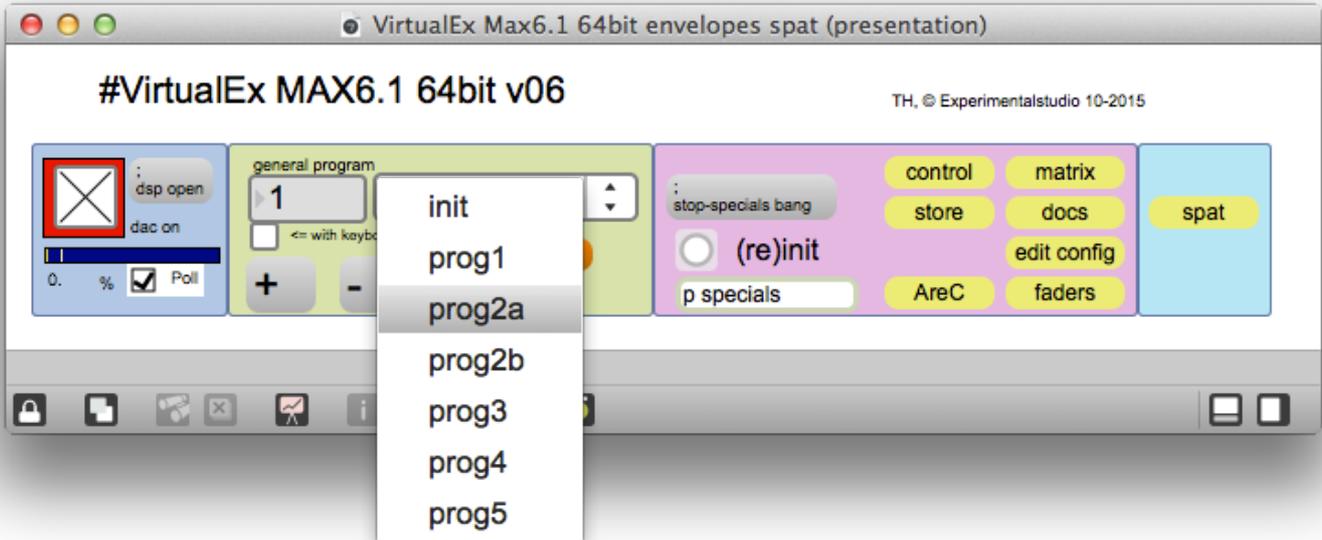
- Keyboard (Main window, program-use section):
By ticking the ,<= with Keyboard' box, you activate the possibility to switch to the next program by hitting the enter button on your keyboard.



Program-use section with ,+' and ,-' buttons and keyboard box.

Note: If you're using a keyboard without number pad, you need to press ,fn' + ,return' for the ,enter' command.

- Manual Switching:
when you click on the white drop-down-menu which is showing the name of the current program, a list of all your programs will be shown and you can jump directly to the one you wish to use.



Choosing a program via drop-down-menu.