

IGNITE AMPS

engineering for the moshpit

SHB-1

AUDIO PLUG-IN

USER MANUAL

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Introduction

The SHB-1 is a digital emulation of a tube amplifier for bass. It has been developed to accurately model its real hardware counterpart, built for Subhuman bassist Federico Fulceri by Ignite Amps, in 2012.

From well fat and round tones for blues, to very tight and focused funky sounds, up to all out distorted, jackhammer-like poundings for modern metal, paired with the proper cab, the SHB-1 can cover them all and then some.

Every single component on the signal path of the real analog circuit has been taken into account and modeled in the best possible way to match the original sound, keeping an eye to CPU performances and real-time playability at the same time.

The SHB-1 is meant to be used as a bass amplifier for live playing and jamming, tracking or mixing inside hosts capable of VST or AU Plug-Ins support.

Minimum System requirements

Windows:

Windows XP/Vista/Windows 7 (32/64 bit)
Intel Pentium 4 or AMD Athlon XP

Mac:

OSX 10.5
Intel processor with SSE2 instructions support

Installation

Windows VST:

Copy the **SHB-1.dll** file into your VST Plug-Ins folder (e.g. C:\Program Files\Steinberg\VSTPlugins)

Mac OSX VST:

Copy the **SHB-1.vst** bundle at the path: /Library/Audio/Plug-Ins/VST/

Mac OSX AU:

Copy the **SHB-1.component** bundle at the path: /Library/Audio/Plug-Ins/Components/

For Windows VST format, we provide separate x86 (32 bit) and x64 (64 bit) binaries, so make sure to choose the right one according to your operative system and plug-in host specifications.

Keep in mind that x64 binaries will not run on 32 bit environments, while x86 binaries will most likely run on 64 bit environments, although we do not recommend such usage, for performance and stability reasons.

Mac plug-ins (VST/AU) are compiled in Universal Binary format, containing both 32 bit and 64 bit code in the same bundle, which means that you don't need to care about choosing x86 or x64 version, as the system will choose the appropriate version automatically.

After installing the plug-ins, you should (re)start your favourite VST/AU host, making sure it re-scans your Plug-Ins folder(s) to recognize SHB-1 as a new "Effect" Plug-In (please note that some hosts may not re-scan the plug-in folder automatically at every start-up, so you may need to do it manually. Refer to your host's manual for instructions).

If everything has gone right, you should now see the SHB-1 entry into the "Effect" Plug-Ins list of your host.

You're now ready to rock!

Main Features

- Dynamic 12AX7 / ECC83 coupled triode stages analog modeling
- Mono / Stereo processing support
- Selectable oversampling rate (up to 8x)
- Global input / output level controls
- Double precision (64 bit) floating point mathematical model
- Fully automatable controls
- Zero latency

SHB-1 Circuit Diagram

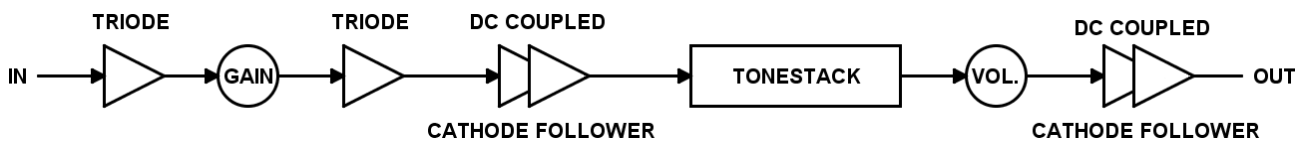


Fig. 1 - SHB-1 Circuit Diagram

Graphic User Interface



Fig. 2 – SHB-1 Front Panel



Fig. 3 – SHB-1 Back Panel

As you can see from the screenshots ([fig.2](#) and [fig.3](#)), we've decided to make SHB-1 as similar as possible to the real hardware, in order to make the user experience easier, giving the chance to tweak the controls of the plug-in like one would do when having the real rack amplifier in front of him. The GUI is divided in two main sections: front panel and rear panel, freely switchable using the double arrow button placed at the right side of the interface.

Front Panel Controls

In the front panel of SHB-1 you'll find the following controls:

Gain: controls the amount of gain / saturation of your sound. At lower values, it influences the overall perceived output volume, at higher values it controls mostly the amount of distortion.

Bass / Mid / Treble: no need to explain much about these controls, but it is worth noting that, like in real amplifiers, every control influences the tonal response of the others involved on the circuit.

Balance: controls the voicing of the amplifier. This is one of the most effective controls of the whole amp, so take your time to experiment with it to find your tone. The “zero” position leaves the equalization circuit unaffected. Turning the knob clockwise will progressively tighten the sound and accentuate the high frequency content of the signal.

Volume: controls the output amount of the preamp signal. It is really important to check the circuit diagram of SHB-1 ([fig.1](#)) to understand that it is not the last element of the signal path, since there is another gain stage right after it. This means that this control doesn't just affect the output volume, but also the amount of signal driving the last stage of the circuit. Therefore, when cranked up to higher values, it may overdrive it, giving more saturation and compression if needed. It also influences the tonestack controls response to a small degree, like in real tube amplifiers

Deep: controls the amount of low frequencies (under about 200Hz), making the sound punchier and more powerful on the lower register, when active. It is worth noting that it acts early in the signal path, so it also influences the saturation of the lowest frequencies.

Bright: controls the amount of picking/plucking attack, making the sound brighter or darker/softer depending on your needs. It acts after the first gain stage, so it strongly influences the saturation behaviour adding even and odd order harmonics to enrich the sound and feel.

Shape: this switch changes the tonestack response on the mid frequencies. When switched on (lever up) the high-mids will be more present, letting the bass cut better through the mix. When switched off (lever down), it will give a scoop on the mids, resulting in a smoother tone, with a softer attack.

Rear Panel Controls

In the SHB-1 rear panel you'll find controls to manage the plug-in to suit your system and bass guitar at best:

Oversampling: lets you choose the internal processing sample rate of the plug-in. The available options are 2x, 4x or 8x. This means that if your host is set up to process at 44100Hz sample rate, by selecting 4x oversampling, for example, SHB-1 will process your signal at $44100 \times 4 = 176400$ samples per second. Oversampling is needed to avoid digital artifacts (aliasing) and improve the accuracy and musicality of the plug-in.

Obviously, the higher the oversampling, the higher the CPU usage.

In our experience and tests, we've found 4x oversampling to be the best compromise for accurate processing and good performance, but we've decided to add other two options to help users with slower machines to run the plug-in without CPU overloading (2x) or run the plug-in at its full potential when having a powerful system available (8x).

Keep in mind that the sound difference between these three modes is not going to be night and day, so, for mixing purpose, you will hardly need to rework the mix settings when switching between different oversampling values. A good practice would be to run the plug-in at 4x or 2x during mixing and switch it to 8x right before rendering your project. This will avoid CPU usage problems when using multiple plug-ins in mixing phase and still give you full processing quality once your tracks are exported.

Input level: it is a simple control to adjust the amount of bass guitar signal going through the virtual circuit. It is really important not to underestimate this control, since it is the key to have the SHB-1

reacting correctly to your instrument and playing. In fact, we can safely say that this is the most important control to get the best out of the SHB-1.

What's the correct way to use it, then? Let's start from your bass guitar signal: as you know, when you play, the pickup output going to your sound-card input will be transformed to a digital signal by the AD converter of your audio interface. The first thing you should keep in mind, is that the converter has a maximum headroom that should never be exceeded. If your signal goes over this maximum threshold, it will be clipped. A clipped signal means less dynamics and the introduction of digital distortion.

So, the first thing you need to make sure of, is to never clip the AD converter (if you are clipping it, the clipping led indicator featured in most audio interface will light on, warning you that your input signal is too hot, so you need to lower the preamplifier control until the problem disappears).

On the other hand, an important thing to keep in mind, is that the higher the input signal (within the above mentioned headroom limit), the more accurate the AD conversion will be, keeping also the signal-to-noise ratio at the higher possible value. This means that, in order to get the best out of your sound-card, you need to keep the input signal as high as possible right before reaching the clipping threshold.

Ok, cool story, but when does the input level control comes into play? Once your signal is converted to digital, it will be represented as a series of numbers that you can see as voltage values. These voltages can have a maximum and minimum value of 1.0 and -1.0 respectively. Supposing your input signal is peaking at its higher possible value right before the clipping threshold of the converter, it will be represented as 1.0 inside your host and the SHB-1 will react to it like if you're sending a 1.0V signal to its input stage.

Why is it so important to know these details? Because if your bass pickup has a maximum output voltage higher than 1V (or 2V peak-to-peak), like many modern active pickups have, you'll need to adjust the input signal that's being sent to SHB-1. That's where the Input Level control comes into play. You need to tweak it to compensate the voltage scaling/normalization made by your AD converter.

At half position (default), the Input Level control multiplies your signal by a 1.5 factor, which means 1.5V maximum pickup output (or 3V peak-to-peak), a standard value for most active bass pickups.

Every tick you see around the Input Level control, represents a variation of 0.3 on the gain factor. For example, if your pickup has a maximum output of 2.1V (so 4.2V peak-to-peak), you'll need to set the knob pointer at the 2nd tick moving it to the right. By doing this, your input will be multiplied by 2.1 ($1.5 + 0.3 + 0.3 = 2.1$), so the SHB-1 will not be fed with a 1.0V maximum signal, instead it'll get a $1.0V \times 2.1 = 2.1V$ maximum signal, which is the correct value to match your pickup specifications.

If you are using a low output pickup, instead, and its maximum output value is, let's say, 0.9V, you'll need to lower the input level by setting the knob pointer to the 2nd tick to the left. This will make the SHB-1 react like the input signal is 0.9V, or $1V \times 0.9$ ($1.5 - 0.3 - 0.3 = 0.9$).

Remember that the sound-card input level is meant to be always set so that you use the full AD converter headroom. Signal level adjustments, to pair SHB-1 with your bass pickups, need to be made after the AD conversion, using the Input Level control.

Please note that these concepts applies only when the SHB-1 is the first plug-in of your virtual bass guitar chain. If you are using another digital effect before SHB-1, we suggest you to keep the input level control at half (default).

Tips for “digital” guitarists and bassists

- Always use the high impedance (Hi-Z) input of your sound-card (when available). This will ensure less noise and signal loss. Most real (pre)amplifiers and stomp boxes, have an input impedance of at least 1MegaOhm, so it would be a good idea to get a sound-card with at least 1MegaOhm input impedance to use the Ignite Amps simulators at their best.
- As mentioned above, make always sure to have the highest input signal before the AD conversion, avoiding clipping.
- Amp sims and stomp box simulators are not noisy, they do not add noise. In fact, they're a lot less noisy than real hardwares. If you have noise issues, check your guitar/bass electronic circuit, cables and sound-card settings.
- In almost all cases, amp sims and stomp box simulators don't introduce latency. The SHB-1 doesn't introduce latency. If you're experiencing latency issues, check your sound-card settings (specifically the Input Buffer Size).

Acknowledgments

Ignite Amps would really like to thank Federico Fulceri ([Facebook](#), [Twitter](#)) of [Subhuman](#) for believing in Ignite Amps and letting us build the SHB-1 Extreme Bass Head according to his tastes.
Thanks to all the musicians interested in the Ignite Amps project, trusting us into taking care of their sound.
You know who you are.

Thanks to You too, for downloading and trying SHB-1 and for reading the f***ing manual! :-)

Sincerely
The Ignite Amps Crew

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