VSTHost

A program to run VST-compatible PlugIns

Version 1.47

Download Information

The latest version of VSTHost can be found at http://www.hermannseib.com/english/vsthost.htm

Contact Information

The author can be reached per email at office@hermannseib.com

Translations

The French localization has been done by Patrice Vigier of Vigier Guitars (www.vigierguitars.com).

Skins

Vera Kinter aka Artvera (www.artvera-music.com) has created some beautiful skins for VSTHost which can be downloaded from VSTHost's web site.

All above contributions have been done voluntarily and unpaid – and I can imagine the effort that's gone into them.
Thank you very much for this!

Copyright Information

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Introduction

What is VST?

“Okay, what are VST PlugIns?”, I hear some of you say… well, let’s do a little history research. If you already know what it means, just skip to the next section.

The term **VST** was coined by Steinberg some years ago as an abbreviation for „**V**irtual **S**tudio **T**echnology“. It is an interface definition that allows communication between a **VST Host** (originally, of course, Steinberg’s Cubase sequencer, but many more programs have adopted the interface by now) and **virtual effects** and **instruments**. These effects and instruments are implemented as separate units and can be “plugged into” the VST Host wherever they’re needed, thus they are commonly called “PlugIns”. The VST Host sends audio data streams to the PlugIns in a special format and adds their output to its own audio processing.

Since V2 of the VST definition, there are two kinds of VST PlugIns: **effects** and **instruments**. The distinction is that effects process an incoming audio stream, while instruments *create* their own – they are triggered by MIDI events, just like an external synthesizer would be.

With V3 of the VST definition, Steinberg created a completely new interface which is completely incompatible to V1 and V2. Since V1.46, VSTHost can load VST3 PlugIns – there are a few, but since they're so radically different internally, PlugIn writers have been *very* reluctant to adopt it so far – but it doesn't yet fully explore the VST3 capabilities. There's a bit of a chicken-and-egg problem here; I can only add features if I got PlugIns to test them with. Fine, but – there are no freeware VST3 PlugIns available, only some commercial ones, which are primarily targeted at the Cubase / Nuendo environments. I can't afford to buy them just for this purpose, so I'm a bit stuck...

Then, there's yet another PlugIn type: VST *modules*. The “VST Module Architecture” describes a kind of sidestep between VST 2 and VST 3 – these PlugIns are architecturally related to VST 3, but offer only MIDI capabilities. I don't think that there are many of these. Since V1.46, VSTHost supports a relatively big subset of the VST Module Architecture capabilities, but I've got the same problem here as with VST 3 – no test material, no further development...

Steinberg’s SDKs provide a VST implementation for quite some operating systems; VSTHost, however, only works on Windows.

VSTHost can use the old-fashioned Windows Multimedia Extensions (MME) interface to exchange audio data with the sound card, or it can use an ASIO driver, if available.

What is ASIO?

“Okay, but what is ASIO?”, I hear some of you say… probably the ones who didn’t know “VST” ☺… well, let’s do a little history research again. If you already know what it means, just skip to the next section.

The term **ASIO**, again, was coined by Steinberg some years ago as an abbreviation for “**A**udio **S**treaming **I**nput **O**utput”. It defines a rather fast communication method between the audio hardware and an audio-processing program, such as a VST Host. An ASIO driver, if available, normally performs better than a MME driver, since it has considerably less overhead, allows multi-channel communication and so on.

More Information on VST, ASIO and PlugIns

The SDKs for Steinberg’s VST and ASIO Software Development Kits can be found on the Internet. When I last checked, they could be found at http://www.steinberg.net/en/company/3rd_party_developer.html .

An exhaustive, searchable list of PlugIn descriptions can be found at http://www.kvraudio.com .

What is VSTHost?

VSTHost is a program to run VST PlugIns. In contrast to the big programs (Cubase, Nuendo, Logic come to mind), it is not a full-fledged giant sequencer package that needs many seconds just to come up to a point where it can say “Hello”. It’s relatively small, and hopefully will stay so, and it *only* runs PlugIns. No sequencing (well, it can play back simple audio and MIDI files), no elaborate recording facilities (although it does have a simple multitrack tape recorder built in). To make up for that, you can define very complex PlugIn setups and switch between them easily.

Evolution

The main goal for VSTHost, in the beginning, was simply to provide a little test bed for VST PlugIn development, and to understand how VST works “under the hood”. By now, this goal has been reached; VSTHost can load nearly every PlugIn (it even occurs in the “list of compatible hosts” for quite some PlugIns, which I find rather flattering). If you want to perform some in-depth debugging, the full source code for a reduced version of VSTHost is available for download on my web site (see page 2 for details).

VSTHost is still evolving, however; the goal for now is to turn it into a valuable tool for performing artists in a live environment. Sort of a “super-synthesizer”, if you want.

What does it cost?

Aaaah, this is the point where money comes into play; I was never good at that ☺… basically, it’s free. The download version is not restricted in any way, doesn’t even show a nag screen. Why encourage pirates to tinker with it?

In theory, it’s “donationware”, which means that you can download and use it; if you find it useful, it would be nice to register by sending a little bit of money to my PayPal account. There’s a “Donate” button on VSTHost’s web site for that. If that doesn’t work, sending to my PayPal account using office@hermannseib.com as receiver does the trick. I don’t insist on it, but it would be nice if you honored the countless hours I’ve invested into making this thing usable by donating a bit to the further development of VSTHost.

Installation

VSTHost is too simple (or too intelligently written? You decide ☺) to need an elaborate installation procedure. Simply copy the contents of the .zip file into a directory that suits you, eventually create a link to it in your start menu or on the desktop, and that's it.

In theory, this would make it possible to use VSTHost as "stickware" (i.e., software directly running from an USB stick); however, since it relies heavily on outside resources (audio cards, PlugIns, …), this can only be reached by restricting yourself to a very basic setup.

Requirements

To run VSTHost, you need at least the following:

- a contemporary computer with a Pentium II (or better) or Athlon processor with least 500MHz; the more, the better (actually, it does even work with an AMD K6-II at 300MHz, but only with *very* simple PlugIns, so this is not really recommendable);
- a fair amount of RAM; while 128MB should be sufficient for a minimalistic setup, 256MB are much better; for larger setups, 512MB or more are recommended; the sky is the limit ☺
- a sound card; while VSTHost works even with the measliest AC97 on-board chips, a modern card that can handle 24bit audio is recommended;
- Windows operating system; Windows 98, ME, NT4, 2000, and XP are supported.
  To my knowledge, it also runs in an up-to-date WINE environment on a x86-based Linux, but I never tried that; while it may work, it is definitely not a supported configuration. Vista and Windows 7… good question… VSTHost *might* work on them, but this is definitely no supported configuration, either.

If your sound card came without an ASIO driver (obviously created with game players in mind instead of musicians), you might try to use Michael Tippach's ASIO4ALL driver, which can be found at, surprise, surprise, http://www.asio4all.com – it can work wonders compared to the MME drivers that are normally provided with the sound cards.

That's it – there isn't more to it. Unless you used an earlier VSTHost version; in this case…

Attention Upgraders!

Starting with V1.43, VSTHost doesn't store its settings in the registry any more. Instead, it uses a "Data" directory for storing information, such as performance banks, recordings, global initialization files and the like. If you just downloaded and installed VSTHost for the first time, that's no problem – the distribution comes with a populated "Data" subdirectory, and VSTHost defaults to using the path where it is installed, with an appended "\Data", so everything just starts up nicely.

For long-term users, the situation isn't so simple, since their settings are already stored in the registry. In previous versions, VSTHost contained startup code that automatically corrected such things, but in the meantime this means *quite* some code that isn't normally needed, so I decided to move it into a separate program. Starting with V1.43, the VSTHost package includes a little helper program called **vsthostregclean**. Simply double-click on this in the Explorer, and it should transfer all your registry settings into the corresponding files (and clean up the registry while doing so).

If you're upgrading from a version >= V1.43, you should *still* execute vsthostregclean, as it also corrects settings that are different from previous versions.

The Slave mode settings are a completely different subset in the registry, so if you previously used VSTHost in Slave mode, you'll have to append the command line parameter **/slave** to vsthostregclean. The easiest way to do this, from my point of view, is to open a command prompt, CD to the VSTHost installation directory, and issue the command, like

```
C:\Program Files\VSTHost>vsthostregclean /slave
```

Mouse junkies can right-click on vsthostregclean.exe, select “Create Link” (or whatever that’s called in your local version of Windows) to create a link, then modify the link’s properties to include the **/slave** parameter on the invoked program’s command line, save the new properties, and then double-click on the link (and remove the link again, since this is a one-time operation).

If you’re also using the Open Source variant of VSTHost, vsthostregclean has the unfortunate side effect of removing all the settings for this one, too; for such an environment, you can pass the additional parameter **/keep** to vsthostregclean so that it doesn’t remove the **Settings** and **Load** sub-keys from the registry.

Then, there’s one more possible parameter – this deals with the fact that in previous versions VSTHost used its own file name (normally “VSTHost”) as its start point in the registry. If you renamed VSTHost (or created a hardlink for it), the key in the registry isn’t VSTHost, either. For such situations, you can append the parameter **/app=*appname*** so that vsthostregclean uses *appname* instead of “VSTHost” for its operation.

That’s it – there isn’t any more to it. Simply start VSTHost for the next task:

Configuration

When you start VSTHost for the first time, it comes up with a minimal configuration. A “deaf, dumb, and blind kid”, as The Who would have called it. You’ll see a window like this (the exact look, of course, is determined by your Windows setup):

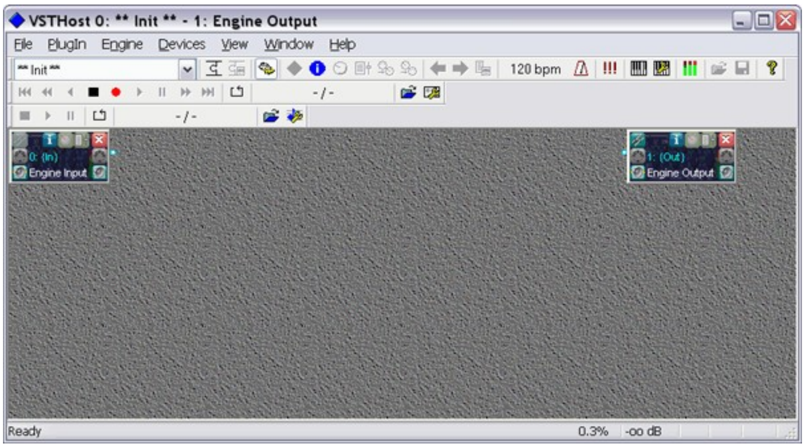


Figure 1: Initial VSTHost window

Hmmm. Well. OK. So what does that mean…? Let’s start with the obvious first task:

Audio Configuration

When VSTHost comes up the first time, it doesn’t know anything about the computer’s configuration. Being rather conservative in its views, it doesn’t preload any specific driver. In Windows systems, there’s something called the **Wave Mapper** device. The user can predefine an audio device as the default device – the thing that is used whenever Windows needs to issue a “Ping!” or “Bleep!” or “Whoop!” to indicate certain conditions. VSTHost preloads this standard device as its Audio output device, and that with a very large buffer size. This, however, is probably the worst possible solution – but one that’s practically guaranteed to work.

To set up a better configuration, we have to enter the **Wave Device Settings** dialog by choosing its menu entry:

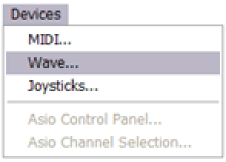
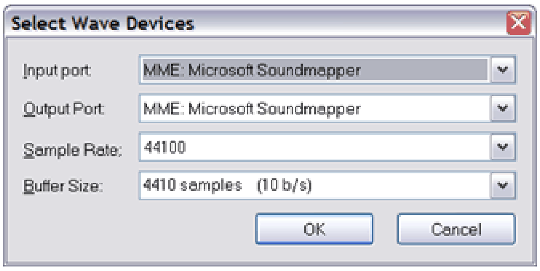


Figure 2: Wave Device Settings menu entry

… which opens the following dialog:



Select Wave Devices

Input port: MME: Microsoft Soundmapper
Output Port: MME: Microsoft Soundmapper
Sample Rate: 44100
Buffer Size: 4410 samples   (10 b/s)

Figure 3: Wave Device Selection Dialog

Here, the wave devices used by VSTHost can be defined. The combo boxes contain the possible devices. As you can see, the Wave Mapper is preselected (and loaded), with a large buffer size. At 44.1kHz, which VSTHost uses with MME devices, this means that it processes audio at a rate of 10 buffers per second. This buffer size should work even on the slowest computers, but it doesn't allow real-time operation. So, we'd better redefine that setup to the best possible for the computer at hand.

The devices listed in the combo boxes all have a prefix, either **MME:** for Windows Multimedia Extensions drivers, or **DSound:** for DirectSound drivers (DirectSound5 at the moment – doesn't work well in Vista or 7. Be warned.), or **ASIO:** for ASIO drivers.

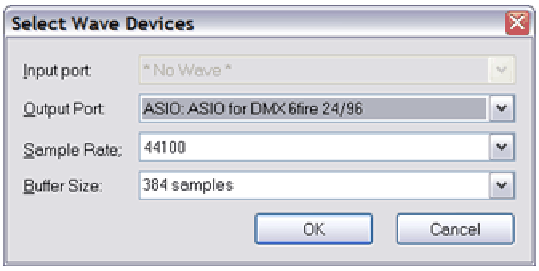
The **Input port** combo box shows all available input devices. This box will never contain ASIO drivers; since ASIO drivers combine the operation of input and output drivers, they are only listed in the **Output Port** combo box. Whenever an ASIO driver is selected in the Output Port box, the Input Port box is grayed out to reflect the fact that ASIO doesn't need a separate Input port.

The **Output Port** combo box shows all available output devices. If it should be empty, your computer doesn't have (or doesn't think it has; Windows 98 sometimes works in mysterious ways ☺) any sound card. In this case, VSTHost can still be used to load and debug PlugIns, but you won't hear anything, which makes it a kind of useless intellectual exercise for most of us.

You should select the best possible combination for your computer; with Windows NT, there's not much choice, since there are not many ASIO drivers for NT floating around (read that as: zero). ASIO4ALL doesn't work, since NT4 doesn't follow the WDM driver model, so your choice will probably be rather limited. In general, you should always take the drivers that are closest to the hardware; in audio processing applications, speed really counts, and avoidable overhead is bad. If an ASIO driver is available for your sound card, take it; it will provide the best performance in most cases… with a notable exception: if you have Cubase or Nuendo installed, they installed an ASIO emulation driver called "ASIO Multimedia Driver", which adds a layer *above* the Windows MME driver. Avoid this ASIO driver whenever possible (it always *is*, since VSTHost can handle the MME driver itself), it gives a horrible performance.

The **Sample Rate** combo box allows to select between various available sample rates, if the configured output driver allows them; VSTHost tries its best to determine what the driver can do and what not, but this doesn't always work out – some drivers happily report that they can playback at 192kHz, although they can't even do 88.2kHz. Also, most ASIO drivers rely on the **ASIO Control Panel** to determine the sample rate. In these cases, the combo box will hold exactly one possible value.

The **Buffer Size** combo box lets you select between some buffer sizes; these are carefully selected for their property that their multiples exactly fit into one second at 44.1kHz. Now, that may be nice, but… first of all, 44.1kHz isn't mandatory for ASIO drivers, and some of these mandate other buffer sizes. Therefore, apart from the predefined values, you can enter any (reasonable) buffer size you want into this combo box.
Here's how my main development computer's configuration looks like (this PC uses a Terratec DMX 6fire 24/96 card):



Select Wave Devices

Input port: * No Wave *

Output Port: ASIO: ASIO for DMX 6fire 24/96

Sample Rate: 44100

Buffer Size: 384 samples

Figure 4: Setup for Terratec DMX 6fire 24/96

Experiment with the buffer size; if it is too large, you'll hear noticeable delays between the triggering of a note and its actual appearance at the speakers. If it is too small, the overhead introduced by the frequent buffer handling might become too much for your poor little computer; in that case, it starts to skip processing some buffers since it doesn't have enough *time* for it. This results in an occasionally audible crackling noise. In this case, increase the buffer size until it goes away.

Once you have configured an ASIO driver, the following two menu entries can be used:

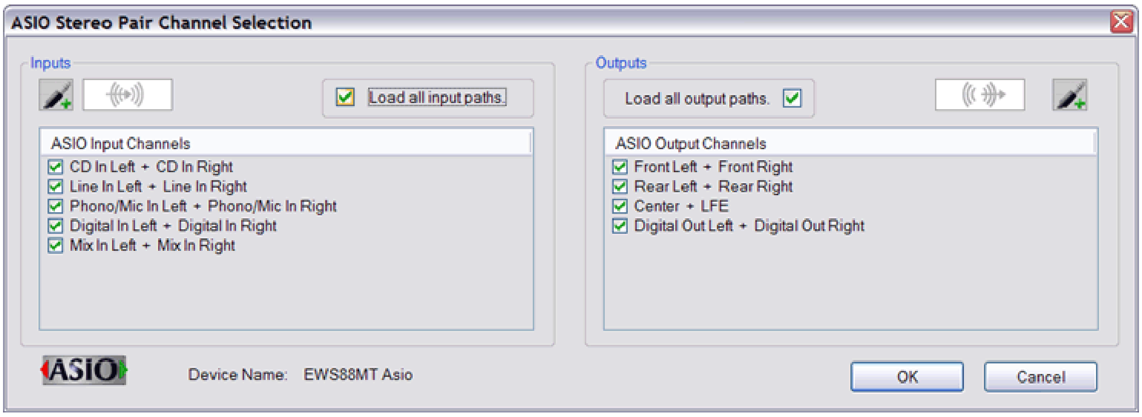
ASIO Control Panel

Here, you can call up the selected ASIO Driver's configuration panel. This varies greatly between the various drivers and is not part of VSTHost. The VSTHost audio engine is stopped while the ASIO Control Panel is open.

ASIO Channel Selection

Normally, VSTHost operates with as many channels as the Wave device drivers permit. If you only need specific channels, however, you can use this to select a subset of the available stereo pairs to use.

Selecting the menu entry brings up the following dialog:



ASIO Stereo Pair Channel Selection

Inputs

☑ Load all input paths.

ASIO Input Channels
- ☑ CD In Left + CD In Right
- ☑ Line In Left + Line In Right
- ☑ Phono/Mic In Left + Phono/Mic In Right
- ☑ Digital In Left + Digital In Right
- ☑ Mix In Left + Mix In Right

Outputs

Load all output paths. ☑

ASIO Output Channels
- ☑ Front Left + Front Right
- ☑ Rear Left + Rear Right
- ☑ Center + LFE
- ☑ Digital Out Left + Digital Out Right

Device Name: EWS88MT Asio

Figure 5: ASIO Channel Selection Dialog

Checking the "Load all input / output paths" boxes sets the normal behavior of using all possible channels. If unchecked, you can select any possible combination (deselecting all reinstalls the default). This can save quite a lot of precious CPU cycles.

OK, we've set up our Wave devices… so now what?

MIDI Configuration

If you're only using VSTHost to load some VST Effects, you don't need this step. Most effects don't rely on MIDI communication. VST Instruments, however, need MIDI data. While VSTHost has a built-in keyboard bar (see "Keyboard Bar" on page 62 for details) that allows you to trigger MIDI notes with the mouse, this can't really be considered a good solution; an external keyboard (the one with the black and white keys, not your computer's ☺) is far superior. To tell VSTHost how to find this external keyboard, you have to define the MIDI devices it should use. So, open the **MIDI Device Configuration** dialog by choosing its menu entry:

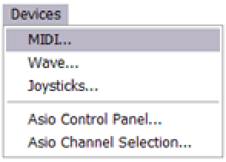
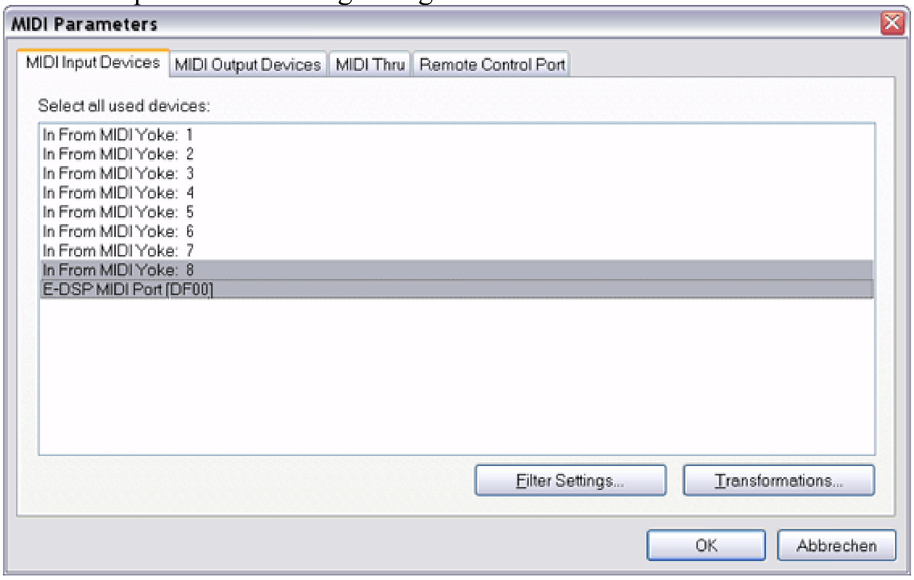


Figure 6: MIDI Device Settings menu entry

… which opens the following dialog:



Select all used devices:

In From MIDI Yoke: 1
In From MIDI Yoke: 2
In From MIDI Yoke: 3
In From MIDI Yoke: 4
In From MIDI Yoke: 5
In From MIDI Yoke: 6
In From MIDI Yoke: 7
In From MIDI Yoke: 8
E-DSP MIDI Port [DF00]

Figure 7: MIDI Device Configuration Dialog

Now *this* is a more complex dialog. It has 4 tabs to define all necessary parameters. Let's start from left to right:

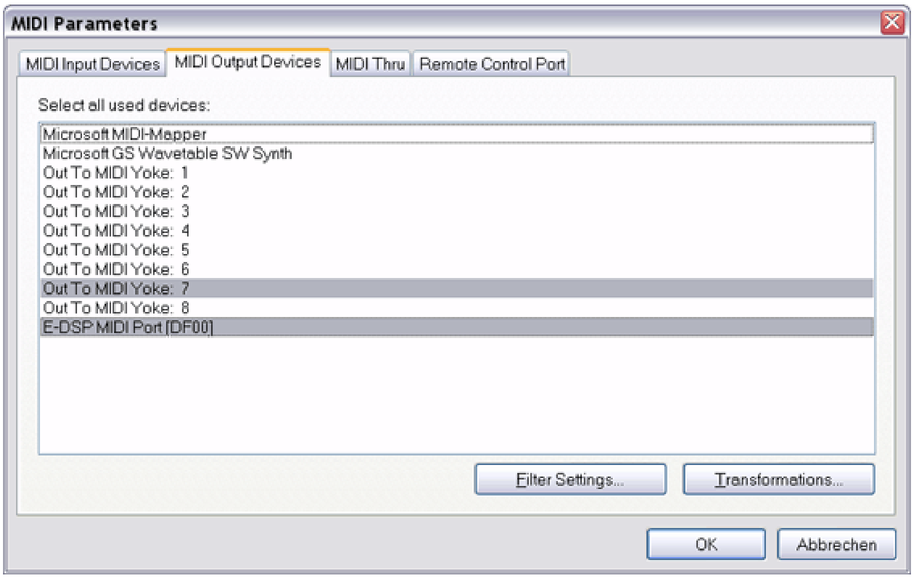
MIDI Input Devices

This tab is shown in the above figure, so have a look at it there. Here, you can select the MIDI Input Device(s) that VSTHost should use. You can select one of them by simply clicking on it; to select a range, click on the first and then shift-click on the last; to add or remove a specific device, control-click on it.

The "**Filter Settings...**" button opens a dialog where you can define MIDI Input filters. Filters set on the **MIDI Input Devices** tab are *global* filters; they act on all incoming MIDI messages, no matter where they come from or where they go to, and before anything else sees them.

The "**Transformations...**" button opens a dialog where you can define MIDI Input transformations. Transformations set on the **MIDI Input Devices** tab are *global* filters; they act on all incoming MIDI messages, no matter where they come from or where they go to, and before anything else sees them, unless they have been filtered. See "Filter Settings and Transformations" on page 35 for details.

MIDI Output Devices



Select all used devices:

Microsoft MIDI-Mapper
Microsoft GS Wavetable SW Synth
Out To MIDI Yoke: 1
Out To MIDI Yoke: 2
Out To MIDI Yoke: 3
Out To MIDI Yoke: 4
Out To MIDI Yoke: 5
Out To MIDI Yoke: 6
Out To MIDI Yoke: 7
Out To MIDI Yoke: 8
E-DSP MIDI Port [DF00]

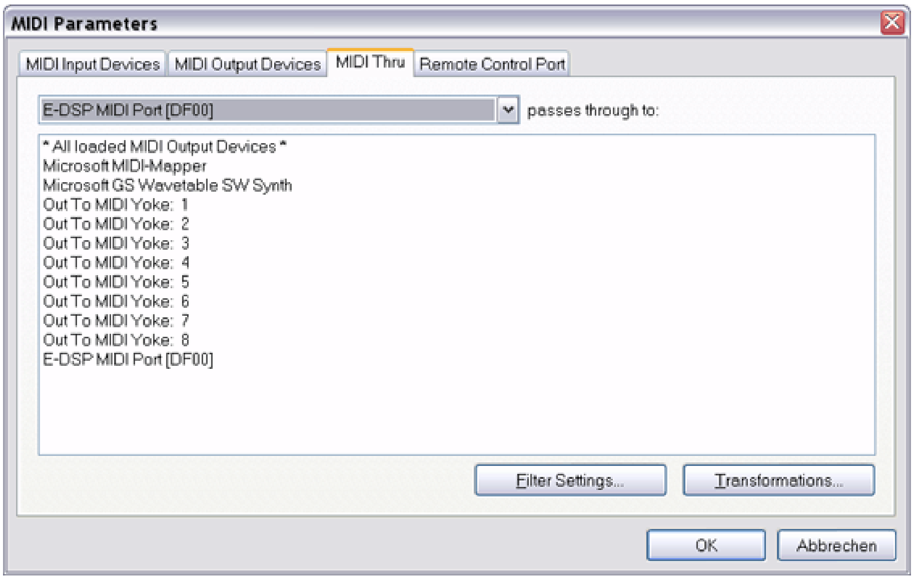
Figure 8: MIDI Output Device selection

Here, you can select the MIDI Output Device(s) that VSTHost should use. You can select one of them by simply clicking on it; to select a range, click on the first and then shift-click on the last; to add or remove a specific device, control-click on it.

The "**Filter Settings...**" button opens a dialog where you can define MIDI Output filters. Filters set on the **MIDI Output Devices** tab are *global* filters; they act on all MIDI messages coming from VSTHost itself, no matter where they come from.

The "**Transformations...**" button opens a dialog where you can define MIDI Output transformations. Transformations set on the **MIDI Output Devices** tab are *global* filters; they act on all MIDI messages coming from VSTHost itself, no matter where they come from, unless they have been filtered. See "Filter Settings and Transformations" on page 35 for details.

MIDI Thru



E-DSP MIDI Port [DF00] passes through to:

* All loaded MIDI Output Devices *
Microsoft MIDI-Mapper
Microsoft GS Wavetable SW Synth
Out To MIDI Yoke: 1
Out To MIDI Yoke: 2
Out To MIDI Yoke: 3
Out To MIDI Yoke: 4
Out To MIDI Yoke: 5
Out To MIDI Yoke: 6
Out To MIDI Yoke: 7
Out To MIDI Yoke: 8
E-DSP MIDI Port [DF00]

Figure 9: MIDI Thru Definitions

Here, you can define VSTHost's "Soft MIDI Thru" behavior. Since PC sound cards normally don't have a MIDI Thru connector, the software has to provide it. Since VSTHost can load multiple MIDI input and output devices, a general MIDI Thru setting would be inappropriate; it might even lead to

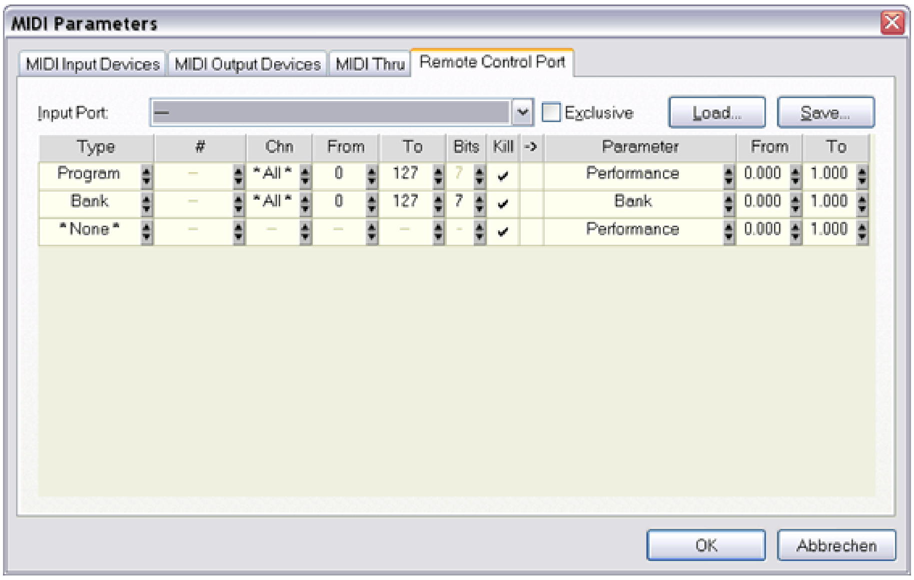
MIDI feedback loops. Therefore, you can separately define the MIDI Output devices for each MIDI Input device that it forwards incoming MIDI messages to. You can select one of them by simply clicking on it; to select a range, click on the first and then shift-click on the last; to add or remove a specific selection, control-click on it.

Note: while you can define as many combinations as you like, VSTHost doesn't remember them all (spoilsport that it is). When you close the dialog, it loads all configured devices and their MIDI Thru settings. All MIDI Thru settings for devices that are *not* loaded (either because they haven't been selected or because they could not be loaded for some reason) are lost.

The "**Filter Settings...**" button opens a dialog where you can define MIDI Thru filters. Filters set on the **MIDI Thru** tab are *global* filters; they act on all MIDI messages that are passed thru from MIDI In before they are sent to the target device(s).

The "**Transformations...**" button opens a dialog where you can define MIDI Thru transformations. Transformations set on the **MIDI Thru** tab are *global* filters; they act on all MIDI messages that are passed thru from MIDI In before they are sent to the target device(s), unless they have been filtered. See "Filter Settings and Transformations" on page 35 for details.

Remote Control Port



Input Port: ---

□ Exclusive

Type	#	Chn	From	To	Bits	Kill	->	Parameter	From	To
Program	–	*All*	0	127	7	✓		Performance	0.000	1.000
Bank	–	*All*	0	127	7	✓		Bank	0.000	1.000
None	–	–	–	–	-	✓		Performance	0.000	1.000

Figure 10: Remote Control Port/Channel Definition

Here, you can define VSTHost's *Remote Control*. In addition to passing MIDI messages to the loaded PlugIns, VSTHost can be remotely controlled by MIDI messages, too. Here, you can define a MIDI Input Port (mental note to self: *finally* decide on "port" or "device" nomenclature!) that controls VSTHost. It has to be one of the devices selected on the **MIDI Input Devices** tab, otherwise VSTHost simply ignores the settings when you close the dialog. The default setting of "---" means that there's no Remote Control port.

Below the port, you can configure the action for each of VSTHost's settings that is remote-controllable; this, I have to admit, is a rather complicated list. This list is of the same type as the one used in the **MIDI -> Parameter Mapping** window (see "MIDI -> Parameter" on page 40 for details on editing it); the difference is that the **From** and **To** settings on the **Parameter** side represent the full range for the parameter (given below) expressed as a floating-point value in range 0.0 .. 1.0. Unless you're really sure what you're doing, it is probably a good idea to leave these settings alone.

Currently, the following VSTHost parameters can be remotely controlled:

Parameter	Type	Range	Comment
Performance	Numeric	0-127	Selects one of the 128 possible performances in the current bank (see “Load Performance” on page 26 for details).
Bank	Numeric	0-16383	Selects one of the 16384 possible banks (see “Use Bank…” on page 25 for details).
Full Rewind Rewind Play Backwards Stop Record Play Pause Forward Full Forward	Switch	0-1	These parameters correspond to the transport buttons in the built-in Wave Player and Recorder (see “Recorder” on page 55 for details). Any incoming value that does not map exactly to 1.000 is ignored; those that *do* map to 1.00 (e.g., incoming value 127 for a 7-bit MIDI CC) trigger the corresponding action.
MIDI Stop MIDI Play MIDI Pause	Switch	0-1	These parameters correspond to the transport buttons in the built-in MIDI Player (see “MIDI Player” on page 58 for details). Any incoming value that does not map exactly to 1.000 is ignored; those that *do* map to 1.00 (e.g., incoming value 127 for a 7-bit MIDI CC) trigger the corresponding action.
BPM	Numeric	1-280	Can be used to set the VST engine’s BPM value. Here’s a little trick if you use a 14bit absolute controller and want to use its full range (i.e., if it’s a knob or slider): set the **To** value on the Parameter side to **0.018** – this compresses the input range (0..16383) into the target range (1..280) rather nicely.
Master Output	Numeric	-60..+10dB	Can be used to set the VST engine's master output level.
Master Input	Numeric	-60..+10dB	Can be used to set the VST engine's master input level.

All MIDI messages that are translated into Remote Control operations are swallowed by VSTHost; all others are passed to the VST host engine’s MIDI processing so that the currently loaded PlugIns can use them.

Joystick Configuration

This, obviously, can only be done if at least one joystick or game pad is installed in your system. If you have, you can use the joystick(s, up to 2 can be used) to generate MIDI messages for the loaded PlugIns and/or MIDI Out ports. The joystick handling defaults to no processing at all; so, if you want to use your joystick(s) in VSTHost, open the **Joystick Configuration** dialog by selecting its menu entry:

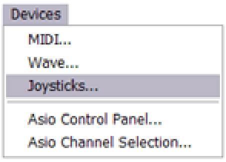
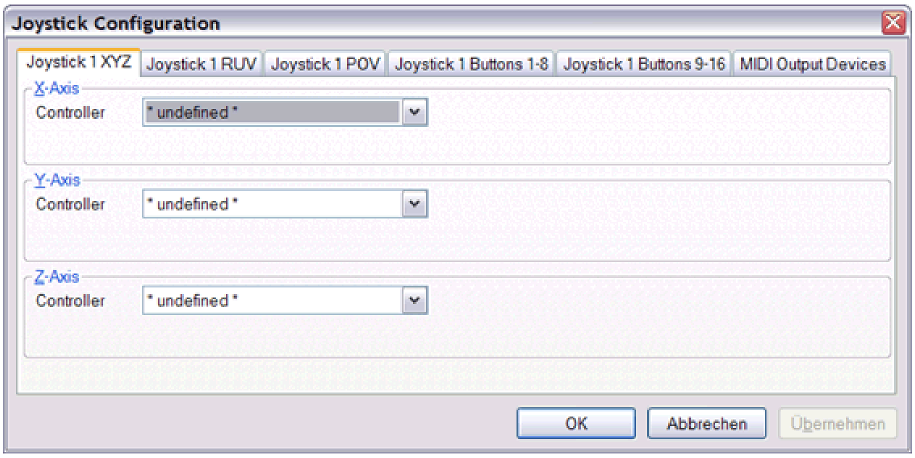


Figure 11: Joystick Configuration menu entry

This opens the following dialog:



X-Axis
Controller * undefined *

Y-Axis
Controller * undefined *

Z-Axis
Controller * undefined *

Figure 12: Joystick Configuration dialog

This is one of the many tabbed dialogs in VSTHost; here, a number of tabs appear for each attached joystick. It depends on the joystick capabilities which ones really appear.

Note: VSTHost only loads the joystick properties once when it starts; Joysticks that are attached or detached while the program is running are not considered in this dialog.

Joystick *n* XYZ

The above tab allows the definition of a joystick's X, Y, and Z axes. These axes normally send *analog* data (well, not really… they're quantized to 0-65535) to allow a wide range of possible positions. Only the axes that are available are displayed. Each of the combo boxes contains the same entries:

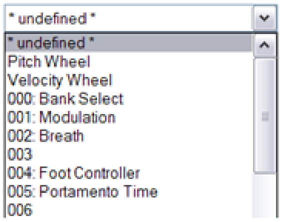
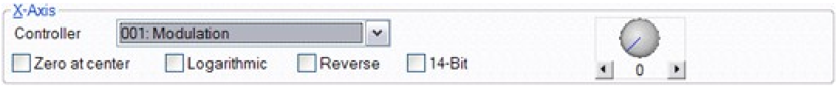


Figure 13: Target MIDI message (partial)

Here, you can select the type of message that is generated. Nearly all of them are MIDI messages that are routed to PlugIns and/or MIDI Output ports, with one notable exception: the **Velocity Wheel** is part of the MIDI Keyboard Bar (see "Keyboard Bar" on page 62 for details).

Once you select a message type, fields defining additional properties appear:



X-Axis
Controller 001: Modulation
□ Zero at center □ Logarithmic □ Reverse □ 14-Bit
0

Figure 14: Axis / Controller Properties

The check boxes have the following meaning:

Zero at center This is mainly interesting for self-centering joystick axes. If this check box is selected, the stick's center position is interpreted as the zero position, and moving the stick in one of the both possible directions increases the value up to the maximum position. If it is not selected, the leftmost (or topmost, for the Y axis) position of the stick is interpreted as the zero position, and the rightmost (or bottommost, for the Y axis) position is the maximum position.

Logarithmic Here, you can define whether the stick's output is interpreted as a linear or logarithmic value. "Logarithmic" means that moving the stick in the lower value area means much finer changes in the MIDI output value than in the higher value area. This can be useful if your joystick is of the “nervous” kind; VSTHost uses a relatively generous “center” area, which is interpreted as 0, if **Zero at center** is checked. Some joysticks, however, generate values outside that area, or the values jump around even if you don’t touch the thing. In this case, it can be very useful to check **Logarithmic**, since this means that variations near the center area have much less effect. It can also be interesting for Pitch Wheels, for example, to add a bit of dynamics.

Reverse This setting reverses the highest and lowest position. This is mainly useful for the Y axis, where the joystick specification defines that the topmost position has the lowest value, and the bottommost position has the highest value – which is precisely the opposite of what you’d expect for a pitch wheel, for example ☺.

14-Bit Depending on which controller is selected (000-031, (N)RPN, you can also define whether the stick sends 7-bit or 14-bit MIDI messages.

The little knob on the right can be used to determine the MIDI channel (numbered 0..15 here) used.

If you select **101: RPN MSB**, the following combo box appears:

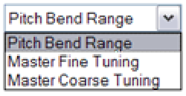
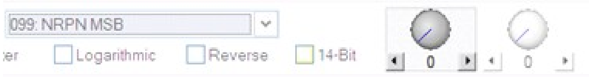


Figure 15: RPN Parameter selection

Here, you can define which of the defined Registered Parameter Numbers is used.

If you select **99: NRPN MSB**, an additional knob appears:


099: NRPN MSB

er □ Logarithmic □ Reverse □ 14-Bit

0 0

Figure 16: NRPN Parameter selection

Here, you can select the Non-Registered Parameter Number (0-16383).

Joystick *n* RUV

This tab allows the definition of a joystick’s R(udder), U, and V axes. Only the axes that are available are displayed. The possibilities are identical to those on the **Joystick *n* XYZ** tab, so I won’t repeat them here.

Joystick *n* POV

This tab can be used to define the joystick's **Point-Of-View** controller, also called "coolie hat" sometimes. The following tab is displayed:

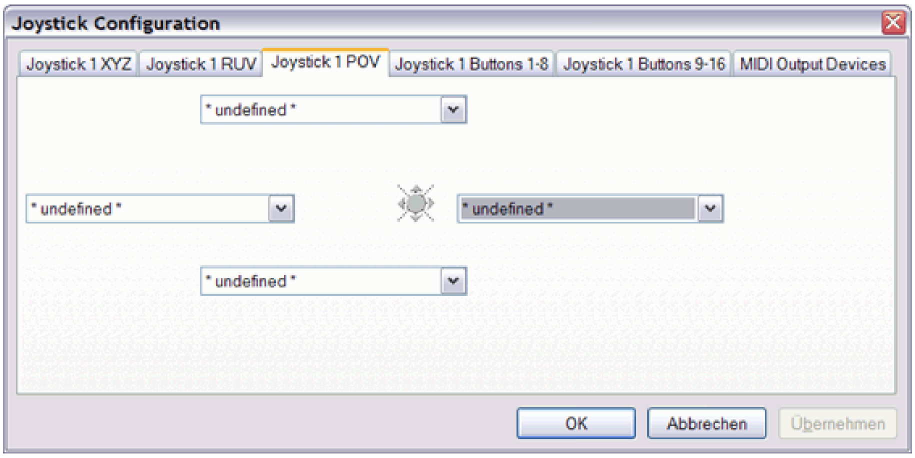


Figure 17: Joystick *n* POV Configuration tab

This little knob, normally sitting on top of the stick, is a *digital* device, like the buttons described below. It can normally be moved into 8 possible positions (besides the center position): up, up+right, right, right+down, down, … you get it. Putting it into one of the combined positions can be used to emit up to 2 MIDI messages at once. Each of the combo boxes contains the same entries:

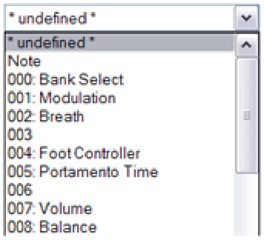


Figure 18: POV Target MIDI Message (partial)

As you can see, there are less possibilities here than on the analog axes described above; since the POV controller is effectively just a set of 4 buttons that are either on or off, it makes no sense to use it as, for example, a controller for pitch wheels.

Once you select a message type, fields defining additional properties appear:

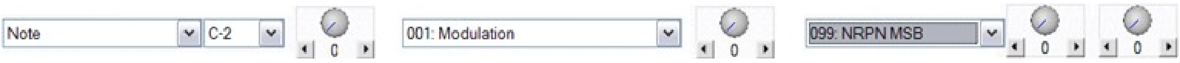
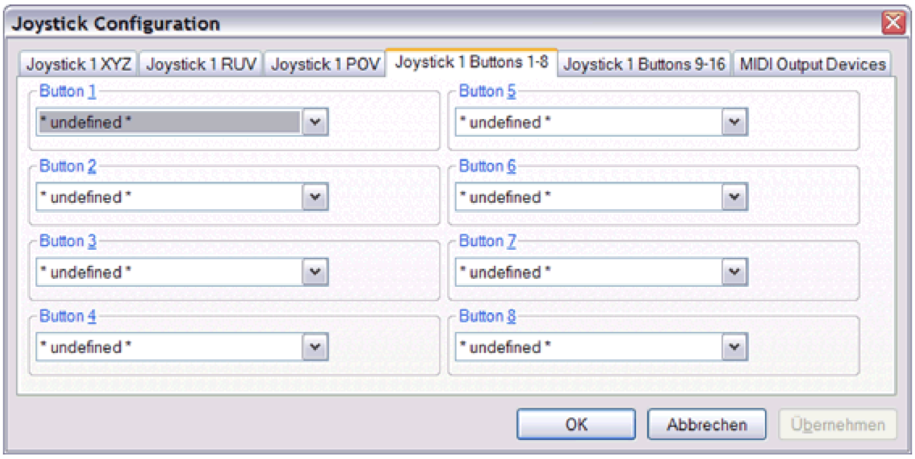


Figure 19: POV Controller Properties

If Note is selected, an additional combo box appears where you can select the note number. This note will be turned on if you activate the POV button and turned off if you release it. The (right, for NRPNs) knob defines the MIDI channel (range 0..15 here); the left knob (NRPNs only) defines the Non-Registered parameter number (0..16383), just like in the analog axes described above. RPNs are not used for joystick buttons; none of them makes any sense for an on-off type of message. Also, the various options available for the analog axes are not implemented for the POV buttons (I mean, how much sense does it make to send "Off" or "On" with 14-bit resolution? ☺).

Joystick *n* Buttons *m-n*

This tab can be used to define a set of the joysticks' buttons. The number of these tabs is defined by the number of buttons on the joystick (up to 32, although I've never seen one with that many buttons). The following tab is displayed:



Button 1: * undefined *
Button 2: * undefined *
Button 3: * undefined *
Button 4: * undefined *
Button 5: * undefined *
Button 6: * undefined *
Button 7: * undefined *
Button 8: * undefined *

Figure 20: Joystick Button Configuration tab

Only the buttons that are available are displayed. Each of the combo boxes contains the same entries:

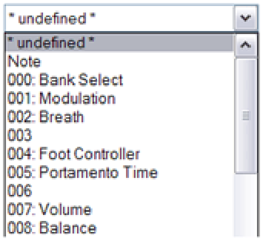


Figure 21: Button Target MIDI Message (partial)

As you can see, there are less possibilities here than on the analog axes described above; since a joystick button can only be either on or off, it makes no sense to use it as, for example, a controller for pitch wheels.

Once you select a message type, fields defining additional properties appear:

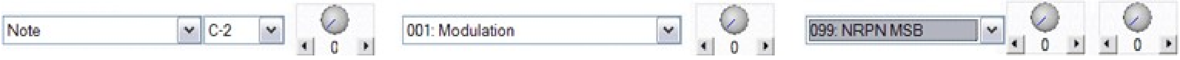
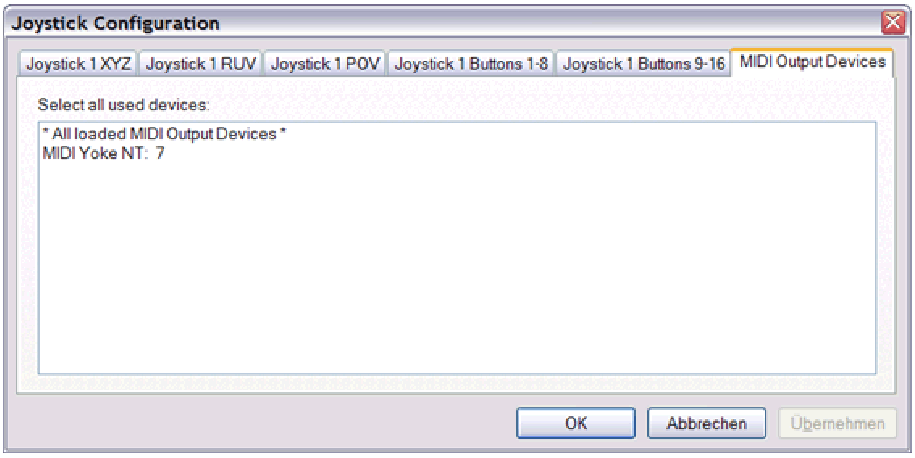


Figure 22: Button Controller Properties

If Note is selected, an additional combo box appears where you can select the note number. This note will be turned on if you activate the button and turned off if you release it. The (right, for NRPNs) knob defines the MIDI channel (range 0..15 here); the left knob (NRPNs only) defines the Non-Registered parameter number (0..16383), just like in the analog axes described above. RPNs are not used for joystick buttons; none of them makes any sense for an on-off type of message. Also, the various options available for the analog axes are not implemented for buttons (I mean, how much sense does it make to send "Off" or "On" with 14-bit resolution? ☺).

MIDI Output Devices

Here, you can define the MIDI Output device(s) that the joysticks send their data to. The following tab is displayed:



Select all used devices:

* All loaded MIDI Output Devices *
MIDI Yoke NT: 7

Figure 23: MIDI Output Devices tab

This tab is always available. Normally, the joysticks don't send MIDI data to the MIDI Output ports; if you want to, you can configure it here. The list box displays all loaded MIDI Output devices. You can select one of them by simply clicking on it; to select a range, click on the first and then shift-click on the last; to add or remove a specific device, control-click on it.

Other Configuration Tasks

While there are quite some other things that can be configured in VSTHost, they are not installation-related, so they'll be described later, when it is appropriate.

Operation

Command line parameters

Just to prevent mouse junkies from going “Eeeek!” – no, VSTHost is not a command line oriented text program, it is GUI-oriented; but you can give it some command line parameters for special occasions. So, let’s describe them in a good old-fashioned style…

Syntax

```
VSTHost [/option]* [PlugIn]
```

The []’s mean that all parameters are optional. If the command line parameter starts with a ‘/’ or ‘-‘, it is treated as an *option*. The ‘*’ means that more than one option can be given. Here’s the meaning of all possible parameters, in alphabetical order:

/hidden Forces VSTHost to come up with a hidden main window; this is a *very* special option that should not be used unless you really know what you're doing.

/noasio Forces VSTHost to ignore all ASIO drivers. This can help to determine the cause if VSTHost inexplicably dies while initializing (see **/noaudio** below).

/noaudio Forces VSTHost to come up without any loaded audio driver. This can help to determine the cause if VSTHost inexplicably dies while initializing. At least in one case, VSTHost tried to load a (still installed) driver for a sound card that was *removed* from the computer – bang…

/nodsound Forces VSTHost to ignore all DirectSound audio drivers. This is mainly interesting as a diagnosis aid if you experience strange problems when VSTHost starts. In a Linux / wineasio environment, it is automatically assumed, since the DirectSound device capabilities detection routine in VSTHost obviously doesn’t work correctly in a WINE environment.

/noexc Forces VSTHost to run in a less secure mode. Normally, exceptions generated by badly behaving PlugIns (and VSTHost itself) are caught at various points in VSTHost, and it tries its best to recover as gracefully as possible. If something *really* goes wrong, VSTHost tries to perform an orderly shutdown (close all opened audio and MIDI devices, then stop). Sometimes, under mysterious conditions, this can lead to problems; in this case, you can try to disable this outermost “catch-all” exception handler.

/noft Forces VSTHost into an even less secure mode ☺ - this stands short for “No Fault Tolerance”. In this mode, VSTHost doesn’t catch *any* exceptions. Whatever happens will kill VSTHost. This parameter is interesting for VST PlugIn developers only.

/nokillvstkeys Listed just for completeness – don’t touch this one unless specifically requested to do so.

/noload Forces VSTHost to skip the initial loading of the previous (or default) setup when it comes up. This, together with the **/nosave** parameter, can be used to quickly debug a PlugIn.

/nolocal Forces VSTHost to come up with the internal English language. Since V1.44, VSTHost can use so-called “satellite DLLs” – DLLS with localized resources in other languages. vsthostDEU.dll and vsthostFRA.dll are included, and automatically loaded on systems where the primary UI language is set to German or French.

/nomidi Forces VSTHost to come up without any loaded MIDI driver. Same reason as for **/noaudio**.

/nomme Forces VSTHost to ignore MME audio drivers. See **/noaudio** above.

/nosave Forces VSTHost to skip the saving of the complete current setup upon program termination. Normally used together with the **/noload** parameter in a debugging situation.

/noskin Forces VSTHost to come up without a skin (see “Skin” on page 66 for details).

/numProcessors=*n* In a multiprocessor environment, VSTHost normally uses as many processors as possible. Using this option, you can force VSTHost to operate in single-processor mode, like versions before V1.43 did, by specifying
/numProcessors=1
You can enter any value here; values below 1 are ignored, values greater than 32 are interpreted as 32. Please keep in mind that it makes absolutely no sense to specify a higher number of processors than you have inside the PC; it won’t make your computer go faster ☺.

/slave[:*nn*] Forces VSTHost into *Slave mode*; the Slave mode and how to use it is not part of this document.

/userexit=*name* Forces VSTHost to load a User Exit DLL. Currently only one User Exit DLL has been created for the Lionstracs Mediastation (see www.lionstracs.com for details) to allow a better integration into this environment.

plugin The complete path name of a PlugIn to load. This is normally used in a debugging environment, but also if you drag a PlugIn onto VSTHost’s icon.

Multiprocessor provisions

In versions before V1.43, VSTHost didn’t care much about the capabilities of the machine it runs on. There are, as I freely admit, no processor-specific optimizations, which may make it a little bit slower than commercial packages, but it also means that it simply *works* on practically every machine that can load at least Windows 98 (Windows 95 doesn’t require a floating-point coprocessor, which VSTHost absolutely needs). In case of a multiprocessor machine, however, this lack of interest for its environment is a bit out of place, since it would mean that VSTHost only uses one processor. Since the rise of the Core Duo and Athlon64 X2, this isn’t a good idea any more; a steadily increasing number of machines have multiprocessor cores, and it’s not really fine if VSTHost uses only one half (or less, in case of a quad core machine) of the available processing power.

Since V1.43, VSTHost can use as many processors as there are in the machine (up to 32, which is a hard-coded 32-bit Windows limit). If there’s only one processor, the overhead is minimal (2 additional “if” statements in the audio processing thread). If there are more, it’s considerable, but it pays off in the end.

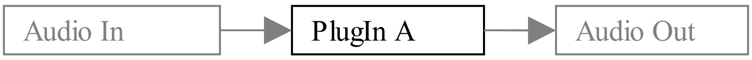
Technical explanation

If you just want to make *music, damnit!*, you can safely ignore these paragraphs, although they might help you to get the maximum performance from VSTHost if a certain configuration simply doesn’t work the way you thought it should.

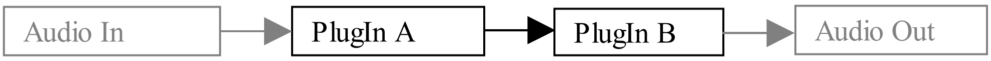
VSTHost starts as many processing threads as there are processors available. While processing audio, it determines how many possible thread start points are possible, and then triggers as many threads as possible and necessary to go to work on them. Each thread finds the same set of thread start points; the first thread going to work on a start point blocks this path for the other threads, which go on searching for thread start points to process. This continues until all threads come to the conclusion that there are no more thread start points to process.

Thread Start Points

What is a “thread start point”? Hmm… well, VSTHost can only parallelize audio processing of independent PlugIns. If a PlugIn’s input is dependent on another PlugIn’s output, they have to be processed sequentially. Consider a simple setup:

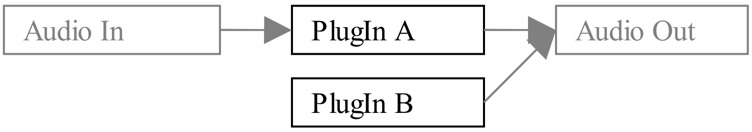


Here, nothing can be run in parallel. Everything has to be done in a strict order. VSTHost doesn't even bother to trigger a thread running on a second processor, as there is only one thread start point – PlugIn A. Now, let's assume that PlugIn A is a VSTi, and you want to run its output through a delay effect:



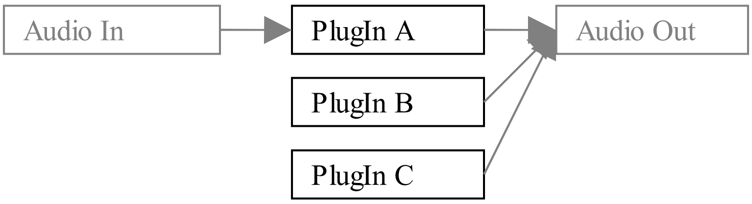
Everything still has to be done in a strict order, PlugIn a remains the only thread start point. In such a configuration, there's absolutely no performance gain from a multiprocessor machine.

A slightly more complex setup would be this:



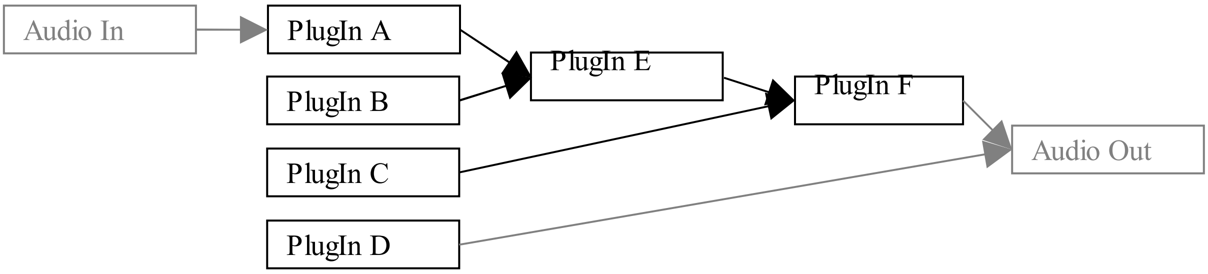
Here, VSTHost *can* run the two PlugIns in parallel; it just to wait with the final audio output until both PlugIns contributed their outputs. PlugIn A and PlugIn B are thread start points.

Let's progress to an even more complex example:



Here, VSTHost could, in theory, run all three PlugIns in parallel; it just has to wait with the final audio output until all three PlugIns have contributed their outputs. PlugIn A, B, and C are thread start points. There's no problem… but wait – let's assume that there are only 2 processors available. What happens now? In this case, VSTHost sends 2 threads to work, one on each processor. The first one that "sees" PlugIn A starts to work on it and marks it as "started". The second one sees that PlugIn A is already being worked on, looks for another start point, and finds PlugIn B, so it starts to work on this one. After some microseconds, both threads come back for more work as PlugIns A and B are finished; the first one processes PlugIn C, the second one stops.

And now for a really complex example:



Here, we see 4 thread start points: PlugIns A, B, C, and D. Assuming our 2 processors again, the behavior becomes rather indeterminable now. One thread will presumably go to work on PlugIn A, the other one will go to work on PlugIn B. Each of them will contribute the respective PlugIn's output to PlugIn E's input. The thread that determines that PlugIn E has enough input now will continue processing E, the other one will continue with the next thread start point, which is PlugIn C. Now, each of the 2 threads contributes to PlugIn F's input; the one that determines that PlugIn F has enough input will process PlugIn F, while the other one begins work on PlugIn D. In this setup, processing should be rather evenly spread over the two processors – *unless* one of the PlugIns A, B, C, or E takes much longer than the others. In this case, the other thread will finish its work after going through all the other start points and finding that there's nothing more to do after the first PlugIn, since PlugIns E and/or F need more input; VSTHost has to wait until the first thread completes the whole sequence. This situation leads to an uneven work distribution, but there's nothing that VSTHost can do about it.

In other words, even if there are two or more processors, VSTHost can not guarantee that they are fully used; depending on the configuration, it might happen that the performance gain is negligible. Some PlugIns contribute to the uncertainty in their own way by being multiprocessor-aware, so they try to spread their processing over multiple processors themselves.

OK, technical stuff finished, let's continue and finally *start working* with VSTHost…

Main Window

Now that we've finally started and parametrized VSTHost, let's return to our initial picture:

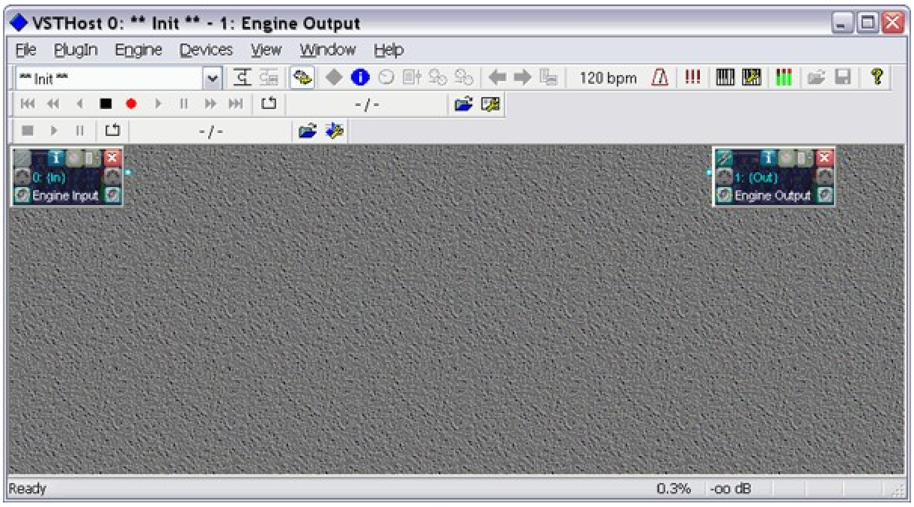


Figure 24: VSTHost Initial (again)

Since V1.46, VSTHost always shows two pseudo-PlugIns: **{In}** and **{Out}**. These "PlugIns" are used to make it easier to graphically show the audio flow, and they have the additional benefit that you can set up Remote Control operations for them – you can, for example, define a MIDI controller to silence Audio In or Out separately. The buttons and connectors on the windows for these PlugIns are described later (see "New PlugIn" on page 28 or "PlugIn Menu" on page 33 for details).

Still no sound… let's change that. The first thing that we need to do is to force VSTHost into operation; being a lazy program, it comes up with the host engine stopped. To start it, simply click on the nice little ⚙ button on the toolbar. Don't worry, it will be described later. Voilà – VSTHost works.

Note: starting with V1.44, VSTHost defaults to a running host engine. There were simply too many people who asked "Why is there no sound in VSTHost?" over and over again…

Menu Entries

Figure 25: VSTHost's unimpressive Main Menu

Practically all of VSTHost's operations can be controlled from the menu, so let's examine that in detail.

File Menu

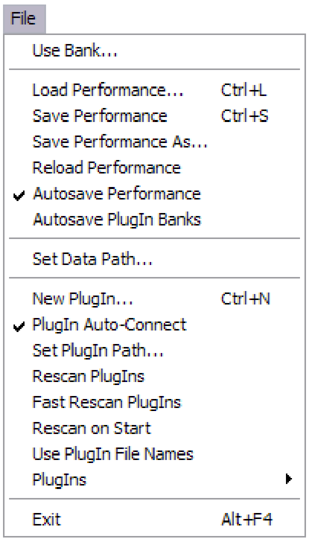


Figure 26: File Menu

Here, you can load and save VSTHost setups (called "performances", organized into "banks") and load new PlugIns into the current performance. Plus, of course, terminate VSTHost ☺.

Use Bank…

This menu opens a dialog to let you select one of the possible VSTHost Performance Banks:

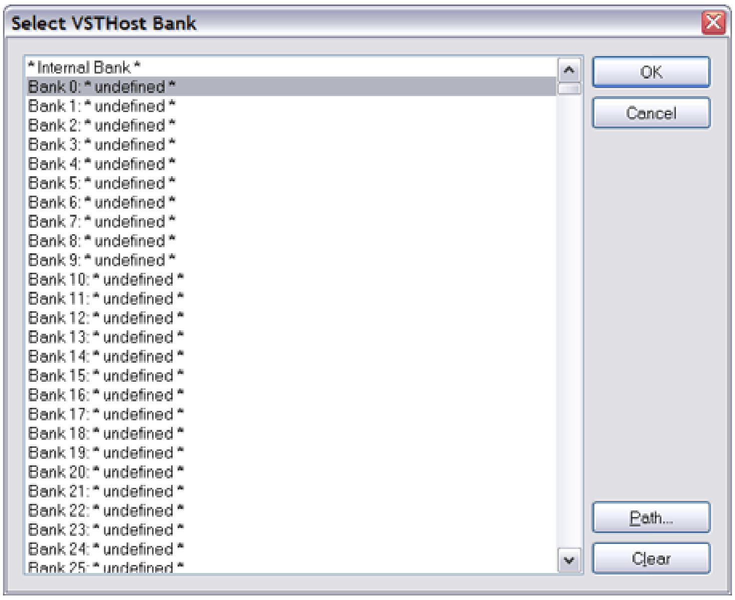


Figure 27: Bank Selection Dialog

There are two types of banks in VSTHost; the *Internal Bank*, which is stored in the file "#Internal.vsthost" in VSTHost's data directory (see "Set Data Path" on page 27), and up to 16384 different *file banks*. The internal bank is used by default, as no file bank has yet been allocated. Only the file banks can be selected by remote operation.

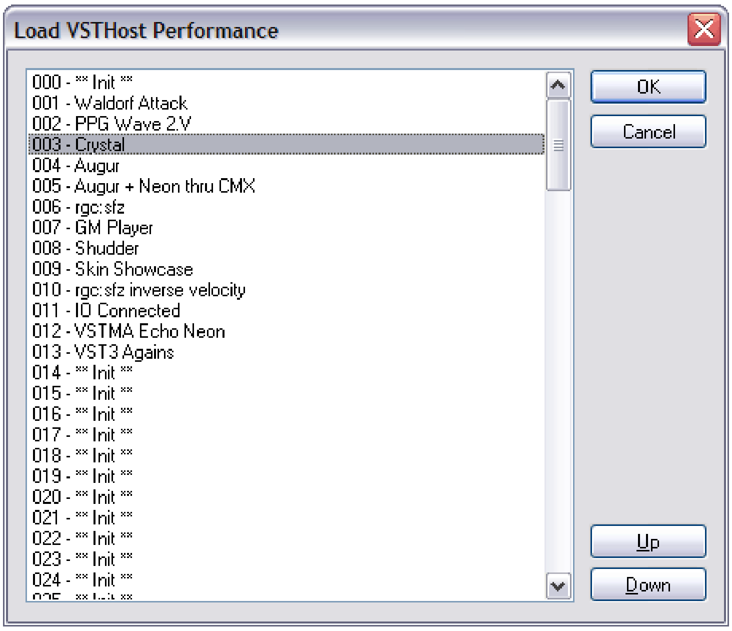
To select one of the banks, simply double-click it, or select it and press OK. If the bank file has already been configured, the dialog is closed and the new bank is used from now on; if, however, the bank file is not configured (or the file name has been removed with the **Clear** button), a file selection dialog is opened where you can select a file to be used to store VSTHost's performances to. The default value should normally be OK, but you can override it, if you want to. You can enter the name of a non-existing file here; if it doesn't exist, VSTHost allocates it.

A *Bank file* contains a set of up to 129 VSTHost performances (see “Load Performance” below). By default, VSTHost stores its performances in the internal bank; since 129 configurations might be too few for some people, you can change to file mode, which gives you up to 16385 banks of up to 129 performances each. That should be enough, I think ☺.

Note: selecting another bank does *not* change the currently loaded performance in any way; if you want to select a program from the new bank, you have to load another performance, too. This behavior can be used to copy performances from one bank to another; simply load the performance, then switch to the target bank, and save the performance (you can use “Save Performance As…” to save it to a new name and/or position, if you want to).

Load Performance

This menu entry opens the following dialog:



Load VSTHost Performance

000 - ** Init **
001 - Waldorf Attack
002 - PPG Wave 2.V
003 - Crystal
004 - Augur
005 - Augur + Neon thru CMX
006 - rgc:sfz
007 - GM Player
008 - Shudder
009 - Skin Showcase
010 - rgc:sfz inverse velocity
011 - IO Connected
012 - VSTMA Echo Neon
013 - VST3 Agains
014 - ** Init **
015 - ** Init **
016 - ** Init **
017 - ** Init **
018 - ** Init **
019 - ** Init **
020 - ** Init **
021 - ** Init **
022 - ** Init **
023 - ** Init **
024 - ** Init **

Figure 28: Load VSTHost Performance Dialog

Here, you can select one of the 129 possible performances in the current bank (see “Use Bank…” above).

This operation can also be performed by sending a **Program Change** MIDI message to the Remote Control Channel, with one exception: performance **000** is a special program; this cannot be selected by remote operation. Unless **Reload Performance** is checked on the File menu, VSTHost loads this performance as its initial setup. This way, you can define a nice default environment.

A performance’s initial name is “** Init **” – not very inventive, I have to admit – and can be changed if you save it with **Save As…** (described below).

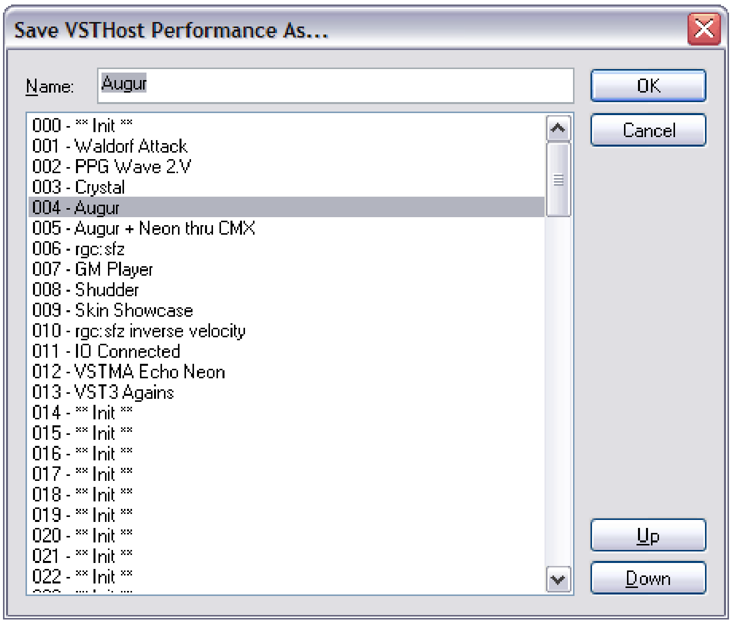
The **Up** and **Down** buttons can be used to reposition the selected performance in the current bank. **Note:** this action takes place immediately; it can **not** be undone by pressing the Cancel button.

Save Performance

Selecting this menu entry saves the current performance. If **Autosave Performance** (see below on that) is turned on, and if the **/nosave** parameter is not given, VSTHost always saves the current performance when it exits. When another performance is loaded, the current performance is saved in any case before loading the new one.

Save Performance As

This menu entry opens the following dialog:



Save VSTHost Performance As...

Name: Augur

000 - ** Init **
001 - Waldorf Attack
002 - PPG Wave 2.V
003 - Crystal
004 - Augur
005 - Augur + Neon thru CMX
006 - rgc:sfz
007 - GM Player
008 - Shudder
009 - Skin Showcase
010 - rgc:sfz inverse velocity
011 - IO Connected
012 - VSTMA Echo Neon
013 - VST3 Agains
014 - ** Init **
015 - ** Init **
016 - ** Init **
017 - ** Init **
018 - ** Init **
019 - ** Init **
020 - ** Init **
021 - ** Init **
022 - ** Init **

Figure 29: Save VSTHost Performance As... Dialog

Here, you can save the current configuration to a(nother) performance. After having selected the new position in the list box, you can give the performance a descriptive name. Pressing OK saves the performance to the new position and automatically uses it as the new current performance.

The **Up** and **Down** buttons can be used to reposition the selected performance in the current bank. **Note:** this action takes place immediately; it can **not** be undone by pressing the Cancel button.

Reload Performance

This menu entry can be toggled; if it is checked, VSTHost reloads the last used performance when it is started the next time (unless the **/noload** parameter is given, of course). If it is unchecked, VSTHost always loads the default performance (number **000**) when it starts.

Autosave Performance

This menu entry can be toggled; if it is checked, VSTHost saves the current performance whenever another performance is loaded, or if VSTHost is terminated.

Autosave PlugIn Banks

Starting with V1.43, VSTHost can automatically save the current settings of all PlugIns of a performance. In previous versions, you had to do it on your own – if you loaded a PlugIn, and changed any sound parameters, you had to save the PlugIn’s bank. VSTHost just remembered the currently loaded bank’s name with the performance. This is still the default, but, unless you’re working in an environment with *very* little free space on your hard disk, you might consider turning this Autosave mode on. It adds a lot of comfort.

In order for this to work, VSTHost allocates a sub-directory for each bank (see “Use Bank…” on page 25) in its Data directory and stores the banks for each performance there.

Set Data Path

This menu entry can be used to set a new Data path for VSTHost. The default value is VSTHost’s location, with an appended **\Data**.

Before V1.43, VSTHost stored nearly all settings in the Windows registry; over time, this has lead to a *very* complicated setup with hundreds of sub-keys, which isn't really easy to work with. VSTHost is using an .ini-file-based operation now. This makes it easier to change settings outside VSTHost (one click opens the right file, no cunning navigation through Regedit's nested structures needed), and eases the path to a preconfigured setup – instead of an installer program, just copy the necessary files together with the application.

VSTHost uses a layered approach; when it starts up, it reads the data path from an initialization file that resides in the same directory as the VSTHost executable, and has the same name, but with the extension .ini (please note the careful wording – you might have renamed the thing from VSTHost.exe to blabla.exe, for example; in this case, it would be blabla.ini). This initialization file, allocated when you start up VSTHost for the first time, is very simple; here's an example:

```
[Settings]
DataPath=C:\Program Files\VSTHost\Data
```

Figure 30: VSTHost.ini

The interesting thing about this setting is that it allows a multi-user setup, because you can put environment variable names into the data path. Here's an example that should work in all Windows NT variants (NT/2000/XP):

```
[Settings]
DataPath=%APPDATA%\VSTHost
```

Figure 31: Multi-user VSTHost.ini

Once VSTHost has read the data path from this initialization file, it switches to *another* initialization file that resides in the data path, and has the same name as VSTHost's executable, but with the extension .ini (see above regarding the careful wording ☺). *This* is VSTHost's main initialization file, where all the settings are kept. Other files that are read from there are PlugIns.ini (containing information about all PlugIns that VSTHost knows; see "Set PlugIn Path" on page 31 for details), effCanDos.ini, and hostCanDos.ini (these files, which come with the VSTHost package, contain a header that details what they are good for).

The default setup assumes that all data that VSTHost uses are put into the same directory; with this menu item, you can define another data path for them.

Attention: if you decide to change the data path to another directory, and want to put some or all of the already existing data there, you have to copy the data files from the old to the new directory yourself – and you have to change the absolute paths that might be stored inside VSTHost.ini, and/or the *.vsthost bank files. VSTHost doesn't do that for you.

New PlugIn

Now it gets interesting… if this menu entry is selected, VSTHost opens a file selection dialog box that allows locating a PlugIn that you want to add to the current performance. Since VSTHost is a simple little program, it doesn't perform lengthy "Where are the PlugIns?" scans upon program start to present a nice, preformed list of available PlugIns (unless you specifically tell it to; see "Rescan on Start" on page 31 for details); it simply allows you to select the file containing the PlugIn. In Windows, PlugIns are normally simple DLLs, i.e., their names end with ".dll".

If a "big player" (Cubase, Nuendo, etc.) has already been installed on your computer, it has set up a directory where VST PlugIns are installed; normally, the path to this directory is stored in the registry under **HKEY_LOCAL_MACHINE\Software\VST** in the value **VSTPluginsPath**. If VSTHost finds this value, it starts the file selection dialog there; if not, it uses the current directory.

In any case, once a PlugIn has been selected and loaded, VSTHost remembers the directory where it took it from as its new start point.

Once you have loaded a PlugIn, VSTHost presents it in a little window on its main client area, like this (the example uses ASynth, a very good freeware VST instrument):

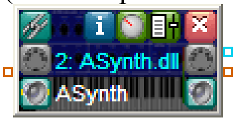


Figure 32: Example for a loaded PlugIn's Main window

There are some buttons on that window. All of them are just alternatives to entries of the PlugIn menu (see “PlugIn Menu” on page 33 for details) and the main toolbar (see “Toolbar” on page 60 for details). If you move the mouse over a button and leave it there, a little popup will be displayed that tells what the respective button can be used for. On the right side, there’s a little level meter that displays the PlugIn’s current output level. The Main window can be dragged around on the screen with the mouse to any location you like. Since the links between PlugIns are displayed there, too, this can be used to arrange the PlugIn windows in a way that shows the relations between them, like this:

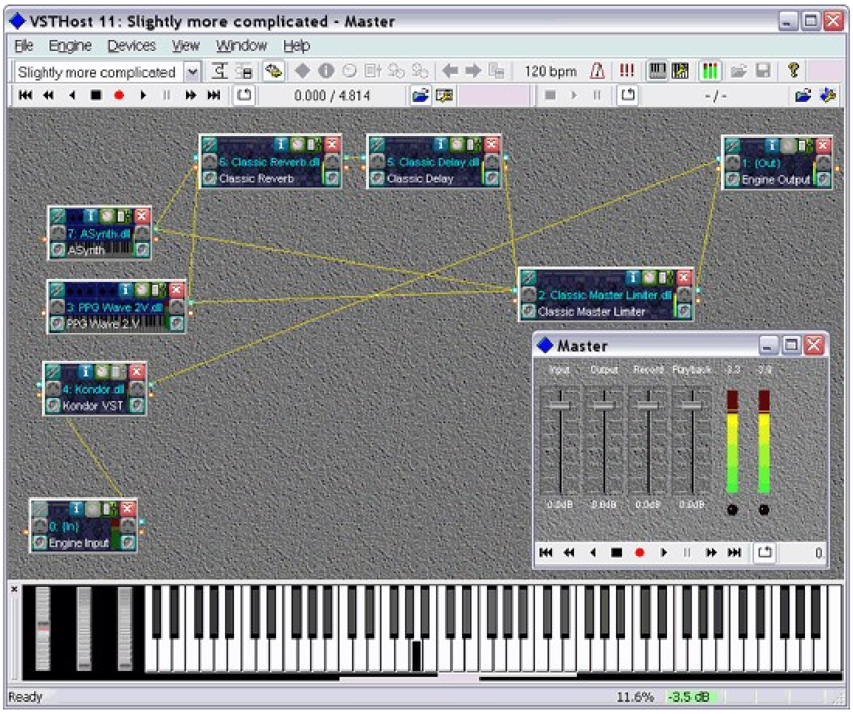


Figure 33: VSTHost Main Window with some PlugIns loaded

Since V1.44, there are some funny little dots to the left and to the right of the PlugIn main windows; these are “connectors” which allow to define links between the PlugIns as a convenient alternative to the “Chain After…” menu item (see page 47 for this one). On the left side, there’s an Audio Input connector and a MIDI input connector; on the right side, there’s an Audio Output connector and a MIDI Output connector. Only connectors that make sense for this PlugIn are shown; if, for example, a PlugIn as no audio input channels, the Audio In connector is omitted.

You can click on one of the connectors with the left mouse button, upon which the connector changes its color; now, without releasing the mouse button, move to the corresponding connector of another PlugIn that you want to create a link to. If you reach a connector that can be used, it changes its color, too; now you can release the mouse button to create a link.

Double-clicking on a line between two connectors opens the “Chain After…” window of the target PlugIn so that you can change the link type, level, and so on.

To delete a link, simply select a connection; you can do this either by clicking on a connector and then dragging the mouse onto an existing line, upon which the line changes its color, or by clicking directly on the line between the two connectors. As soon as the line changes its color, you can delete the connection by clicking with the right mouse button – *without releasing the left mouse button first*. This may sound complicated at first, but if you try it, it's rather intuitive (as "intuitive" as this whole computer stuff can get ☺).

Another notable thing about the PlugIn main window is the background image; this one is different for Instrument and Effect PlugIns. If you don't like it, you can provide another one – VSTHost looks for a .BMP or .PNG file that comes with the PlugIn. If, for example, your PlugIn is a DLL located at "C:\Program Files\VstPlugins\Again.dll", and there is a file called "C:\Program Files\VstPlugins\Again.bmp" (which really holds a bitmap ☺), VSTHost will use the this bitmap as the background for the PlugIn main window.

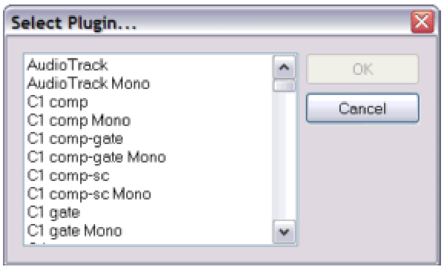
Bridging

VSTHost in its current incarnation is a 32-bit program (code, not audio format this time ☺). This means that it can only load 32-bit PlugIns; if you're running it on a 64-bit system (Windows Vista / Windows 7), and already have assembled a nice collection of 64-bit PlugIns (still very much future music while I'm writing this), VSTHost can't load these. Steinberg provides a separate bridge program in their Cubase / Nuendo products for this; VSTHost doesn't. But there's another possibility:

Since V1.47, VSTHost supports **JBridge**, which can be used to "bridge" the gap between the 32-bit and the 64-bit world. If it's installed, VSTHost uses it automatically to load 64-bit PlugIns. You can find JBridge at http://jstuff.wordpress.com/jbridge/. Just installing it is sufficient – you don't need to do anything else, as far as VSTHost is concerned.

Shell PlugIns

There are some special PlugIns called "Shell PlugIns"; these are special in that they are no effect or VSTi by themselves, but they provide a "shell" for a set of secondary PlugIns. The Waves bundles (see www.waves.com for these) are a prominent – and perhaps the only – example for this special kind of PlugIn. If VSTHost encounters one of these, it doesn't immediately load the PlugIn, but presents a dialog that allows you to select one of the secondary PlugIns, like this:



AudioTrack
AudioTrack Mono
C1 comp
C1 comp Mono
C1 comp-gate
C1 comp-gate Mono
C1 comp-sc
C1 comp-sc Mono
C1 gate
C1 gate Mono

Figure 34: Shell PlugIn Selection Dialog

Once one of the PlugIns has been selected, it is opened just like any normal PlugIn.

PlugIn Auto-Connect

This menu entry defines what happens when a new PlugIn is loaded. Normally, it is checked; in this setting, a new PlugIn is automatically connected to Audio In and Audio Out. This is a good thing for quick tests – when loaded, the PlugIn can instantly be used. If you're in the process of setting up a more complex configuration, however, it may be easier to clear this setting. In this case, the PlugIn is not connected at all, which makes it easier to set up a PlugIn chain, as you don't have to remove the unnecessary Audio In and Out links.

Set PlugIn Path

This menu entry opens a dialog where you can define the PlugIn path(s) that VSTHost uses to generate its PlugIn list.

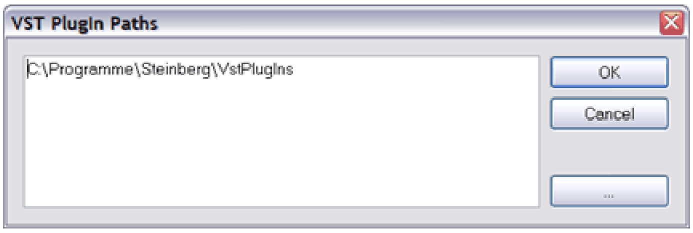


Figure 35: VST PlugIn Path dialog

Here, you can define a set of paths that are searched, one in each line. The "…" button opens a standard directory selection dialog where you can select new paths to be added to the list, if you don't know the location by heart. Changing the contents of this list automatically leads to a Fast Rescan (see below).

If a "big player" (Cubase, Nuendo, etc.) has already been installed on your computer, it has set up a directory where VST PlugIns are installed; normally, the path to this directory is stored in the registry under **HKEY_LOCAL_MACHINE\Software\VST** in the value **VSTPluginsPath**. If VSTHost finds this value, and has no PlugIn path of its own set yet, it automatically initializes the list to this value.

Rescan PlugIns

When selected, VSTHost performs a full scan of all PlugIns in the configured PlugIn paths (see above) to fill the **PlugIns** submenu (see "PlugIns" on page 32). This can take quite some time, since VSTHost has to load, analyze, and unload each file that's possibly a PlugIn which it encounters.

Fast Rescan PlugIns

Does the same as "Rescan PlugIns" (see above), but it only scans PlugIns that it doesn't already have in its list, which can be much faster, depending on the number of installed PlugIns.

Rescan on Start

When checked, VSTHost performs a fast rescan (see above) every time it is started. While this can slow down things a bit, it guarantees an accurate PlugIn list.

Use PlugIn File Names

When checked, VSTHost uses the PlugIn file names instead of their display names in the PlugIn lists (see "PlugIns" below for this). This can sometimes be helpful, and is in most cases far more compact, but not necessarily as informative as the list of display names.

PlugIns

After the PlugIn paths have been scanned, this menu entry turns into a submenu that lists all currently available PlugIns, like this:

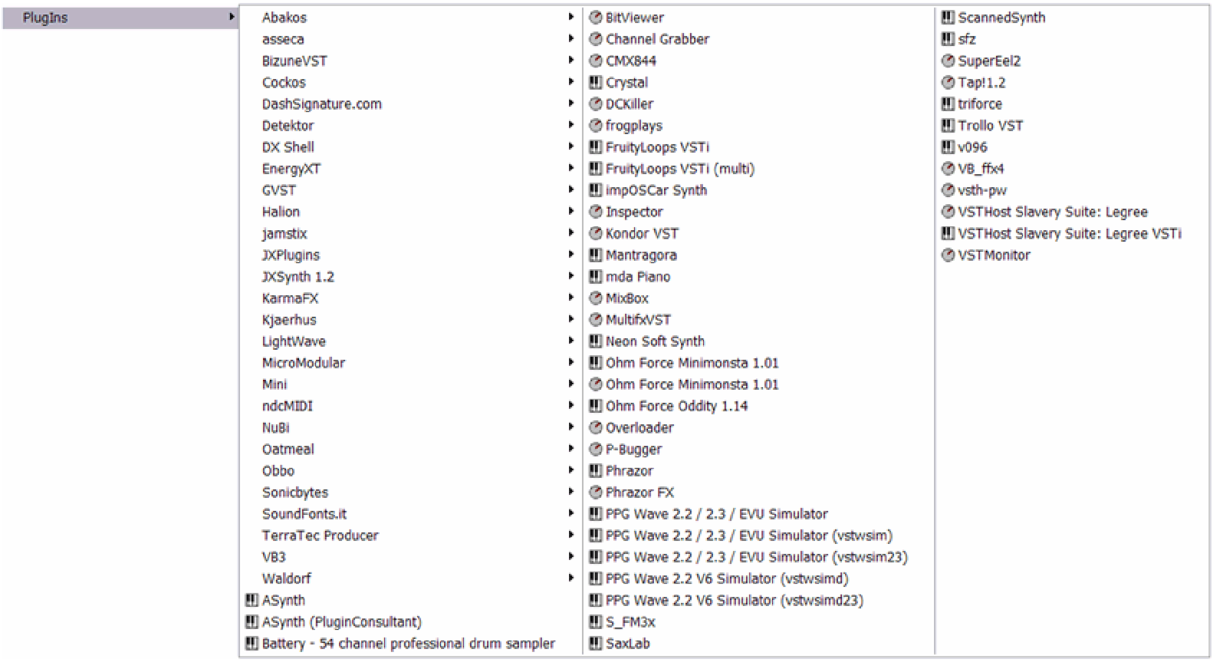


Figure 36: PlugIn menu

Effect, Instrument, and MIDI PlugIns have different icons.

As you can see, this menu can become quite big; I haven't done real stress tests yet whether there are some Windows versions that go Ka-Boom! after more than, say, 500 entries. Be warned.

Exit

Does what it says and terminates VSTHost. Without warning, as I might add; I hate "Are you sure?" message boxes. I *am* sure. ☺

PlugIn Menu

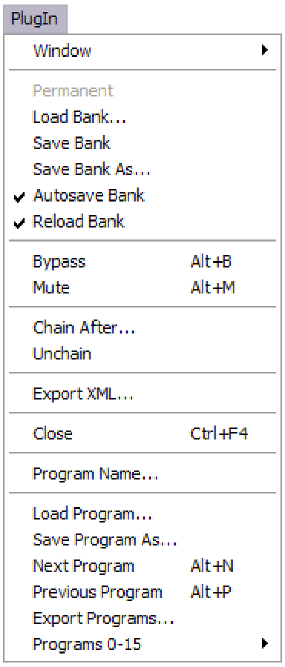


Figure 37: PlugIn Menu

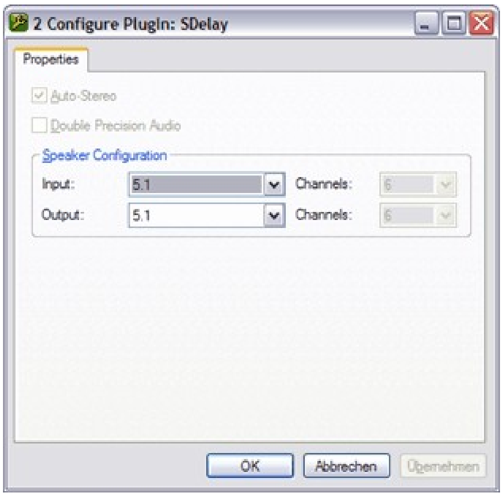
This menu is only visible if a PlugIn window is currently selected (main, edit, parameter, MIDI <-> Parameter, or info window); more on these later in the "Toolbar" section on page 60. Right-clicking on one of the PlugIn windows (except for the Edit window) shows the same menu as a popup menu.

Window

This sub-menu lets you select (or open, if it isn't opened yet) one of the possible windows of the PlugIn. Information on most of them can be found in the "Toolbar" section on page 60. The following sub-menu entries deserve special treatment, however…:

Configure

This sub-menu entry can only be selected if it makes sense, i.e., if the PlugIn requires any of the settings that can be configured on the following window:


2 Configure PlugIn: SDelay

Properties

☑ Auto-Stereo
□ Double Precision Audio

Speaker Configuration

Input: 5.1 Channels: 6
Output: 5.1 Channels: 6

Figure 38: PlugIn Configuration Window

The following settings can be changed here, if possible:

Auto-Stereo

This check box can only be selected when the current PlugIn has only one output channel. If checked, VSTHost automatically expands the PlugIn's output to 2 identical pseudo-stereo outputs.

Double Precision Audio

This check box can only be selected for PlugIns that implement this feature. In the current version, this is mainly usable for testing PlugIns that support **processDoubleReplacing()** for audio processing. In this mode, VSTHost passes audio to the PlugIn in double precision format (the much-hyped "64 bit audio processing!!!1" ☺). This, however, doesn't mean that the output sounds "better" - VSTHost still uses 32 bit audio processing internally; it just converts the samples to 64 bit before calling the PlugIn and converts the result back afterwards. So, all you get is a little performance degradation; that's why I said it's mainly for testing purposes.

But then... if you're using a lot of PlugIns that support double-precision audio, and you want to create chains of them, the continuous conversion between 32- and 64-bit audio would cause more of a performance degradation than running the whole chain with 64-bit double precision audio.

Starting with V1.45, VSTHost is also available in a 64-bit version (that's 64-bit *audio*, not 64-bit *code*; the code is still 32-bit... we live in interesting times <sigh>) that can be separately downloaded from the web site mentioned on page 2 of this document. This version uses 64-bit signal processing internally, which means that:

1. all buffers are twice as big as in the 32-bit version; each and every operation needs to move twice as many bytes around;
2. if a PlugIn does *not* support 64-bit audio processing, VSTHost now has to convert all buffers to 32-bit before and after they are passed through the PlugIn

… in short, it's slower and bigger than the 32-bit version.

While the overall sound quality *might* be a little bit better if 64-bit audio processing is used, I sincerely doubt that anyone can hear this. VSTHost is not meant to be the main vehicle of a mastering studio, where the additional quality might make a difference. Well, it's your decision... a contemporary high-end machine surely has no problem with this version.

Speaker Configuration

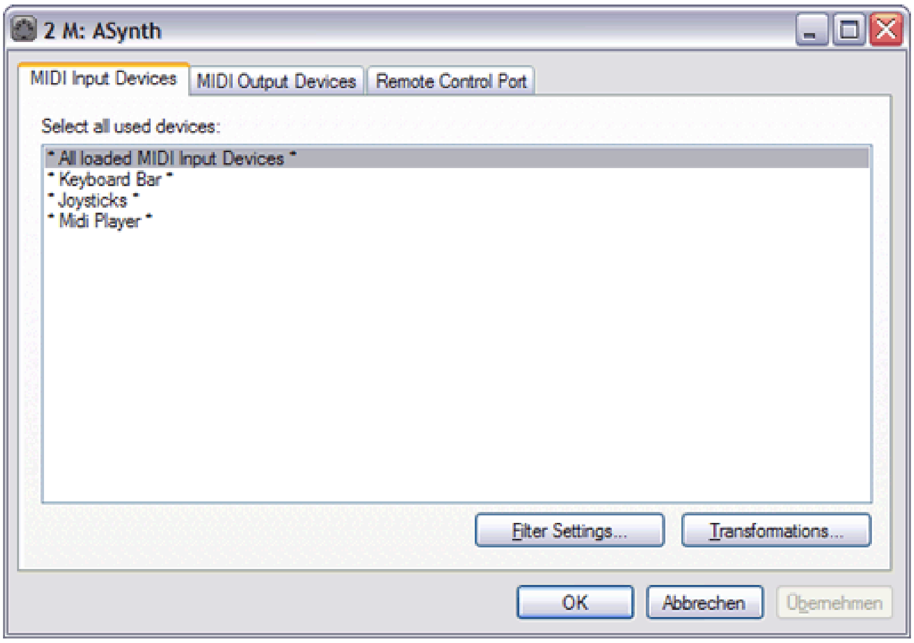
If the PlugIn supports setting the speaker configuration, and thus the usable audio channels, you can configure the PlugIn's input and output speaker configuration here.

MIDI Parameters

This menu entry will probably get a better name in the next version... it's too similar to "MIDI -> Parameter" below...

Selecting this menu entry opens a window that allows to configure the PlugIn's MIDI properties.

MIDI Input Devices



Select all used devices:

- * All loaded MIDI Input Devices *
- * Keyboard Bar *
- * Joysticks *
- * Midi Player *

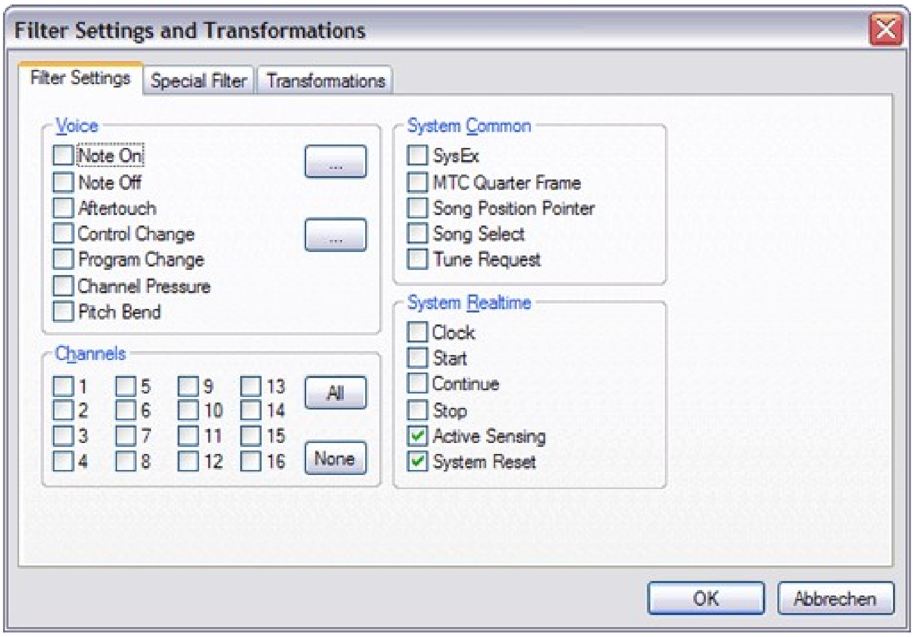
Figure 39: PlugIn MIDI Parameters Window, Input Devices Tab

On the **MIDI Input Devices** tab, you can define the MIDI Input Devices used by this PlugIn; the default is to react on messages from all loaded devices. The Keyboard Bar and the MIDI Player are treated like MIDI Input devices here. You can select one of them by simply clicking on it; to select a range, click on the first and then shift-click on the last; to add or remove a specific device, control-click on it.

Filter Settings and Transformations

The "Filter Settings..." and "Transformations..." buttons open a secondary dialog (both open the same dialog, they just start it on a different tab):

Filter Settings



Voice
- □ Note On
- □ Note Off
- □ Aftertouch
- □ Control Change
- □ Program Change
- □ Channel Pressure
- □ Pitch Bend

Channels
- □ 1 □ 5 □ 9 □ 13
- □ 2 □ 6 □ 10 □ 14
- □ 3 □ 7 □ 11 □ 15
- □ 4 □ 8 □ 12 □ 16

System Common
- □ SysEx
- □ MTC Quarter Frame
- □ Song Position Pointer
- □ Song Select
- □ Tune Request

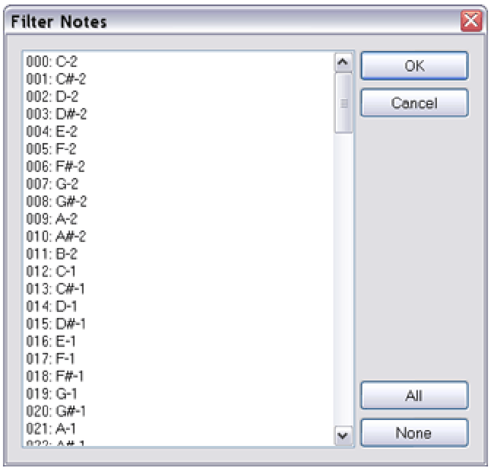
System Realtime
- □ Clock
- □ Start
- □ Continue
- □ Stop
- ☑ Active Sensing
- ☑ System Reset

Figure 40: Filter Settings and Transformations, Filter Settings Tab

Here, you can select MIDI Messages that are *filtered*; i.e., they are removed from the MIDI stream that is sent to this specific PlugIn. Common usages include:

- Disallowing messages from specific MIDI channels; this can be used to separately control up to 16 PlugIns from a single MIDI Input Device
- Preventing Program Change messages to change the PlugIn's program
- Inhibiting certain controllers
- Preventing SysEx messages to reach the PlugIn

If you want to filter only some Note On/Off messages, you can define them by pressing the "**...**" Button on the right of the "Note On" check box, which opens the following sub-dialog:

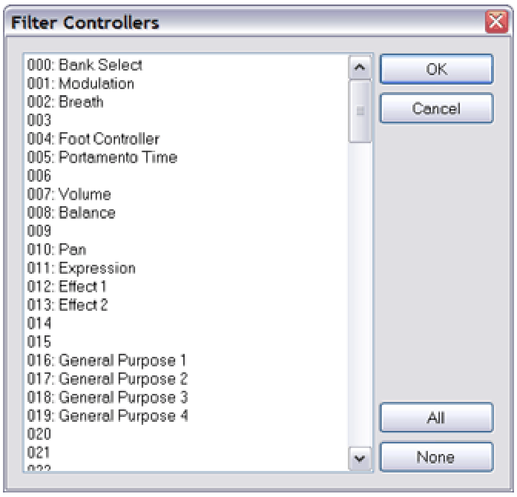


000: C-2
001: C#-2
002: D-2
003: D#-2
004: E-2
005: F-2
006: F#-2
007: G-2
008: G#-2
009: A-2
010: A#-2
011: B-2
012: C-1
013: C#-1
014: D-1
015: D#-1
016: E-1
017: F-1
018: F#-1
019: G-1
020: G#-1
021: A-1
022: A#-1

Figure 41: Filter Notes Dialog

Here, any combination of Note On/Off messages can be filtered.

If you want to filter only some Control Change messages, you can define them by pressing the "**...**" Button on the right of the "Control Change" check box, which opens the following sub-dialog:

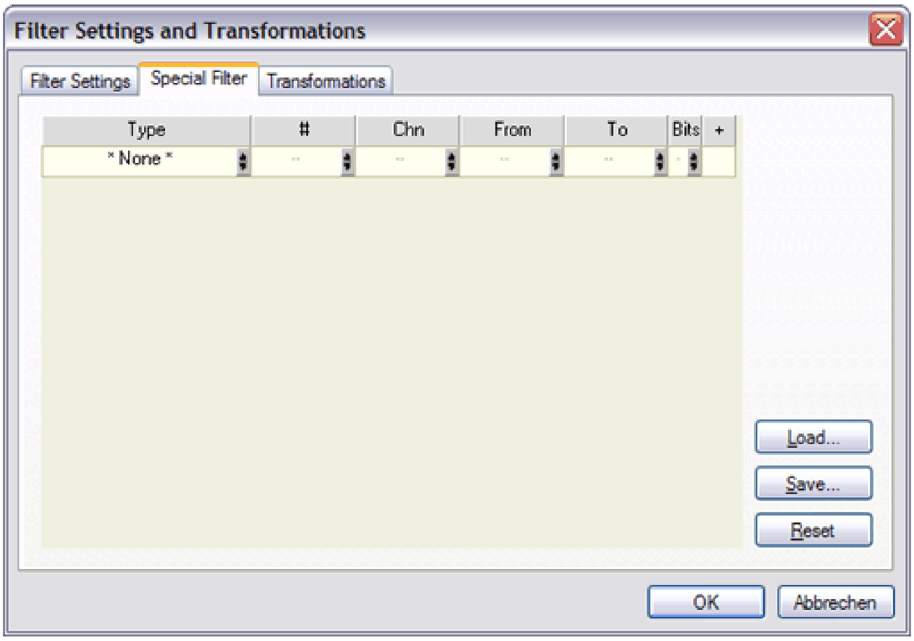


000: Bank Select
001: Modulation
002: Breath
003
004: Foot Controller
005: Portamento Time
006
007: Volume
008: Balance
009
010: Pan
011: Expression
012: Effect 1
013: Effect 2
014
015
016: General Purpose 1
017: General Purpose 2
018: General Purpose 3
019: General Purpose 4
020
021
022

Figure 42: Filter Controllers Dialog

Here, any combination of Continuous Controller messages can be filtered.

Special Filter



Type: * None *

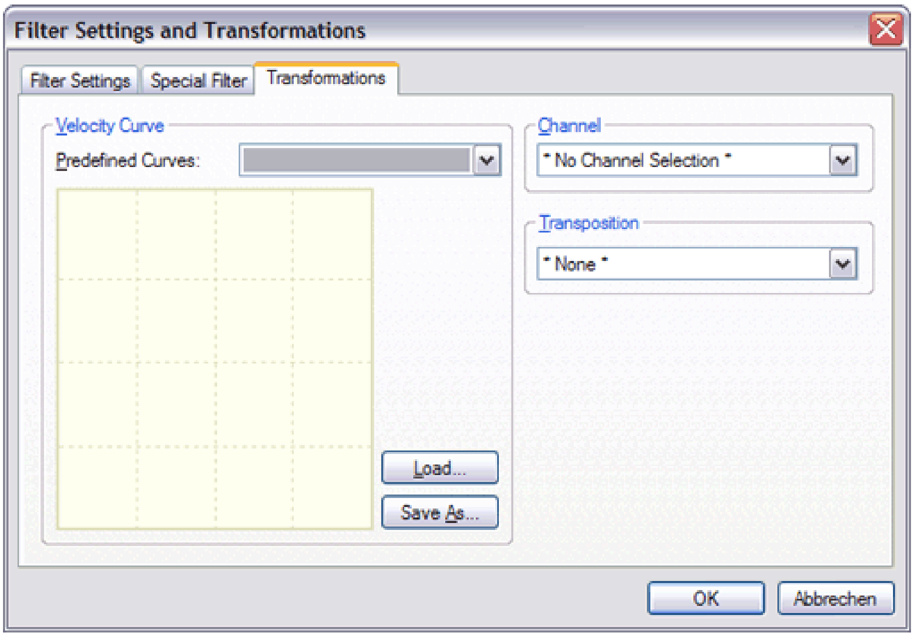
Figure 43: Filter Settings and Transformations, Special Filter Tab

On this tab, you can define special MIDI filters that aren't possible with the “normal” filter page (see above). It uses the same logic as the “MIDI -> Parameter” window (see page 40 for details); the fields are described there.

While this window allows to set up very flexible filters that can filter MIDI messages in really extreme ways, there's a downside – setting up filters this way is quite a bit slower than with the “normal” filtering mechanism, so it is better to use that for simple filtering purposes.

Of course, this becomes less important if your computer is fast enough. Hey, it's just MIDI we're talking about here – 3000 bytes per second... unless it comes from a MIDI-over-IP or virtual MIDI cable, of course.

Transformations



Channel: * No Channel Selection *

Transposition: * None *

Figure 44: Filter Settings and Transformations, Transformations Tab

Here, you can define MIDI transformations. The following transformations can be done:

Velocity Curve

This transformation is only valid for **Note On** messages. The predefined curves that can be loaded deal with various standard situations, such as adapting an external MIDI Master Keyboard's velocity curve to your personal preferences. You *can*, however, set up completely weird velocity transformations with this.

Each curve is defined through a set of *nodes*. Each of these nodes is shown as a little rectangle on the curve. There are two types of nodes: *linear* and *spline* nodes. A linear node is just that – it creates a straight line between itself and the adjacent nodes. A spline node, in contrast, creates a curved line between itself and the adjacent nodes. The two node types are shown in different colors – grey for linear nodes and cyan for spline nodes.

You can insert a node by double-clicking somewhere in the area. The type of the node can be toggled by left-clicking on it, and then right-clicking it, too, *without* releasing the left mouse button first. That may sound complicated, but it's relatively easy to do it. Unless you're a switched Mac user who has a handicapped one-button mouse, hee hee.... ahem.

Clicking on a node shows its current position. You can drag the selected node around freely in the range set by its left and right neighbors.

A node can be deleted by left-clicking on it and pressing the *Del* key on on keyboard.

Note: the velocity transformation can also be used to turn notes off – it allows to change the velocity to **0**, which is interpreted as a **Note Off** message. This is intentionally possible, and if you drag a node to the lowest possible position, “Off” is shown to make it clear.

Channel

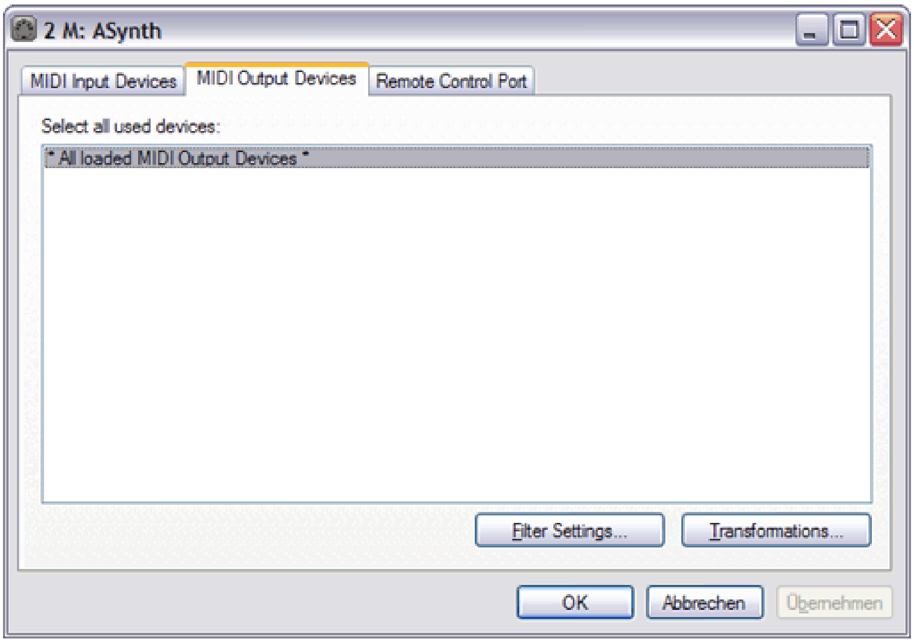
This transformation is valid for all “normal” MIDI messages that carry channel information. Using it, you can change the message's MIDI channel to a fixed value.

Transposition

This transposition is valid for all messages that have a note information – **Note On**, **Note Off**, and **Polyphonic Aftertouch**. Messages of this kind can be transposed up to 4 octaves in both directions.

Now let's carry on with the other tabs on the “MIDI Parameters” window we started to describe on page 34...

MIDI Output Devices



Select all used devices:

* All loaded MIDI Output Devices *

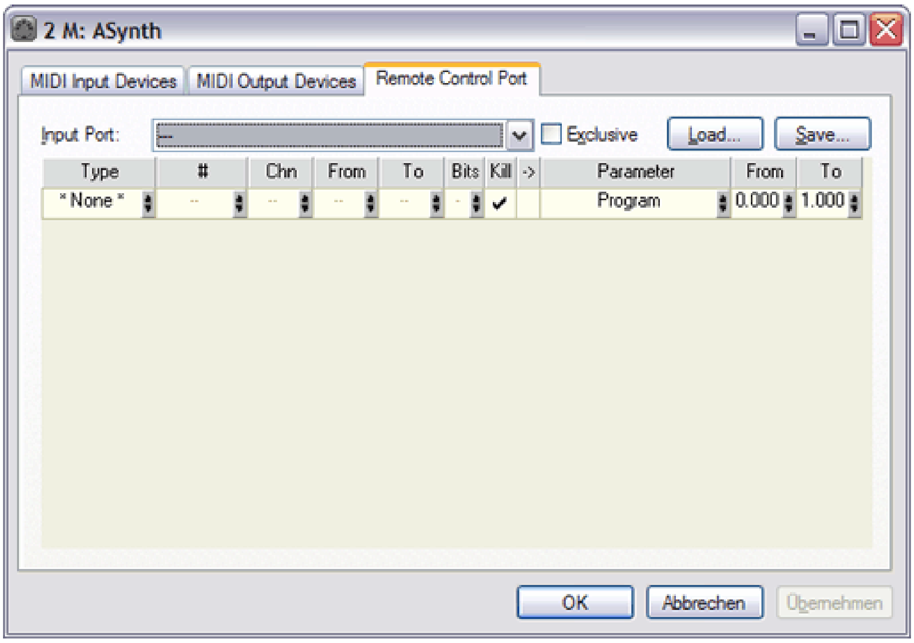
Figure 45: PlugIn MIDI Parameters Window, Output Devices Tab

On the **MIDI Output Devices** tab, you can define the MIDI Output devices that this PlugIn sends MIDI messages to. Normally, it sends to all loaded MIDI Output Devices. You can select one of them by simply clicking on it; to select a range, click on the first and then shift-click on the last; to add or remove a specific device, control-click on it.

The “Filter Settings...” and “Transformations...” buttons open a secondary dialog (both open the same dialog, they just start it on a different tab). See “Filter Settings and Transformations” on page 35 for details.

Note: in earlier versions, MIDI routing between PlugIns was set up on this tab; this is now done with MIDI links (see “Chain After” on page 47 for details).

Remote Control Port



Input Port: --   □ Exclusive

Type	#	Chn	From	To	Bits	Kill	->	Parameter	From	To
* None *	--	--	--	--	-	✓		Program	0.000	1.000

Figure 46: PlugIn MIDI Parameters Window, Remote Control Port Tab

On the **Remote Control Port** tab, you can define the PlugIn's *Remote Control*. In addition to passing MIDI messages to the PlugIns, some of the PlugIn's basic operations can be remotely controlled by MIDI messages, too. Here, you can define a MIDI Input Port that controls the PlugIn. It has to be one of the devices selected on the **MIDI Input Devices** tab, otherwise VSTHost simply ignores the settings when you close the dialog. The default setting of "---" means that there's no Remote Control port.

Below the port, you can configure the action for each of the PlugIn's settings that is remote-controllable. This list is of the same type as the one used in the **MIDI -> Parameter Mapping** window (see "MIDI -> Parameter" on page 40 for details on editing it); the difference is that the **From** and **To** settings on the **Parameter** side represent the full range for the parameter (given below) expressed as a floating-point value in range 0.0 .. 1.0. Unless you're really sure what you're doing, it is probably a good idea to leave these settings alone.

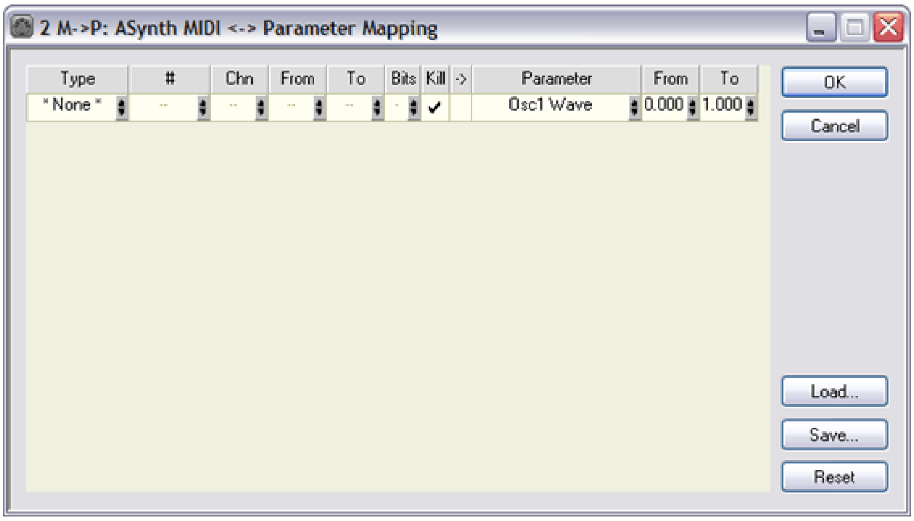
Currently, the following PlugIn parameters can be remotely controlled:

Parameter	Type	Range	Comment
Program	Numeric	PlugIn-Dependent	Selects one of the possible programs of the PlugIn.
Bypass	Switch	0-1	Turns Bypass on or off.
Mute	Switch	0-1	Turns Mute on or off.
Close	Switch	0-1	Closes the PlugIn if the value is in the upper range.
Next Program	Switch	0-1	Switches to the next program if the value is in the upper range.
Previous Program	Switch	0-1	Switches to the previous program if the value is in the upper range.

All MIDI messages that are translated into Remote Control operations are swallowed by VSTHost; all others are passed to the PlugIn's MIDI processing.

MIDI -> Parameter

Selecting this menu entry opens a window that allows the mapping of incoming MIDI messages to VST Automation parameters for the PlugIn. Most contemporary PlugIns can handle incoming MIDI Controller messages themselves, in more or less sophisticated ways; for those that cannot, this dialog and its companion below ("Parameter -> MIDI") have been added.



2 M->P: ASynth MIDI <-> Parameter Mapping

Type	#	Chn	From	To	Bits	Kill	->	Parameter	From	To
* None *	--	--	--	--	-	✓		Osc1 Wave	0.000	1.000

Figure 47: MIDI -> Parameter Mapping Window

This is one of the more complex windows in VSTHost, since there are quite a lot of possibilities.

Nearly all of the fields here are spin controls; i.e., they got a *spin button* on their right side that allows scrolling through the possible values by clicking in on the upper/lower half. Dragging the mouse up or down allows to change the speed at which the selection changes. Wherever possible, clicking the item with the right mouse button offers a *context menu* with all possible settings. Some of the fields can be *edited* directly by double-clicking them.

As soon as you change the value of the last line's MIDI Type from ***None*** to anything else, a new ***None*** line is added to the list. This allows the definition of as many lines as you like. All lines containing a type of ***Learn*** or ***None*** are discarded when the window is closed with **OK**.

The window has two parts; the left part defines the incoming MIDI message(s), the right part defines which parameter is to be modified by them, and how. The two parts are discussed below.

There are some additional buttons on the window. **Reset** simply resets the list. **Load…** can be used to load a new mapping from a file, whereas **Save…** can be used to save the current mapping to a file. **Attention:** VSTHost does *not* check the PlugIn type when loading a mapping from a file; since only the Parameter *number* is saved, mappings created for a completely different PlugIn will be happily loaded, but may result in undesirable mappings, since each PlugIn has its own idea about which parameter is at which position.

Incoming MIDI Message

This side defines the incoming MIDI message to be mapped to a parameter. It consists of the following fields:

Type This field defines the type of the MIDI message(s) processed for this line. Aiming to be as versatile as possible, there are quite a lot of choices here:

- ***Learn*** If this type is selected, VSTHost uses the next incoming MIDI message to define the type of the MIDI message.
- ***None*** This is the default value; lines of this type are ignored by MIDI processing.
- **Bank** React on an incoming CC#0 (and eventually CC#32) message. This can be either a 7-bit or 14-bit message.
- **Program** React on an incoming Program Change message.
- **CC** React on an incoming Continuous Controller message. If the controller number is below 32, this can be either a 7-bit or 14-bit controller.
- **RPN** React on an incoming RPN message bundle. Both Increment/Decrement and Data Entry are processed.
- **NRPN** React on an incoming NRPN message bundle. Both Increment/Decrement and Data Entry are processed.
- **Pitch** React on an incoming Pitch Wheel message
- **Note On Key** React on an incoming Note On message's key. # in this case defines the velocity.
- **Note On Velocity** React on an incoming Note On message's velocity. # in this case defines the key.
- **Note Off Key** React on an incoming Note Off message's key. # in this case defines the velocity.
- **Note Off Velocity** React on an incoming Note Off message's velocity. # in this case defines the key.
- **Poly Aftertouch Key** React on an incoming Polyphonic Aftertouch message's key. Not many attached keyboards will be able to deliver this. # in this case defines the pressure.
- **Channel Pressure** React on an incoming Channel Pressure message.
- **Clock** This, actually, isn't a MIDI message; VSTHost can

determine the clock speed from a set of incoming MIDI Clock (F8) realtime messages, and use this as an input value for all kinds of MIDI <-> parameter operations. The **From** and **To** fields are set to VSTHost's minimum and maximum clock speeds in this case.

Start, Continue, Stop These correspond to the MIDI Realtime messages of the same name. Since they can only send exactly one value (1), they aren't really usable for MIDI <-> Parameter conversions, unless setting the parameter triggers an action, but they can be very useful for Remote Control (see "Remote Control Port" on page 14).

Then, there are the "CC Relative" types; these are not part of the official MIDI specification, but have been added by some companies to augment their product's capabilities. They were implemented to use the new features provided by rotary encoders, something that simply wasn't available when the MIDI standard was created. Using these encoders, you can pass *relative* controller changes to the program. This is a very nifty feature – you can send "increment the value a little" or "decrement the value a little more" messages from an external controller. Unfortunately, there's no standard for this kind of message, so just about each major player did it in his own way… that's why the modern controllers that can send Relative CC (for example, Behringer BCR-2000/BCF-2000, Doepfer Pocket Dial) normally provide more than one way to send them. Since I happen to own a Behringer BCR-2000, the types below correspond to the BCR-2000's "Relative 1", "Relative 2", and "Relative 3" modes in their order.

CC Relative 2C Relative changes are sent as 2's-complement numbers. In 7-bit mode, bit 6 is the sign bit, and in 14-bit mode, bit 13 is the sign bit. This is the mode used by Steinberg products, for example.

CC Relative Bin Relative changes are sent as binary values, with an offset (64 in 7-bit mode and 2048 in 14-bit mode).

CC Relative SB Relative changes are sent with a dedicated *sign bit*; in 7-bit mode, bit 6 is the sign bit, and in 14-bit mode, bit 13 is the sign bit. If set, the number is negative. This is the mode used by Apple/eMagic Logic, for example.

# For some types, an additional number can be given; for example, for CC messages, this is the controller number, while it is the note number for Note On/Off and Polyphonic Aftertouch messages. ***All*** can be used to react on the full range indiscriminately.

Chn Can be used to set the MIDI channel. ***All*** can be used to react on the full range indiscriminately.

From
To These define the MIDI value range. For 7-bit types, this is normally 0..127 (except for the relative CC types, where it is 0..64), whereas it is 0..16383 for 14-bit types (except for the relative CC types, where it is 0..8192). This can be used to further narrow the range of incoming messages; you can, for example, decide to only process Note On messages with a velocity between 64 and 127.
If the range is *reversed* (i.e., **To** is lower than **From**), the values between **To** and **From** are *excluded* from processing; i.e., defining the range as 127..64 would only process incoming values of 0..63.

Bits For some types, you can define whether they are treated as 7-bit or 14-bit entities

Kill This flag defines whether the MIDI message is "killed", i.e., removed from the MIDI events list. This defaults to yes; normally, if you transform a MIDI message into a parameter, you won't need to pass the MIDI message to the PlugIn any more. If you want to pass the MIDI message anyway, a simple mouse click on the "Killing field" allows this.

Translation to...

This field, which has the header text "**->**", can be used to define a complex set of changes – it can be used to create a **conjunction**. If you click into this field, a "+" sign appears, and the outgoing parameter change fields (see below) disappear. In this mode, the incoming MIDI message is parsed, but is not used to change a parameter; VSTHost merely remembers whether the last message of the given type and channel would match the other criteria.

This result is then ANDed with the *next* line. Only if both lines' criteria are met, the incoming MIDI message is translated into a parameter.

Note: you can set up as many ANDed lines as you like, but they have to be followed by a line which finally determines which parameter is to be changed. If this final line is missing, all ANDed lines are discarded when the setup is saved.

Outgoing Parameter Change

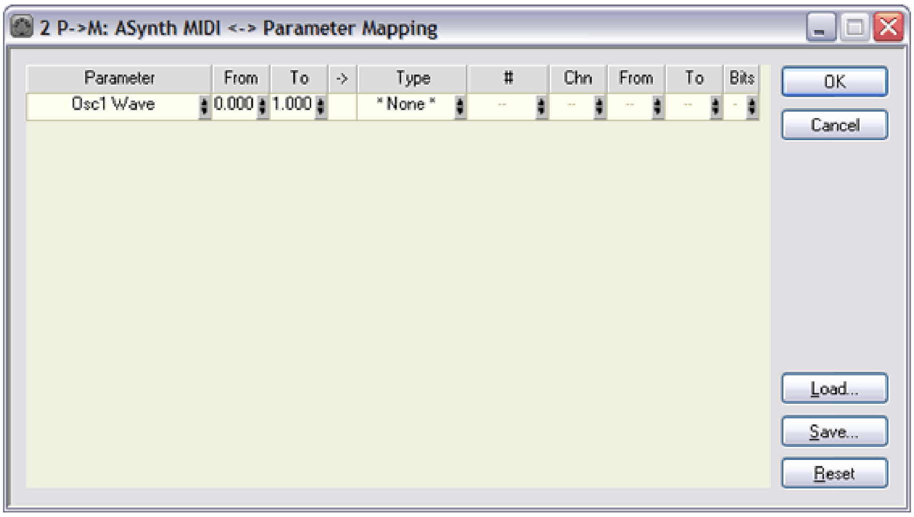
This side defines which of the PlugIn's parameters is to be modified by the incoming MIDI message. It consists of the following fields:

Parameter Here, you can select one of the PlugIn's VST Parameters.
If ***Learn*** is selected, VSTHost uses the parameter from the Automation value change that comes in; this allows you to select ***Learn***, then switch to the PlugIn's Editor window, twiddle the desired knob there, and (provided this *is* an automatable parameter) instantly have the corresponding parameter selected.

From
To Here, you can select the value range that is sent to the PlugIn. To do so, the incoming MIDI message's value range is converted into a possible range of 0.000…1.000, which is then expanded into the value range given here.
If the range is *reversed* (i.e., **To** is lower than **From**), the output values are *reversed*, too; i.e., by specifying a range of 1.000..0.000 here, an incoming value of 0.1 would result in a parameter value of 0.9 sent to the PlugIn.

Parameter -> MIDI

Selecting this menu entry opens a window that allows the mapping of incoming VST Automation parameter changes to outgoing MIDI messages for the PlugIn. Most contemporary PlugIns can handle incoming and outgoing MIDI Controller messages in more or less sophisticated ways; for those that cannot, this dialog and its companion above ("MIDI -> Parameter") have been added.



2 P->M: ASynth MIDI <-> Parameter Mapping

Parameter	From	To	->	Type	#	Chn	From	To	Bits
Osc1 Wave	0.000	1.000		* None *	--	--	--	--	-

Figure 48: Parameter -> MIDI Mapping Window

See “MIDI -> Parameter” above for a general description of the editing possibilities on this window.

The window has two parts; the left part defines the incoming VST Parameter change, the right part defines which set of MIDI messages is to be generated by them, and how. The two parts are discussed below.

There are some additional buttons on the window. **Reset** simply resets the list. **Load…** can be used to load a new mapping from a file, whereas **Save…** can be used to save the current mapping to a file. **Attention:** VSTHost does *not* check the PlugIn type when loading a mapping from a file; since only the Parameter *number* is saved, mappings created for a completely different PlugIn will be happily loaded, but may result in undesired mappings, since each PlugIn has its own idea about which parameter is at which position.

Incoming Parameter Change

This side defines which of the PlugIn’s parameters should generate a (set of) MIDI message(s). It consists of the following fields:

Parameter Here, you can select one of the PlugIn’s VST Parameters.
If ***Learn*** is selected, VSTHost uses the parameter from the Automation value change that comes in; this allows you to select ***Learn***, then switch to the PlugIn’s Editor window, twiddle the desired knob there, and (provided this *is* an automatable parameter) instantly have the corresponding parameter selected.

From
To Here, you can select the value range that’s accepted from the PlugIn. The defined maximal value range for VST parameters is 0.000…1.000.
If the range is *reversed* (i.e., **To** is lower than **From**), the values between **To** and **From** are *excluded* from the generation; i.e., defining the range as 1.000..0.500 would only process incoming values between 0.000 and 0.49°.

Translation to..

This field, which has the header text “**->**”, can be used to define a complex set of changes – it can be used to create a **conjunction**. If you click into this field, a “+” sign appears, and the outgoing MIDI message fields (see below) disappear. In this mode, the incoming parameter change is parsed, but is not used to create a MIDI message; VSTHost merely remembers whether the last change of the given parameter would be in the given range.

This result is then ANDed with the *next* line. Only if both lines' criteria are met, the incoming parameter change creates a MIDI message.

Note: you can set up as many ANDed lines as you like, but they have to be followed by a line which finally determines which MIDI message is to be generated. If this final line is missing, all ANDed lines are discarded when the setup is saved.

Outgoing MIDI Message

This side defines the (set of) MIDI Message(s) generated by the parameter change. These messages are then treated just like original MIDI messages originating from the PlugIn – they can be sent to all configured MIDI Outputs, or to another PlugIn (where they could even be modified to VST Parameter changes again, allowing rather bizarre inter-PlugIn modulations). It consists of the following fields:

Type This field defines the type of the MIDI messages. Aiming to become as versatile as possible, there are quite a lot of choices here:

Learn If this type is selected, VSTHost uses the next incoming MIDI message to define the type of the MIDI message (this is a bit of a hack; an *incoming* MIDI message is used to define the type of an *outgoing* MIDI message… oh well, it works…).

None This is the default value; lines of this type are ignored by MIDI processing.

Bank Creates an outgoing CC#0 (and eventually CC#32) message. This can be either a 7-bit or 14-bit message.

Program Creates an outgoing Program Change message.

CC Creates an outgoing CC message. This can be either a 7-bit or 14-bit message.

RPN Creates an outgoing RPN message bundle.

NRPN Creates an outgoing NRPN message bundle.

Pitch Creates an outgoing Pitch Wheel message

Note On Key Creates an outgoing Note On message's key. The velocity is defined by #.

Note On Velocity Creates an outgoing Note On message's velocity. The key is defined by #.

Note Off Key Creates an outgoing Note Off message's key. The release velocity is defined by #.

Note Off Velocity Creates an outgoing Note Off message's velocity. The key is defined by #.

Poly Aftertouch Key Creates an outgoing Polyphonic Aftertouch message's key. Not many attached keyboards will be able to deliver this. The aftertouch pressure is defined by #.

Polyphonic Aftertouch Creates an outgoing Polyphonic Aftertouch message. Not many attached keyboards will be able to deliver this. The key is defined by #.

Channel Pressure Creates an outgoing Channel Pressure message.

Clock This doesn't really make much sense – although a specially crafted PlugIn might put it to use. The parameter value, whatever it is, triggers a single MIDI Clock (F8) realtime message.

Start, Continue, Stop These also don't make much sense in a normal environment. The parameter value, whatever it is, triggers a single MIDI Start, Continue, or Stop realtime message.

Then, there are the "CC Relative" types; these are not part of the official MIDI specification, but have been added by some companies to augment their product's capabilities in a makeshift, non-standardized way. They were implemented to use the new features provided by rotary encoders, something that simply wasn't available when the MIDI standard was created. Using these encoders, you can pass *relative* controller changes to the program. This is a very nifty feature – you can send "increment the value a little" or "decrement value a little more" messages from an external controller. Unfortunately, there's no standard for this kind of message, so just about each major player did it in his own way… that's why the modern controllers that can send Relative CC (for example, Behringer BCR-2000/BCF-2000, Doepfer Pocket Dial) normally provide more than one way to send them. Since I happen to own a Behringer BCR-2000, the types below correspond to the BCR-2000's "Relative 1", "Relative 2", and "Relative 3" modes.

CC Relative 2C Relative changes are sent as 2's-complement numbers. This is the mode used by Steinberg products, for example.

CC Relative Bin Relative changes are sent as binary values, with an offset (64 in 7-bit mode and 2048 in 14-bit mode).

CC Relative SB Relative changes are sent with a dedicated *sign bit*; in 7-bit mode, bit 6 is the sign bit, and in 14-bit mode, bit 13 is the sign bit. If set, the number is negative. This is the mode used by Apple/eMagic Logic, for example.

# For some types, an additional number can be given; for example, for CC

messages, this is the controller number, while it is the note number for Note On/Off Velocity and Polyphonic Aftertouch messages.

Chn Can be used to set the MIDI channel.

From
To These define the MIDI value range. For 7-bit types, this is normally 0..127 (except for the relative CC types, where it is 0..64), whereas it is 0..16383 for 14-bit types (except for the relative CC types, where it is 0..8192). This can be used to further narrow the range of incoming messages; you can, for example, decide to only process Note On messages with a velocity between 64 and 127.
If the range is *reversed* (i.e., **To** is lower than **From**), the values between **To** and **From** are *reversed*, too.

Bits For some types, you can define whether they are treated as 7-bit or 14-bit entities

Permanent

This menu entry is reserved for future use. Just ignore it ☺

Load Bank

Selecting this menu entry opens a dialog where you can load a program bank (normally a file with extension ".fxb") into the current PlugIn. Once you specify one and save the performance, VSTHost loads this bank into the PlugIn automatically whenever the performance containing the PlugIn is loaded. If the PlugIn banks are saved automatically (see "Autosave PlugIn Banks" on page 27 for details), VSTHost treats this as an *import*; as soon as the performance is saved, the loaded bank is saved into VSTHost's data directory for the current bank, and this copy is used from then on.

Save Bank

Selecting this menu entry saves the current PlugIn's program bank into the file. If there is no current program bank defined for the PlugIn (i.e., no **Load Bank** operation has been done before), it acts like **Save Bank As**.

Save Bank As

Selecting this menu entry opens a dialog where you can select a new file name (normally a file with extension ".fxb") to save the current PlugIn's program bank into.

Autosave Bank

This menu entry defines whether the PlugIn's program bank is automatically saved with the performance. Initially, it is checked; however, there may be circumstances where you don't want this to happen. In this case, turn it off.

Reload Bank

This menu entry is nearly synonymous to "Autosave Bank" above, but it covers the other way – if it is checked, the PlugIn's program bank is automatically loaded when the PlugIn is part of a performance that's just being loaded. Initially, it is checked; however, there may be circumstances where you don't want this to happen. In this case, turn it off.

Bypass

Selecting this menu entry toggles the Bypass mode for the effect on and off. In contrast to **Mute** (see below), bypassing an effect doesn't turn off the whole chain, since all effects that are chained after the bypassed one still receive its input.

Note: bypassing an effect does *not* turn it off; it still receives input, and it still generates output (which is silently discarded), since it has to deliver the correct output as soon as Bypass is turned off again. So, no performance gain here ☺.

In V1.44, this behavior has been refined a bit; if the PlugIn reports that it can be bypassed (i.e., if canDo("bypass") returns 1), VSTHost calls the PlugIn's setBypass() method to let it define whether bypassing turns processing off completely or whether the PlugIn does a "soft bypass" on its own.

Mute

Ah yes, a very important menu entry. Selecting this (un)mutes the current effect. In contrast to Bypass (see above), this completely mutes the effect's output; this means that all effects that are chained to the muted one receive only silence as input.

Note: muting an effect does *not* turn it off; it still receives input, and it still generates output (which is silently discarded), since it has to deliver the correct output as soon as Mute is turned off again. So, no performance gain here ☺.

In V1.44, this behavior has been refined a bit; if the PlugIn reports that it can be bypassed (i.e., if canDo("bypass") returns 1), VSTHost calls the PlugIn's setBypass() method to let it define whether bypassing turns processing off completely or whether the PlugIn does a "soft bypass" on its own.

Chain After

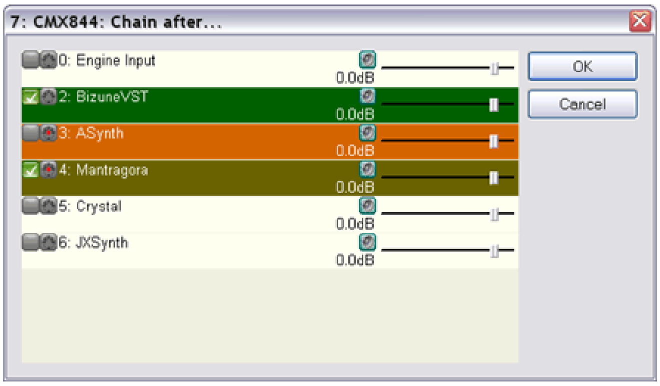
Selecting this menu entry allows to define PlugIn *Chains*; a chain, in VSTHost, is a sequence of PlugIns that are linked together.

The **{In}** pseudo-PlugIn provides audio input from VSTHost to a PlugIn (unless it has no inputs), then the PlugIn's output is passed on to the next element(s) in the chain, and so on, until the **{Out}** pseudo-PlugIn has been reached; this PlugIn's output generates the real VSTHost audio output.

Note: versions earlier than V1.46 used a rather complicated setup with *Send* and *Insert* links; this is not necessary any more, since there are dedicated audio input and output PlugIns.

You can set up complicated setups this way. Each PlugIn can be linked to a multitude of other PlugIns.

Selecting the **Chain After** menu entry opens the following dialog:



7: CMX844: Chain after...

□ 0: Engine Input 0.0dB
☑ 2: BizuneVST 0.0dB
□ 3: ASynth 0.0dB
☑ 4: Mantragora 0.0dB
□ 5: Crystal 0.0dB
□ 6: JXSynth 0.0dB

Figure 49: Chain PlugIn After Dialog

This dialog lists all PlugIns that the current PlugIn can be "chained after", or "linked to". It does not include PlugIns that include the current PlugIn in their predecessor chains, because that would lead to recursive setups – and this would kill VSTHost.

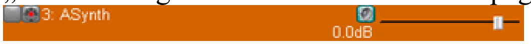
There are some buttons available for each entry:

□ - this button is used to link the current PlugIn's *Audio channels* after the selected one. Selected PlugIns look like this:

☑ 2: BizuneVST 0.0dB

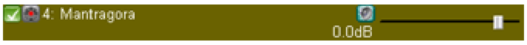
The button has changed to ☑, and the line is shown in a different color. This button is only available if the PlugIn can deliver audio output.

● - this button is used to link the current PlugIn’s *MIDI Input* after the selected one. If selected, any MIDI output generated by the selected PlugIn is sent to the current PlugIn (unless it is filtered – see „Filter Settings and Transformations“ on page 35 for that). Selected PlugIns look like this:

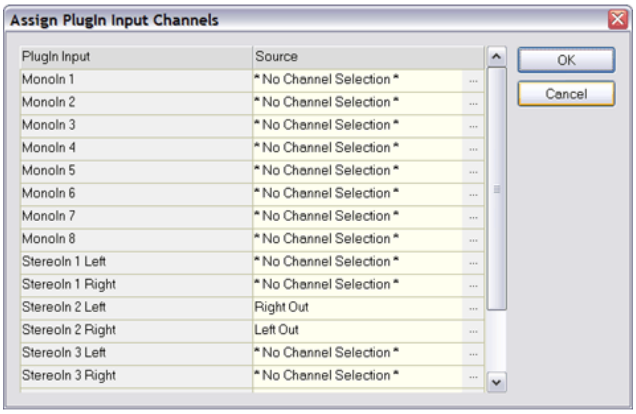


The button has changed to ●, and the line is shown in a different color. This button is only available if the current PlugIn can accept MIDI input.

If both Audio and MIDI data are linked to the PlugIn, the line color is a mixture between the two:



● - this button is used to define the Input Channel assignment for the link. You can assign the chained PlugIn’s output channels to the current PlugIn’s input channels here. Here’s a more complicated setup:



PlugIn Input	Source
MonoIn 1	* No Channel Selection *
MonoIn 2	* No Channel Selection *
MonoIn 3	* No Channel Selection *
MonoIn 4	* No Channel Selection *
MonoIn 5	* No Channel Selection *
MonoIn 6	* No Channel Selection *
MonoIn 7	* No Channel Selection *
MonoIn 8	* No Channel Selection *
StereoIn 1 Left	* No Channel Selection *
StereoIn 1 Right	* No Channel Selection *
StereoIn 2 Left	Right Out
StereoIn 2 Right	Left Out
StereoIn 3 Left	* No Channel Selection *
StereoIn 3 Right	* No Channel Selection *

Figure 50: Assign Chained Effect Input Channels Dialog

This example is taken from the chain between 4**: Mantragora.dll** and 7**:cmx844.dll** in the following VSTHost program:

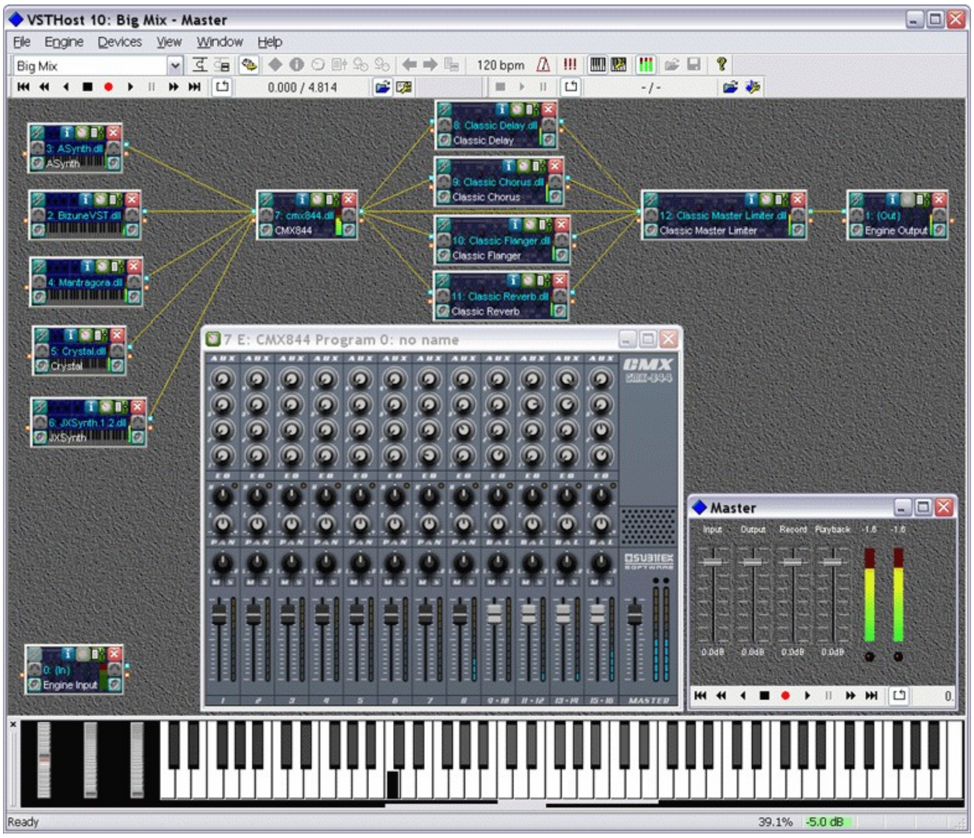


Figure 51: complicated setup with multichannel mixer

Then, there’s a little slider that allows to define the level passed through this link; if, for example, you want to chain a Reverb PlugIn after an Instrument PlugIn, you would define the link as a Send Link and reduce the level in this link to, say, -10dB. In this way, both the original instrument and the reverb are heard, but the reverb contributes much less to the overall audio output.

Note: if you already linked some PlugIns, you can activate the “Chain After” dialog of the target PlugIn by double-clicking on a link line on the main window.

Unchain

This is a bit tricky… the **Chain After** dialog can be used to set up the PlugIn(s) that a PlugIn is linked to. Deselecting the link on that dialog removes it, breaking the chain if there’s any other PlugIn linked to the current one.

Selecting the **Unchain** menu item, however, removes all links to and from the current PlugIn – but it leaves the rest of the chain intact and “glues” predecessors and successors together. That is, all predecessors and successors remain linked, just the current PlugIn is entirely removed from the chain.

Note: the effect can be quite dramatic... if you unchain PlugIn 7: CMX844 from the performance shown above, 20 new links suddenly appear! So, please use this with caution.

Export XML

Starting with the VST SDK 2.4, Steinberg added a new feature to the VST specification – an XML definition to refine the parameter definitions of a PlugIn. Normally, the parameters are displayed as a rather non-descriptive bunch of short strings and attached values (see “Toolbar” on page 60 for details). To quote the VST SDK: “The VST Parameters Structure XML definition provides an easy way to structure parameters of existing VST Plug-Ins hierarchically, without having to recompile the Plug-In binary.” Well, in case of VSTHost, this doesn’t really apply yet (the hierarchical definitions are ignored), but at least it can be used to give the parameters more descriptive names, add tags to various value ranges, and the like. If a .vstxml file or embedded resource is available with a PlugIn, VSTHost uses it automatically.

Since most PlugIns don’t come with an associated .vstxml file (the only one I’m currently aware of is Terratec’s KOMPLEXER), VSTHost allows the generation of such files. It uses all data about the parameters that it can gather from the PlugIn to create a .vstxml file which you can adjust to your taste (see the VST SDK for the Parameters Structure XML definition). This file has to have the same filename and path as the PlugIn, just with the extension .vstxml. Here’s a small example for Steinberg’s Neon synthesizer, which can now be downloaded for free – and which, as one of the first examples of a VSTi, has an exceptionally dumb (and short, which makes it a good candidate for this discussion) parameter set:

```
<VSTPluginProperties>
  <VSTParametersStructure>
    <Param id="0" name="OscRang" label="amount" />
    <Param id="1" name="OscWave" label="wave" />
    <Param id="2" name="Osc2Det" label="amount" />
    <Param id="3" name="LfoFreq" label="amount" />
    <Param id="4" name="VcfCut" label="amount" />
    <Param id="5" name="VcfReso" label="amount" />
    <Param id="6" name="VcfAtt" label="amount" />
    <Param id="7" name="VcfDec" label="amount" />
    <Param id="8" name="VcfSus" label="amount" />
    <Param id="9" name="VcfRel" label="amount" />
    <Param id="10" name="VcaAtt" label="amount" />
    <Param id="11" name="VcaDec" label="amount" />
    <Param id="12" name="VcaSus" label="amount" />
    <Param id="13" name="VcaRel" label="amount" />
  </VSTParametersStructure>
</VSTPluginProperties>
```

Figure 52: Neon.vstxml in its original form

Here’s an example how that could be restructured to make things a bit more readable:

```
<VSTPluginProperties>
  <VSTParametersStructure>
    <!-- Value Types: -->
    <ValueType name="OscRang" label="'">
      <Entry name="16" />
      <Entry name="8" />
      <Entry name="4" />
    </ValueType>
    <ValueType name="OscWave" label="">
      <Entry name="Triangle" />
      <Entry name="Sawtooth" />
      <Entry name="Rectangle" />
    </ValueType>

    <Group name="Oscillator">
      <Param id="0" name="Osc Range" shortName="OscRng" numberOfStates="3"
type="OscRang"  label="'" />
      <Param id="1" name="Osc Waveform" shortName="OscWv" numberOfStates="3"
type="OscWave" label="" />
      <Param id="2" name="Oscillator 2 Detune" label="" shortName="Os2Det" />
    </Group>
    <Param id="3" name="LFO Speed" label="" shortName="LfoFreq" />
    <Group name="VCF">
      <Param id="4" name="VCF Cutoff" label="" shortName="VcfCut" />
      <Param id="5" name="VCF Resonance" label="" shortName="VcfRes" />
      <Param id="6" name="VCF Attack" label="" shortName="Att" />
      <Param id="7" name="VCF Decay" label="" shortName="Dec" />
      <Param id="8" name="VCF Sustain" label="" shortName="Sus" />
      <Param id="9" name="VCF Release" label="" shortName="Rel" />
    </Group>
    <Group name="VCA">
      <Param id="10" name="VCA Attack" label="" shortName="VcaAtt" />
      <Param id="11" name="VCA Decay" label="" shortName="VcaDec" />
      <Param id="12" name="VCA Sustain" label="" shortName="VcaSus" />
      <Param id="13" name="VCA Release" label="" shortName="VcaRel" />
    </Group>

  </VSTParametersStructure>
</VSTPluginProperties>
```

Figure 53: Neon.vstxml, modified

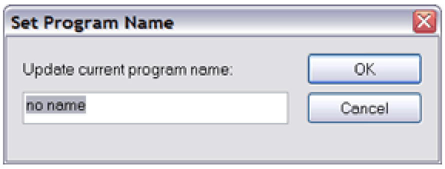
VSTHost doesn’t use the groups yet, it still displays all parameters in numerical order; but all other settings are used the next time you load the Neon PlugIn.

Close

Selecting this menu entry closes the currently selected PlugIn and all of its windows if the main window of the PlugIn is active; otherwise, only the respective window is closed.

Program Name

Selecting this menu entry opens a little dialog where you can enter a new name for the current program used in this PlugIn:



Set Program Name

Update current program name:

no name

Figure 54: Set Program Name Dialog

Please note that while the change is instantly visible after you have pressed OK, you need to save the PlugIn's Bank or Program to a file to really make it permanent. If PlugIn sound banks are automatically saved (see "Autosave PlugIn Banks" on page 27 for details), this is taken care of when the performance is saved.

Load Program

Selecting this menu entry opens a dialog where you can load a program (normally a file with extension ".fxp") into the current PlugIn.

Save Program As

Selecting this menu entry opens a dialog where you can save the current program of the current PlugIn into a file (normally a file with extension ".fxp")

Next Program

Selecting this menu item changes the PlugIn's current program to the next program in the list.

Previous Program

Selecting this menu item changes the PlugIn's current program to the previous program in the list.

Export Programs

Selecting this menu item opens a dialog where you can select a folder; VSTHost then saves all programs of the PlugIn into this folder. Each program is saved under an automatically generated name of the form ***PlugInName_ProgramNumber.ProgramName*.fxp** – looks rather complicated when written in this form, but if you look at an example, like "ASynth_001.PWBass.fxp", it becomes fairly obvious.

Programs mm-nn

A PlugIn can define how many programs it supports. Some have no program, some have one, some have 10, others have 128… and so on. Since a single list of potentially thousands of programs would be rather awkward to use, VSTHost splits it into manageable parts and displays a list of submenus for these. Selecting one of the items on the submenu loads the selected program into the PlugIn.

The above three menu items change the current program for a PlugIn; VSTHost remembers this program number, together with an eventually loaded Program Bank. VSTHost loads this program into the PlugIn automatically whenever the VSTHost performance containing the PlugIn is loaded.

Note: VSTHost does not automatically save the PlugIn's program bank. If the PlugIn relies on a specific setup that's stored in a bank file, please remember to save that before you save the performance. Since V1.43, this can be changed (see "Autosave PlugIn Banks" on page 27).

Engine Menu

This menu contains entries that control the overall operation of the VST Audio Engine.

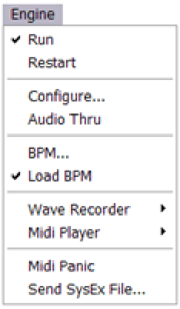


Figure 55: Engine Menu

Run

Selecting this menu entry toggles the engine's run mode. When VSTHost is started the first time, the engine is turned on; selecting this menu entry, or clicking on the corresponding toolbar button, turns it off.

This menu entry is primarily used for debugging purposes; sometimes, if you just want to debug various display aspects of a PlugIn, it's not necessary to keep the full audio engine running in the background, consuming tons of precious CPU cycles.

Restart

Stops and restarts the audio engine. Mainly useful if something goes wrong (buffer size too small, for example, leading to synchronization errors between VSTHost and the ASIO driver).

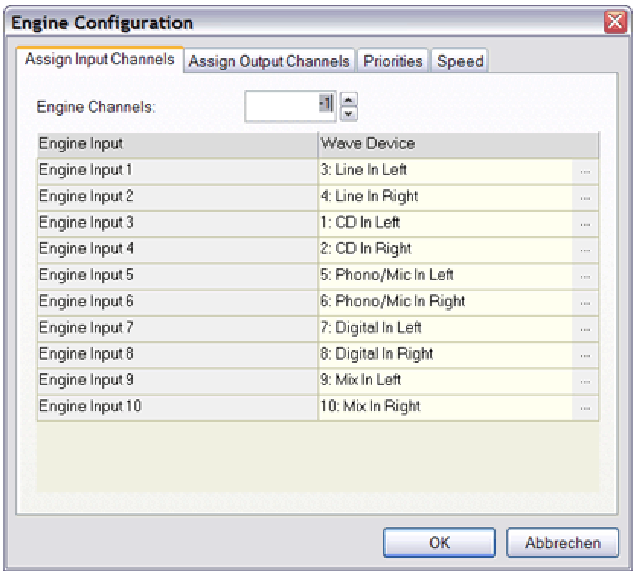
If Player Sync is not checked (see "Player Sync" on page 56 for details), this can be used to reset the current position.

Configure

This is one of the many tabbed dialogs in VSTHost. It has three tabs:

Input Assign

Selecting this tab opens the following dialog:



Engine Channels: -1

Engine Input	Wave Device
Engine Input 1	3: Line In Left
Engine Input 2	4: Line In Right
Engine Input 3	1: CD In Left
Engine Input 4	2: CD In Right
Engine Input 5	5: Phono/Mic In Left
Engine Input 6	6: Phono/Mic In Right
Engine Input 7	7: Digital In Left
Engine Input 8	8: Digital In Right
Engine Input 9	9: Mix In Left
Engine Input 10	10: Mix In Right

Figure 56: Engine Configuration, Assign Input Channels Tab

Just as a PlugIn can have its inputs reassigned (see “Chain After” on page 47), so can VSTHost’s Audio Engine.

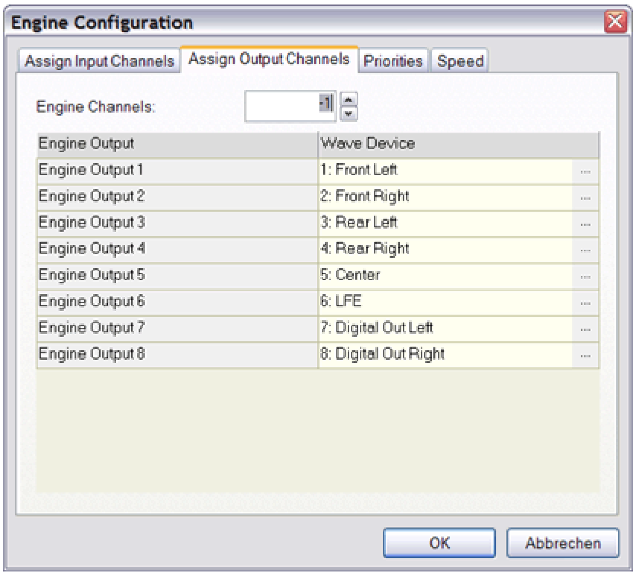
You can define the number of audio input channels that VSTHost's engine uses internally; the default setting of -1 means “use as many channels as provided by the current audio input device”. If you want a consistent setup for multiple audio devices, like “the internal engine uses 2 input channels, no matter what the audio interface provides”, you can set it up here.

On the left side, the channels used by VSTHost’s VST audio engine are listed; on the right side, you can select one of the channels provided by the loaded Wave Input device. Click on the “**…**” on the right side of the Source column to select from the available channels.

This allows a reassignment, or removal of certain unwanted channels. See the above figure – the DMX 6fire 24/96 ASIO driver presents the **CD In Left** and **Right** channels in positions 1 and 2; I prefer to have the Line Inputs there so that loaded Effect PlugIns automatically use these if their input assignment is not specifically set.

Output Assign

Selecting this tab shows the following, already familiar, dialog:



Engine Channels: -1

Engine Output	Wave Device
Engine Output 1	1: Front Left
Engine Output 2	2: Front Right
Engine Output 3	3: Rear Left
Engine Output 4	4: Rear Right
Engine Output 5	5: Center
Engine Output 6	6: LFE
Engine Output 7	7: Digital Out Left
Engine Output 8	8: Digital Out Right

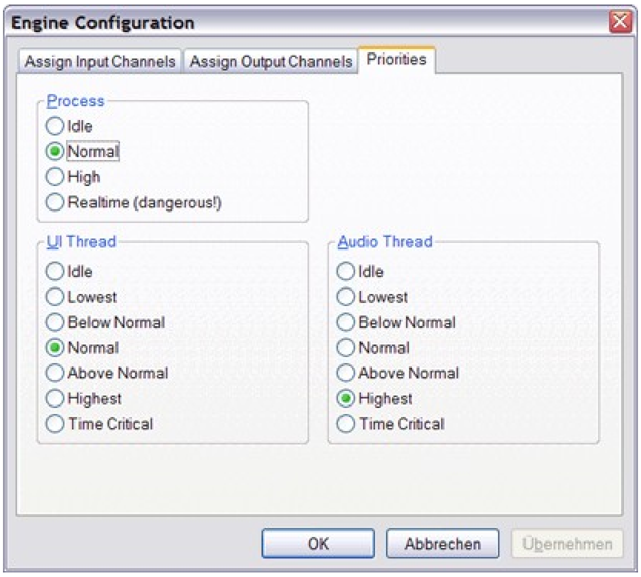
Figure 57: Engine Configuration, Assign Output Channels Tab

This works just like **Input Assign** above, but in the other direction. Here, you can assign an output channel provided by the Wave Output device to each of the VSTHost audio engine’s internal channels.

You can define the number of output audio channels that VSTHost's engine uses internally; the default setting of -1 means “use as many channels as provided by the current audio output device”. If you want a consistent setup for multiple audio devices, like “the internal engine uses 2 output channels, no matter what the audio interface provides”, you can set it up here.

Priorities

Selecting this tab shows the following dialog:



Process
○ Idle
● Normal
○ High
○ Realtime (dangerous!)

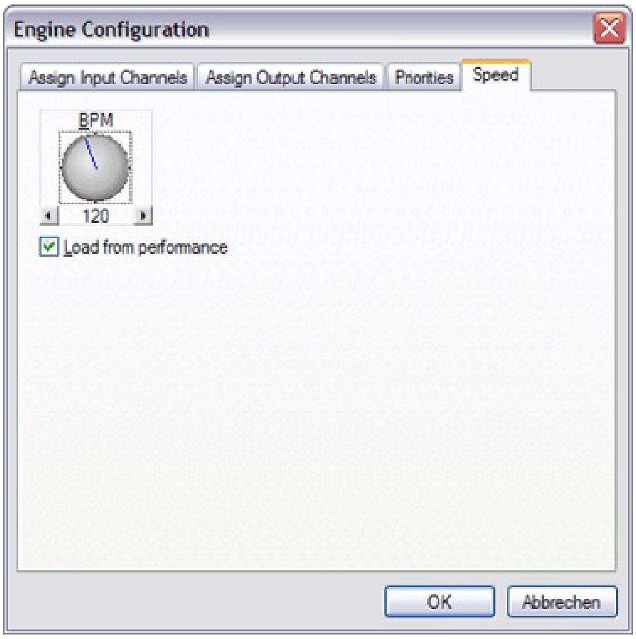
UI Thread
○ Idle
○ Lowest
○ Below Normal
● Normal
○ Above Normal
○ Highest
○ Time Critical

Audio Thread
○ Idle
○ Lowest
○ Below Normal
○ Normal
○ Above Normal
● Highest
○ Time Critical

Figure 58: Engine Configuration, Priorities Tab

Normally, this can be left untouched; VSTHost automatically sets the priority to “very high” before loading an ASIO driver and then reverts to the configured setting. This leads to a reasonable behavior in most cases. If the default settings don’t work satisfactorily with your specific configuration, you can play with VSTHost’s settings until you find a solution that works. Be careful, however – setting the process priority to **Realtime** and the thread priority to **Time Critical** can lead to situations where VSTHost consumes all of the computer’s CPU time and doesn’t let anyone else work – the computer freezes. Especially dangerous on slower machines. You’ve been warned – “Don’t press this button!” ☺

Speed



BPM 120

☑ Load from performance

Figure 59: Speed Tab

If you don’t have the main toolbar (see “Toolbar” on page 60 for details) activated, you can define VSTHost’s current BPM rate using this tab. With this, you can define the speed that VSTHost reports to the loaded PlugIns. The **Load from performance** check box duplicates the function of the “Load BPM” menu entry (see below).

Audio Thru

This menu entry can be toggled to define whether VSTHost directly passes its Audio input to the output. If checked, the audio input is not only sent through eventually loaded PlugIns, but also directly to the Wave Output device. In versions before V1.40, this was the default (and only) behavior; now, the default setting is **Off** to prevent audio feedback loops.

Since V1.46, checking this item has the result that VSTHost automatically creates a link between the **{In}** and **{Out}** pseudo-PlugIns. Of course, you can set this by hand as well – this menu item might disappear in the next version, as it's not really necessary any more.

Note: this setting is stored with the current performance, since it depends on the used PlugIns whether it makes sense.

BPM

Selecting this menu entry opens the Speed page of the Engine Configuration window (see “Speed” on page 54 for details).

Load BPM

This menu entry defines whether VSTHost loads the BPM settings from the performance or not. Sometimes, you might want to automatically adjust the speed for a performance’s PlugIns, sometimes this is not needed; you can turn this on and off here.

Recorder

This is a submenu to configure and run VSTHost’s built-in Wave Player and Recorder.

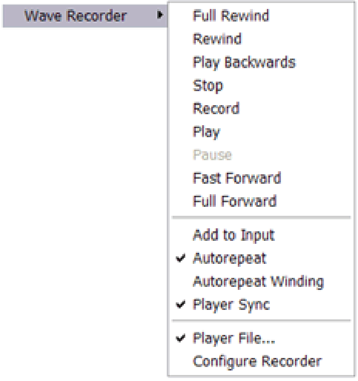


Figure 60: Recorder Submenu

VSTHost contains two separate entities for that: a **Wave Player** and a **Wave Recorder**. The Wave Recorder is inserted into the audio engine just before the sound data are sent to the output device; the Wave Player can be inserted there, too, or in parallel to the audio engine input. The accumulated output can then be recorded by the Wave Recorder, allowing ping-pong style recordings.

The same menu is also available in form of a toolbar, which additionally offers a display of current and total time:

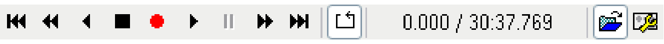


Figure 61: Recorder Toolbar

I admit freely that this is not a very elegant solution, but there are lots of sophisticated sequencer packages on the market. This little one-man spare time project called VSTHost doesn’t, and can’t compete with them in their own arena. If you need nifty audio recording features, VSTHost isn’t the right program. The Wave Recorder and Player are just little additions that allow capturing a jam session, for example, or allow the playback of a prerecorded track while you play some VSTi PlugIns to it, or run a prerecorded track through a (set of) effect(s).

The Wave Player mimics a tape recorder, just like the ones you all might know since early childhood, with some little add-ons – you can, for example, play the loaded file backwards, and you can record and playback at the same time.

Whenever the **Stop** button or menu entry is clicked while recording, VSTHost allows you to determine whether and under which name the recording should be saved.

Some of the menu items, however, do require a little explanation:

Add to Input

This menu entry can be used to toggle the Wave Player's position. If it is checked, a played audio file is played in parallel to the audio engine's *input* so that you can run it through (chains of) loaded effects. If it is unchecked, a played audio file is played in parallel to the accumulated *output* of all loaded PlugIns.

Autorepeat

This menu entry can be used to toggle between normal playback mode, in which the Player stops when it reaches the end of the input file, and auto-repeat mode, where it automatically restarts playback.

Autorepeat Winding

This menu entry can be used to toggle between normal winding mode, in which the Player stops when it reaches the end of the input file, and auto-repeat mode, where it automatically restarts winding.

Player Sync

This menu entry can be used to change the semantics of the Wave Player a bit.

If unchecked, the player is treated as a separate sound generation device, and VSTHost uses a free-running transport information sent to the PlugIns (i.e., it always reports "playback is running", and the current position is incremented).

If checked, however, the Wave Player acts as a simple transport control for the VST engine. If you load a PlugIn that has sequencing capabilities (Phrazor comes to mind, or Jamstix), this can be used to control the Start/Stop/Position information sent to the PlugIn. This functionality also works if no file is loaded into the Wave Player; in this case, it just "plays" silence until Stop is pressed, and **Full Forward** cannot be selected (there's no defined end position).

This is not a very elaborate transport control yet (you can't, for example, set loop positions), but sufficient for basic transport control purposes.

Player File

Here, you can define the file that the Wave Player uses. Most of the transport menu entries / toolbar buttons will be grayed out until a valid Wave file has been loaded. Before V1.43, this was a global setting; now, it is stored with the current performance.

Normally, VSTHost loads only .wav files; you can, however, teach it to load .mp3 files as well. VSTHost can use the mpg123 package for this. You can find it at http://www.mpg123.org.

Since there might be "interesting" licensing problems with the MPEG consortium (not with the libmpg123 creator, as this is licensed under the LGPL, so I *could* embed it without problems) if VSTHost simply included this package, I've decided against doing it. You have to download and install it yourself – this way, there should be no licensing problems.

Here's how to get it, if you haven't installed it already:

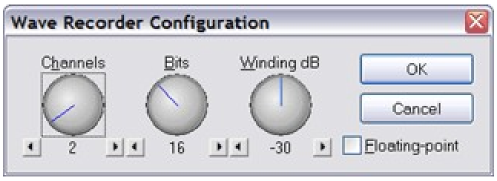
1. You have to download a version from http://www.mpg123.org - on their download page, there's this nice little paragraph:

   > Occasional Win32 binaries
   >
   > Have a look into the download/win32/ directory for zip files with mpg123 builds (with libmpg123 DLL or static, different decoder options). I don't promise to update these too often. You can always download the source code and compile it with MinGW32 in MSYS.

   So, go to the Win32 download directory now. There's a whole range of files of different versions there; when I wrote this paragraph, I used http://www.mpg123.org/download/win32/mpg123-1.9.1-x86.zip. At the time you read this, there might be a better version available; as long as the .zip contains a file called "libmpg123-0.dll", you should be able to use the latest&greatest version.
2. Once you decided on and downloaded a file, all you need to do is to unzip the file libmpg123-0.dll contained in the archive to a position that VSTHost finds in the library search path. I put it into the Windows system directory, but that's not really necessary; the easiest place, if you don't need libmpg123-0.dll in any other product, is the directory where you installed VSTHost.
   Of course, you can unzip the complete package and enjoy the nice little MP3 player application it contains, but... well, you got the Windows Media Player, and/or WinAMP, and/or... still, you can. If you want to look at the license, or add the DLL to your own programs, you find everything you need in the package.
3. Once you installed the libmpg123 package so that VSTHost can find it, and restarted VSTHost if it was running, it should be able to load .mp3 files, too; the dialog should show come up with the file type "Audio Files (*.wav; *.mp3)" now.

Configure Recorder

Selecting this menu item brings up the following dialog:



Wave Recorder Configuration

Channels: 2

Bits: 16

Winding dB: -30

□ Floating-point

Figure 62: Wave Recorder Configuration Dialog

Here, you can define the format of files that are *recorded* by VSTHost. The default setting is rather conservative – 2 channels, 16 bit integer. This format has the big advantage that the generated files are comparatively small and can be read by virtually every wave file editor package in existence. It isn't the best format, however…

Most modern sound cards for musicians can do much better. They can deliver accurate sampling and playback of 24 bit audio streams, on potentially dozens of channels – far more than VSTHost's CD-compatible default format permits.

The **Channels** setting should not exceed the available number of output channels in the VSTHost audio engine – while you can set it to up to 32 channels, most of them would simply contain silence. A rather costly silence, since each little sample of silence occupies at least a byte on your hard disk, more likely two, or even four bytes.

The **Bits** setting is a bit misleading. You can set the number of bits per sample, but internally VSTHost treats them the following way:

- **8** generates 8-bit unsigned samples; like in the old SoundBlaster 1 days ☺

- **9-16** generates 16-bit signed samples
- **17-24** generates 24-bit signed samples
- **25-32** generates 32-bit samples

Floating-point, if selected, overrides the **Bits** setting. In this case, the 32-bit floating point data that are used internally by VSTHost are directly recorded. This provides the most accurate recording that also deals very gracefully with clipping, but produces rather large recordings.

Winding dB is actually a setting for the Wave Player. While rewinding or fast forwarding in the wave file, you can listen to the data currently being under the “virtual head” of this simulated tape recorder. With this setting, you can define the playback level which is used while winding. Setting this to **-60** dB disables the feature, thereby saving some CPU cycles.

MIDI Player

This is a submenu to configure and run VSTHost’s built-in MIDI Player.

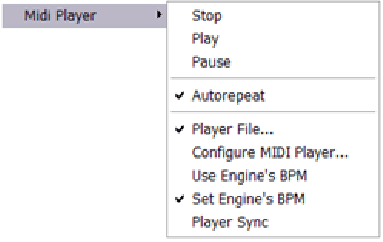


Figure 63: MIDI Player Submenu

Since V1.40, VSTHost contains a MIDI File Player. This relatively simple player allows to load MIDI sequences and to send them to the loaded PlugIns and/or to the opened MIDI Output devices.

The same menu is also available in form of a toolbar, which additionally offers a display of current and total time:

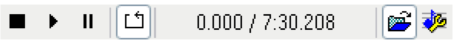


Figure 64: MIDI Player Toolbar

The display is in time format (hh:mm:ss.mmm), just like the Wave Player’s.

I admit freely that this is not a very elegant solution, but there are lots of sophisticated sequencer packages on the market. This little one-man spare time project called VSTHost doesn’t, and can’t compete with them in their own arena. If you need nifty MIDI recording/editing/playback features, VSTHost isn’t the right program.

Note: the MIDI Player built into VSTHost isn’t complete yet; if you try to load MIDI files that contain SMPTE time information or Type 2 files that contain different speed settings for the contained tracks, chances are high that the results are a bit… well, unexpected ☺.

The meaning of the **Stop**, **Play**, and **Pause** menu entries should be clear to anybody. If not, tell me ☺.

Autorepeat

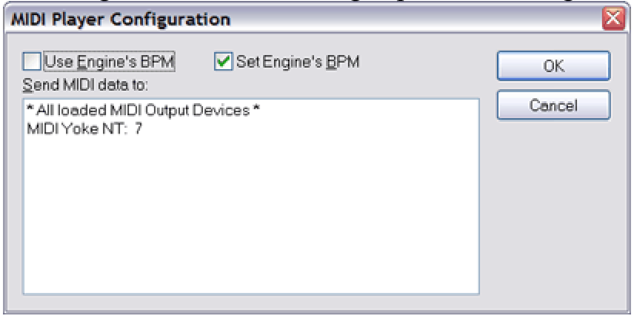
This menu entry can be used to toggle between normal playback mode, in which the Player stops when it reaches the end of the input file, and auto-repeat mode, where it automatically restarts playback.

Player File

Here, you can define the file that the MIDI Player uses. Most of the transport menu entries / toolbar buttons will be grayed out until a valid MIDI file has been loaded. Before V1.43, this was a global setting; now, it is stored with the current performance.

Configure MIDI Player

Selecting this menu item brings up the following dialog:



MIDI Player Configuration

□ Use Engine's BPM ☑ Set Engine's BPM

Send MIDI data to:

* All loaded MIDI Output Devices *
MIDI Yoke NT: 7

Figure 65: MIDI Player Configuration Dialog

Here, you can define various settings. **Use Engine's BPM** and **Set Engine's BPM** correspond to the menu entries described below. **Send MIDI data to:** defines the MIDI devices that the MIDI Player sends to; by default, MIDI data are only passed to interested PlugIns. You can select one of them by simply clicking on it; to select a range, click on the first and then shift-click on the last; to add or remove a specific device, control-click on it.

Use Engine's BPM

If this menu item is checked, VSTHost overrides the BPM settings in the MIDI files with its own that you can define on the main toolbar (see the corresponding field in the toolbar discussion on page 61 for details).

Set Engine's BPM

If this menu item is checked, VSTHost adapts its BPM settings to the ones that are used in the MIDI file. This can be important for PlugIns that, for example, adjust LFO or delay settings to the used BPM rate.

Player Sync

This menu entry defines whether the MIDI Player is treated as a separate entity or controlled with the Wave Player's transport control buttons. Since the MIDI Player in its current incarnation is a bit restricted (you can't, for example. move to a specific position), checking this menu item modifies the transport controls of the Wave Player, too – you can't select things any more that aren't possible for MIDI playback.

Midi Panic

This menu entry is only there for emergencies. When you need it, you need it badly ☺. When selected, VSTHost tries its best to reset all loaded VSTi PlugIns, MIDI-capable effect PlugIns, and all MIDI devices attached to the configured MIDI Output ports to a known state. It turns off all notes on all channels, resets all controllers and pitch wheel information.

Send SysEx File

This menu entry can be used to send a SysEx file (.syx format – the simplest possible format, just a bunch of SysEx messages) to all MIDI devices that have been configured on the SysEx window (see "SysEx" on page 67 for details).

Devices Menu

All entries of this menu have already been discussed in the Configuration section (see "Configuration" on page 9 for details).

View Menu

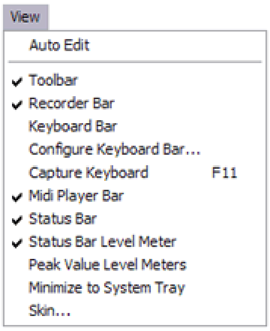


Figure 66: View Menu

This menu can be used to configure VSTHost's general layout.

Auto Edit

This menu entry defines how new PlugIns are treated; when it is checked, and you load a new PlugIn that allows to open an Editor window (see "Toolbar" below), this editor window is opened automatically.

Toolbar

This menu entry toggles the main toolbar display. This is the main toolbar:

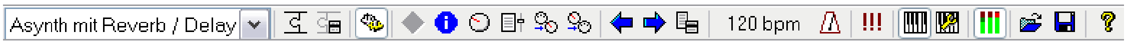


Figure 67: Main Toolbar

First, obviously, there's a combo box that allows direct selection of a VSTHost performance of the current bank. This works just like the **Load Performance** menu entry in the **File** menu (see "Load Performance" on page 26 for details).

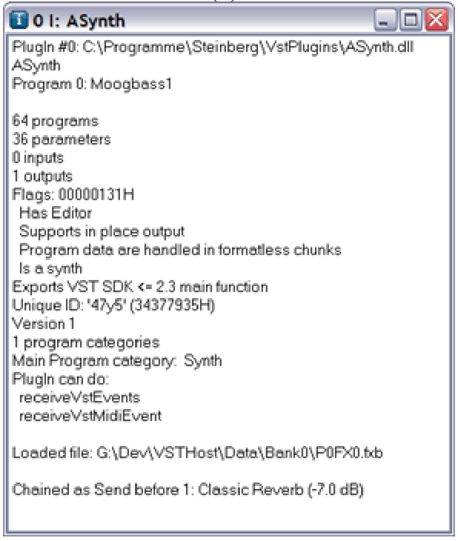
acts like the **New PlugIn** menu entry (see „New PlugIn" on page 28 for details).

This button opens a popup menu with the contents of the **PlugIns** menu entry (see "PlugIns" on page 32 for details) to allow for convenient selection of one of the PlugIns known to VSTHost.

acts like the **Run** menu entry (see „Run" on page 52 for details).

activates the main window of a PlugIn (see "New " on page 28 for details)

Opens or activates the currently selected PlugIn's **Information Window**; this window contains valuable(?) information about the PlugIn and its properties, like this:



```
PlugIn #0: C:\Programme\Steinberg\VstPlugins\ASynth.dll
ASynth
Program 0: Moogbass1

64 programs
36 parameters
0 inputs
1 outputs
Flags: 00000131H
 Has Editor
 Supports in place output
 Program data are handled in formatless chunks
 Is a synth
Exports VST SDK <= 2.3 main function
Unique ID: '47y5' (34377935H)
Version 1
1 program categories
Main Program category: Synth
PlugIn can do:
 receiveVstEvents
 receiveVstMidiEvent

Loaded file: G:\Dev\VSTHost\Data\Bank0\P0FX0.fxb

Chained as Send before 1: Classic Reverb (-7.0 dB)
```

Figure 68: PlugIn Information Window

Opens or activates the currently selected PlugIn's **Editor Window**; this window is provided by the PlugIn for configuration purposes. Since it's provided by the PlugIn, the layout of this window can vary. Greatly. And since the window behavior is controlled by the PlugIn, this can vary greatly, too… anyway, here's an example:

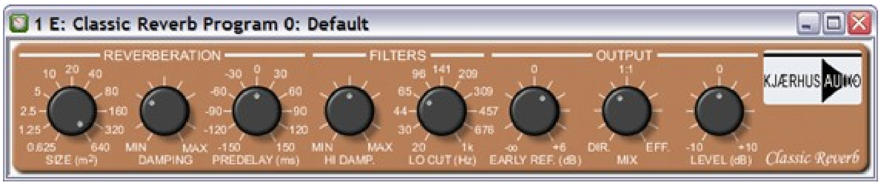
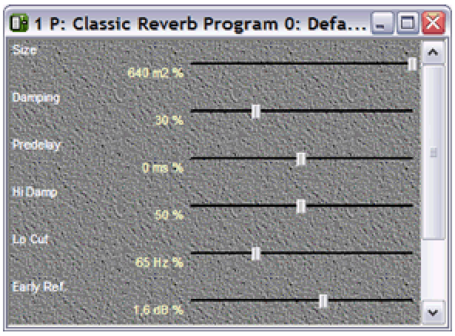


Figure 69: Example PlugIn Editor Window

Opens or activates the currently selected PlugIn's **Parameter Window**; since not all PlugIns provide an Editor window, this can be the only possibility to set the PlugIn's parameters. Some PlugIns can only be configured on the Parameter window; others refuse that completely and only accept input from the Editor window. Anyway, you can open both in VSTHost. Here's an example:


1 P: Classic Reverb Program 0: Defa...

Size
640 m2 %

Damping
30 %

Predelay
0 ms %

Hi Damp
50 %

Lo Cut
65 Hz %

Early Ref.
1,6 dB %

Figure 70: Example PlugIn Parameter Window

The displayed parameters and their values, of course, vary from PlugIn to PlugIn; while the layout is done by VSTHost, the parameters, their value range and display are provided by the PlugIn. If the PlugIn has more than 100 parameters, the window contains a menu at the top that allows to select a parameter range to be displayed.

VSTHost remembers the opened windows and their positions for each PlugIn in the performance.

Opens the PlugIn's **MIDI->Parameter Mapping** window (see "MIDI -> Parameter" on page 40 for details).

Opens the PlugIn's **Parameter->MIDI Mapping** window (see "Parameter -> MIDI" on page 43 for details).

⬅ ➡ These buttons correspond to the **Previous Program** and **Next Program** menu entries (see "Next Program" and "Previous Program" on page 51 for details).

This button opens a popup menu for the current PlugIn that allows selection of a specific program. It corresponds to the **Program mm-nn** menu entries in the **PlugIn** menu, but is displayed over the active PlugIn's currently selected window.

120 bpm This field shows the currently defined speed. The default used by VSTHost is 120 BPM. This value is reported to all loaded PlugIns. Clicking on the speed allows you to directly enter a new BPM value, or modify the current using the mouse wheel.

This button, in case you didn't find that out by yourself, resembles a metronome. It opens the Speed Setup dialog (see "BPM" on page 55 for details).

!!! This button corresponds to the **Midi Panic** menu entry (see "Midi Panic" on page 59 for details).

This button shows or hides VSTHost's **Keyboard Bar**. See "Keyboard Bar" below for details.

This button is used to configure the Keyboard Bar. See "Configure Keyboard Bar" on page 63 for details.

This button opens the **Master** window. See “Master” on page 66 for details.

This button is used to load a program bank into the currently selected PlugIn. See “Load Bank” on page 46 for details.

This button is used to save the current program bank of the currently selected PlugIn to disk. See “Save Bank” on page 46 for details.

The most important button of them all. See “About VSTHost” on page 69 for details.

Recorder Bar

Selecting this menu item hides or shows the Recorder toolbar display. The Recorder toolbar has already been discussed (see “Recorder” on page 55 for details).

Keyboard Bar

Selecting this menu item hides or shows the Keyboard bar. The Keyboard bar, when opened for the first time, looks like this:

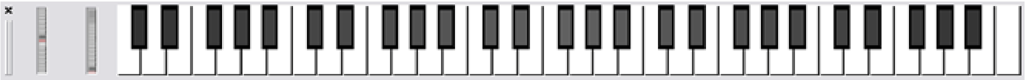


Figure 71: Keyboard Bar

It comes up with a Pitch Wheel, a Mod Wheel, and a keyboard with 61 keys, covering the bottom area of VSTHost’s main window. This bar can be configured to a very high degree (see “Configure Keyboard Bar” below for details), and you can grab it with the mouse and fix it on top of the window area or on the bottom (default), or anywhere else on the screen if you want to. VSTHost remembers the position.

The Keyboard bar can be used as a “poor man’s MIDI keyboard”; you can enter MIDI messages by mouse or (computer) keyboard with it. You can configure for each PlugIn whether it reacts on messages from the Keyboard Bar (see “MIDI Input Devices” on page 35 for details).

The following keys on the PC keyboard can be used to trigger MIDI Notes, if the Keyboard Bar is active (i.e., activated by clicking on it with the mouse):

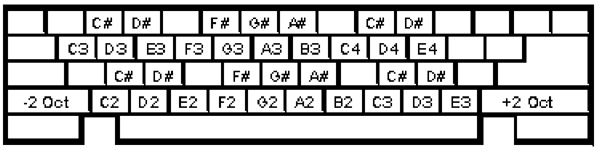

C# D# F# G# A# C# D#
C3 D3 E3 F3 G3 A3 B3 C4 D4 E4
C# D# F# G# A# C# D#
-2 Oct C2 D2 E2 F2 G2 A2 B2 C3 D3 E3 +2 Oct

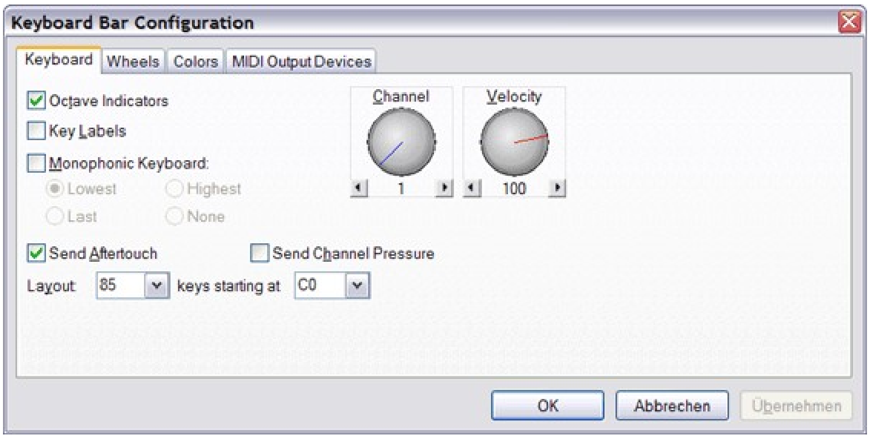
Figure 72: PC keyboard keys used for MIDI Note generation

In addition, the following keys can be used:

Left shift, Right shift	transposes the PC keyboard's range two octaves down/up
Ins, Del	increment/decrement pitch wheel data
Home, End	increment/decrement modulation wheel
PgUp, PgDn	increment/decrement key velocity
Left, Right	decrement/increment upper keyboard octave
Down, Up	decrement/increment lower keyboard octave

Configure Keyboard Bar

Selecting this menu entry opens the following dialog:



Keyboard Bar Configuration

☑ Octave Indicators
☐ Key Labels
☐ Monophonic Keyboard:
● Lowest ○ Highest
○ Last ○ None

Channel 1
Velocity 100

☑ Send Aftertouch ☐ Send Channel Pressure

Layout 85 keys starting at C0

Figure 73: Keyboard Bar Configuration Dialog, Keyboard Tab

Huh. Yet another of these tabbed configuration dialogs. Isn't it depressing to see how many options there are in such a simple program? ☺

Anyway, this is the **Keyboard** tab where you can define the general layout of the Keyboard Bar.

Octave Indicators

If this item is checked, the Keyboard Bar shows 2 **octave indicators** below the keyboard. These are two (normally gray) bars that indicate the keys that can be played on your PC's keyboard. You can drag these bars around with the mouse to change the octaves used by the upper and lower key range on your PC keyboard (see "Keyboard Bar" above for the usable keys).

Key Labels

Gimmick for people who don't use keyboards very often. You can display the note names on the keys.

Monophonic Keyboard

This check box can be used to switch between polyphonic and monophonic keyboard mode.

In monophonic keyboard mode, every pressed key terminates the previous note. The radio buttons govern what happens when the current note is released, and there are still other notes held:

Lowest	the lowest currently pressed key determines the current note
Highest	the highest currently pressed key determines the current note
Last	the last note pressed before the terminated note determines the current note
None	still pressed keys are ignored

Channel

This knob defines the MIDI channel used for MIDI messages generated by the Keyboard Bar.

Velocity

This knob defines the velocity used if you trigger notes with the PC keyboard, which cannot send velocity information (unfortunately… I'd *love* a keyboard where the attack can be used to define whether a character is printed **bold** in a word processor, or where the pressure defines the autorepeat rate, or… ☺). The velocity can be redefined by adding a **Velocity Wheel** to the keyboard, or by the PgUp/PgDn keys.

Send Aftertouch

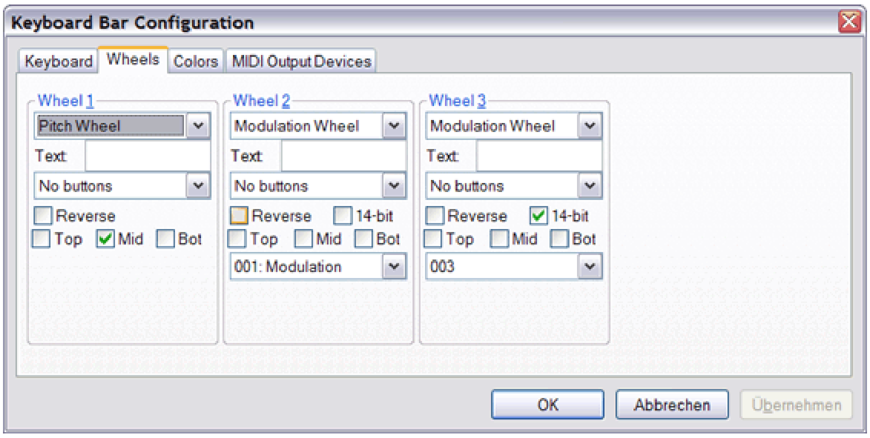
This check box can be used to activate the sending of (Polyphonic) Key Aftertouch MIDI messages if you slide the mouse up and down a key while keeping one of the mouse buttons pressed. Note that not all PlugIns will be able to react on Key Aftertouch, since devices that offer it are relatively rare.

Send Channel Pressure

This check box can be used to activate the sending of Channel Pressure MIDI messages if you slide the mouse up and down a key while keeping one of the mouse buttons pressed.

Layout

Here, you can define how many keys starting at which key are displayed on the Keyboard Bar. If the predefined values in the combo boxes don't suit your needs, you can enter any reasonable value you like.



Wheel 1: Pitch Wheel; Text: ; No buttons; □ Reverse; □ Top ☑ Mid □ Bot

Wheel 2: Modulation Wheel; Text: ; No buttons; □ Reverse □ 14-bit; □ Top □ Mid □ Bot; 001: Modulation

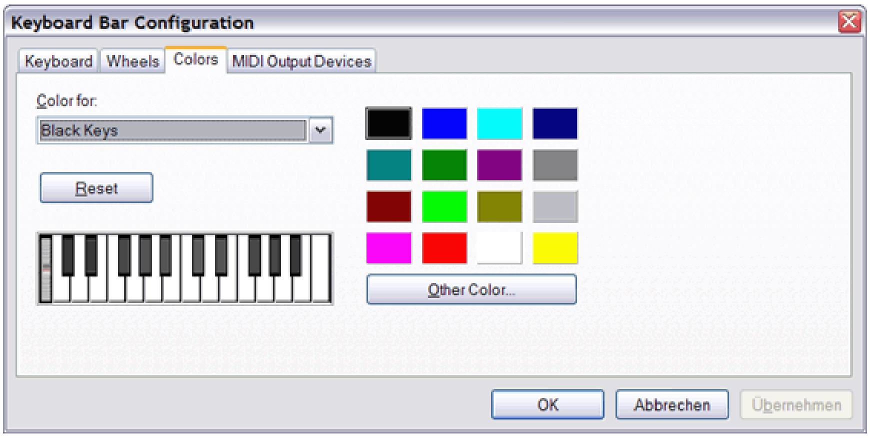
Wheel 3: Modulation Wheel; Text: ; No buttons; □ Reverse ☑ 14-bit; □ Top □ Mid □ Bot; 003

Figure 74: Keyboard Bar Configuration Dialog, Wheels Tab

On this tab, the wheels shown by the Keyboard Bar can be configured. There are three types of wheels:

Pitch Wheel	Can be used to send Pitch Wheel MIDI messages. Auto-centers when the wheel is released.
Modulation Wheel	Can be used to send a configured Continuous Controller MIDI message. By default, this is set to send **Mod Wheel** data (CC#1), but it can set to any other CC# you like (or need).
Velocity Wheel	Can be used to increase or decrease the velocity for MIDI messages generated with the PC keyboard.

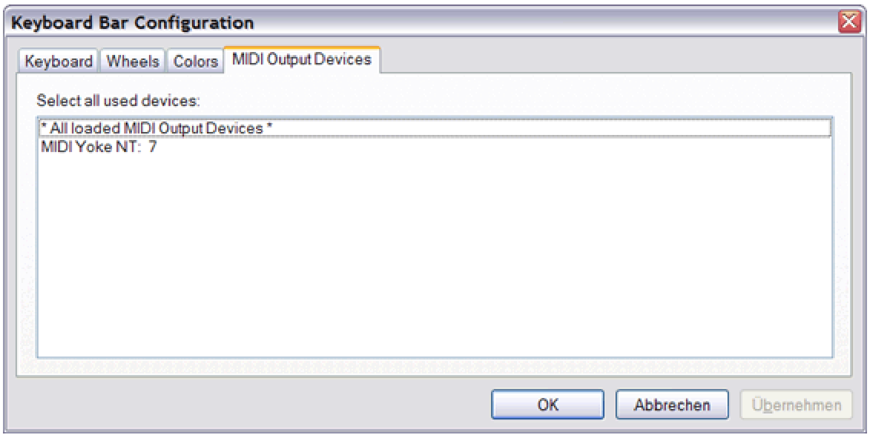
You can set quite a lot of options for these wheels; have fun experimenting!



Color for: Black Keys

Figure 75: Keyboard Bar Configuration Dialog, Colors Tab

Here, you can redefine the color of the black and white keys, and the background color of the wheel area, to any color scheme you like. Again, have fun experimenting!



Select all used devices:

* All loaded MIDI Output Devices *
MIDI Yoke NT: 7

Figure 76: Keyboard Bar Configuration Dialog, MIDI Output Devices Tab

Normally, the Keyboard Bar is used to send MIDI messages to the loaded PlugIns. It can, however, be used to send MIDI messages to attached MIDI devices that are connected to one of the configured MIDI Output ports, too. Here, you can define these.

Capture Keyboard

This menu entry can be used to switch VSTHost's Keyboard Capturing Mode. "Keyboard", in this case, is the alphanumeric input device with the 101 or more little buttons attached to the computer, not a musical device. When this item is checked, VSTHost sends all keys that are pressed or released to the Keyboard bar (see "Keyboard Bar" on page 62 for details), if they trigger an action there. If it is not checked, the Keyboard bar only receives any keyboard activity when it has the input focus. This allows you to play with a PlugIn's settings on its editor window and still be able to play some notes with the computer keyboard.

Note: this also works if the Keyboard bar is currently hidden.

Attention: activating this can have unintended side effects; the keys are passed to the keyboard bar regardless of the state that VSTHost is in – even if, for example, a file save dialog is open and you want to enter a file name there. It would be a good idea to disable keyboard capturing before such operations.

MIDI Player Bar

Selecting this menu item hides or shows the MIDI Player toolbar display. The MIDI Player toolbar has already been discussed (see "MIDI Player" on page 58 for details).

Status Bar

This menu entry can be used to toggle the Status Bar on the bottom of VSTHost's main window on or off.

Status Bar Level Meter

The status bar can be used to show a little level meter, if you don't use the **Master** window for that (see "Master" below). Since this can be a bit irritating, it can be turned on or off with this menu entry.

Peak Value Level Meters

This setting configures how the level meters on status bar, the Master window, and the main windows of the loaded effects work. If this setting is not checked, they display the level in RMS format. This is the default since V1.38, since it uses less CPU cycles. When checked, the peak level (i.e., the level of the loudest sample in the buffers running through the engine) is displayed.

Minimize to System Tray

Normally, when the VSTHost main window is minimized, it appears in the task bar, just like a normal application. If this menu item is checked, however, it is minimized into the *system tray* of the task bar, leaving only a little icon visible. Double-clicking this icon restores the VSTHost main window; right-clicking it brings up a popup menu, which contains the normal VSTHost menu entries, plus a "Restore" item, which does the same as double-clicking the icon.

This feature just saves some space on the task bar; I've been asked for it, and had the code at hand, so I added it... decide for yourself whether it makes sense.

Skin

Since V1.44, the GUI of VSTHost can be radically changed. This has been called "skinning" in the IT world for quite some time now, so I've adopted the (slightly rubbish IMO) term. Here, you can select a "Skin file" (which is just a special .INI file) which holds all entries that define the current "look" of VSTHost. Included in VSTHost.zip, you should find a sample skin definition in the subdirectory Data\DefaultSkin. The Skin.ini in this directory contains a complete description of all parameters that can be modified.

After having selected a new skin for VSTHost, you have to close the application to put it into effect; while new windows opened in VSTHost will already show the new skin, pre-existing windows and the background won't.

Vera Kinter has created some skins (see http://www.artvera-music.com for some more fine examples of her creativity); these can be found on VSTHost's web site (see page 2 for this).

Window Menu

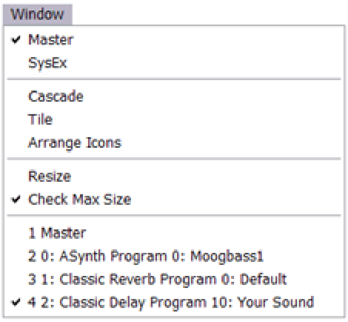

Window
✓ Master
SysEx
Cascade
Tile
Arrange Icons
Resize
✓ Check Max Size
1 Master
2 0: ASynth Program 0: Moogbass1
3 1: Classic Reverb Program 0: Default
✓ 4 2: Classic Delay Program 10: Your Sound

Figure 77: Window Menu

The contents of this menu vary with the number of loaded PlugIns and their various opened windows. The first two menu entries, however, are always there:

Master

Selecting this menu entry opens or activates the **Master** window:

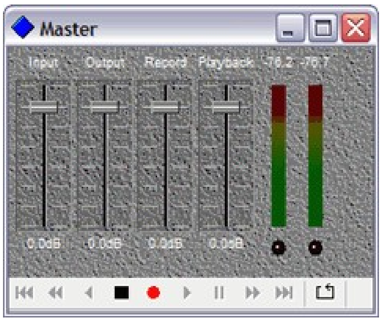


Figure 78: Master Window

The number of level meters on the right varies with the Wave Output device (and/or ASIO Channel selection); there is one meter for each available audio channel. The faders on the left side are always there. Each level meter has a little text display above it that shows the maximum output level sent to this channel; clicking on one of these texts resets them all.

The **Input** fader can be used to set the overall input level of VSTHost's audio engine.
The **Output** fader can be used to set the overall output level of VSTHost's audio engine.
The **Record** fader can be used to set the recording level of the Wave Recorder.
The **Play** fader can be used to set the Wave Player's level. This is independent of the setting of the Master fader.

On the bottom, the Master window has a copy of the Recorder Toolbar for convenient tape recorder operation; if you prefer the Master window, you can hide the Recorder Toolbar and vice versa.

SysEx

Selecting this menu entry opens or activates the **SysEx** window:

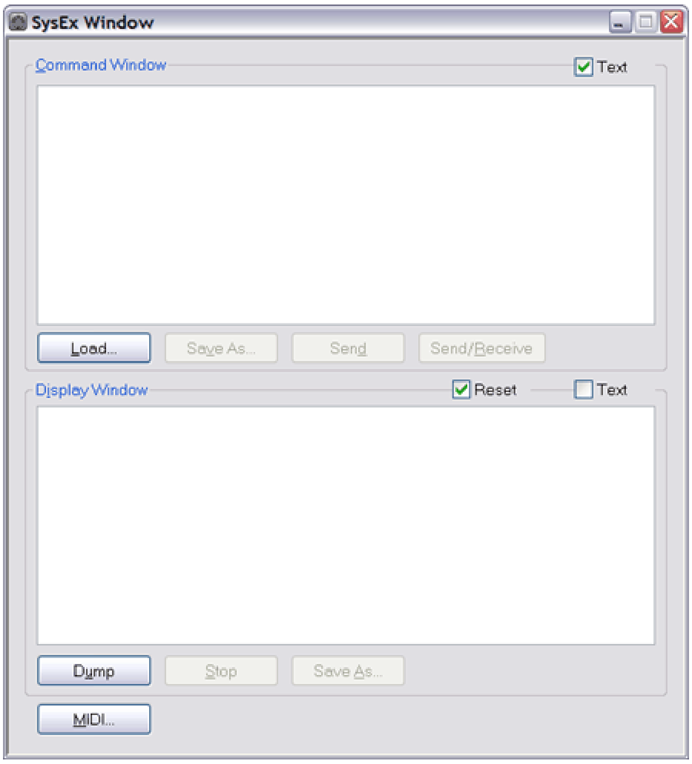


Figure 79: SysEx Window

Here, you can load and/or save SysEx files in .syx format. This is a very simple file format, also used by Midi-OX, for example; it's just a set of SysEx messages without any protocol overhead.

There are two important windows here: the *Command Window* and the *Display Window*. Both accept and display data in hexadecimal format, and, if the **Text** box is checked, in text format, too. You can use the Tab and Backtab keys to switch between the two areas, if necessary.

The ***Command Window*** contains SysEx messages (and other interspersed MIDI messages – VSTHost is agnostic when it comes to sending messages from this window ☺) to be sent to the configured MIDI devices. Pressing the **Load** button opens a file selection window where you can select a file to be loaded (surprise, surprise…). The contents of this file are taken 1:1; VSTHost doesn't check the contents, neither when loading it, nor when sending the data. You can use this to send out complete garbage; be warned.

As soon as data have been entered or loaded from a file, the other buttons are activated. **Save As**... well, I'll let you find out what it does ☺. **Send** sends out the contents of the Command Window, but doesn't check for any responses from the MIDI devices; **Send/Receive** sends them, too, but also turns on reception of SysEx messages into the Display Window.

The ***Display Window*** contains messages received from the MIDI devices. Only SysEx messages are processed; this works the same way as in Midi-OX (the whole SysEx window is modeled after the Midi-OX SysEx window, just differing in details), and Jamie and Jerry know their stuff pretty well, so I used the same logic.

Reception of MIDI data into the Display Window can be started in two ways. The first way, using the **Send/Receive** button, has already been discussed above. The second way would be to press the **Dump** button. This is useful if a MIDI device can only send manual dumps, triggered on the device itself. In both cases, VSTHost starts to write incoming SysEx messages into the Display Window. If the **Reset** box is checked, the previous contents of the window are cleared when reception starts; if not, they are kept and new messages are simply appended.

As soon as reception starts, the **Stop** button is activated and a text field appears that informs you how many bytes of SysEx data have currently been received into the Display Window. Pressing the **Stop** button terminates SysEx reception – VSTHost doesn't know or care about the incoming MIDI messages' format, since this is completely generic, so it can't determine from the incoming data when the transmission has been completed. I could, of course, add a timeout, following the logic: "If nothing happened for 10 seconds, it looks like the transmission is over", but that's a bit unreliable; the whole procedure needs manual operation, so having to press the Stop button is OK in my opinion.

Save As... does the same as on the Command Window, just for the Display Window's contents.

Pressing the **MIDI…** button opens a dialog where you can select the MIDI devices that VSTHost sends to and receives SysEx from; this is also used for files sent directly using the **Send SysEx File** menu command (see "Send SysEx File" on page 59 for details).

Help Menu

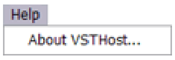
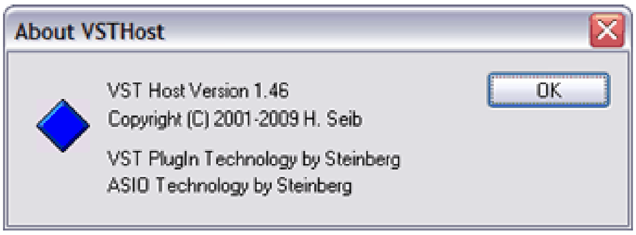


Figure 80: Help Menu in its entire glory

This menu is not extremely helpful at all; as this is a spare time project, I haven't found the time yet to create a help file (don't ask how long it took to write this *manual*!), so it contains only one entry:

About VSTHost

Selecting this menu entry opens the most important dialog of the whole program, the thing you've all been waiting for:



About VSTHost

VST Host Version 1.46
Copyright (C) 2001-2009 H. Seib

VST PlugIn Technology by Steinberg
ASIO Technology by Steinberg

Figure 81: the equally glorious About dialog

… and with this extremely important information I'll end this document.

Have fun using VSTHost!

Hermann Seib
Vienna, October 14th, 2009