

IGNITE AMPS

engineering for the moshpit

THE ANVIL

AUDIO PLUG-IN

USER MANUAL

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Introduction

The Anvil is a digital emulation of a three channels tube preamplifier for guitar. It has been developed to accurately model its real hardware counterpart, designed by Andy Zeugs.

The Anvil has three completely independent channels, with different signal paths and separate tonestack controls, to maximize its versatility.

The Clean channel is inspired by the classic Californian circuits and provides crystal clear tones even at high gain settings.

The Rhythm channel has a hot-rodded British character, varying from mild crunch to hi-gain distortion.

The Lead channel provides super-tight metal tones, retaining accuracy and responsiveness even at very high gain settings.

Every single component on the signal path of the real analog circuit has been took 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 Anvil is meant to be used as a guitar preamplifier 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 bit)
Intel Pentium 4 or AMD Athlon XP

Mac:

OSX 10.5
Intel processor with SSE2 instructions support

Installation

To install The Anvil Plug-In, just follow the instructions below, according to the platform and plug-in format you want to use.

Windows VST:

Copy the file **Anvil.dll** into your VST Plug-Ins folder.
(for example C:\Program Files\Steinberg\VSTPlugins)

Mac OSX VST:

Copy the bundle **Anvil.vst** into the path: /Library/Audio/Plug-Ins/VST/

Mac OSX AU:

Copy the bundle **Anvil.component** into 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.

We strongly advice the Windows user against putting both x86 and x64 versions in the host VST folder(s), as it may cause one of the versions to not be recognized as a plug-in.

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

After that, you should (re)start your favourite VST/AU host, making sure it re-scans your Plug-Ins folder(s) to recognize The Anvil 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 is right, you should now see The Anvil entry into the "Effect" Plug-Ins list of your host.

Main Features

- Dynamic 12AX7 / ECC83 coupled triode stages analog modeling
- Three channels: clean, rhythm and lead, each with fully separated controls
- 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

The Anvil Circuit Diagram

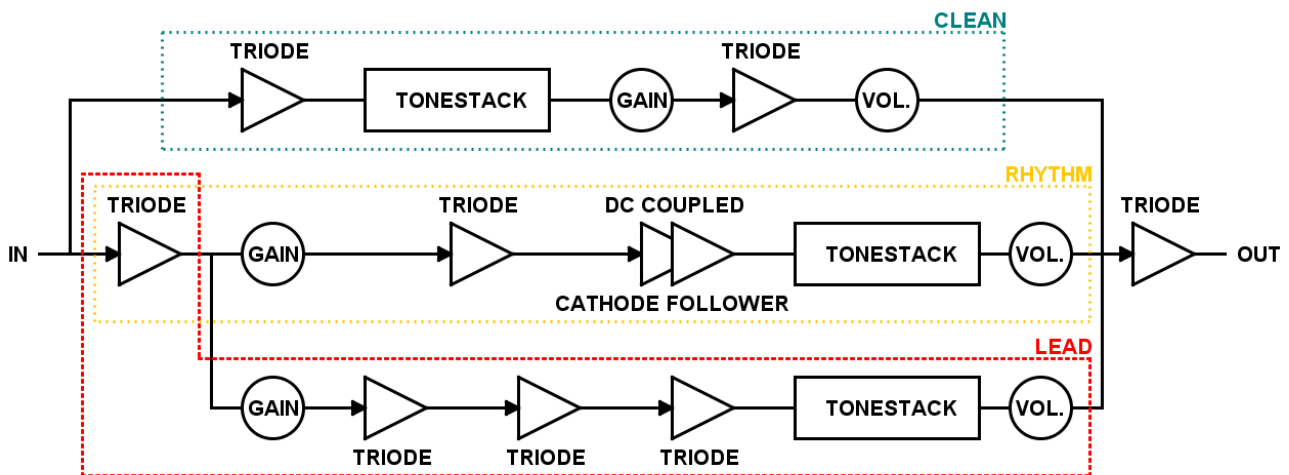


Fig. 1 - The Anvil Circuit Diagram

Graphic User Interface



Fig. 2 – The Anvil Front Panel

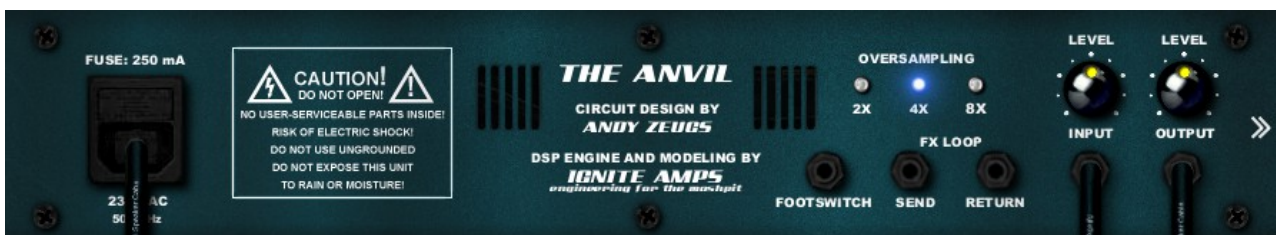


Fig. 3 – The Anvil Rear Panel

As you can see from the screenshots ([fig.2](#) and [fig.3](#)), we decided to make The Anvil 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 preamplifier 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 The Anvil you'll find all the controls you're used to see in every classic guitar (pre)amplifier:

Channel Leds: lets you choose the channel you want to use. Just click on the channel led to switch to that channel.

Gain: controls the amount of gain / saturation of your sound. In Clean mode, it influences the overall perceived output volume more than in Rhythm and Lead mode, where 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.

Volume: controls the output of the single channels. It is really important to check the circuit diagram of The Anvil ([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 it doesn't control just the output volume, but also the amount of signal driving the last stage of the circuit. Therefore, when cranked up to high values, it may overdrive it, giving more saturation and compression when needed. It also influences the tonestack controls response to a small degree.

Other controls for single channels

Clean channel

Bright: controls the amount of picking attack, making the sound brighter or darker/softer depending on your needs.

Rhythm channel

Bright: as in the clean channel, it controls the amount of picking attack, making the sound brighter or darker / softer depending on your needs. The bright switch may help you to saturate the upper register of your tone, adding even and odd harmonics to enrich the sound and feel.

Lead channel

Bright: it controls the attack and picking response of the Lead channel and it can be really useful to increase the attack and definition of the tone. In this channel only, the bright control effect is dependent on the gain control setting. If you set the gain at max, the bright capacitor will be bypassed, so, switching it on and off won't make any difference to the final sound.

It's worth noting that in most of the modern hi-gain amplifiers, this control is always active and not switchable. Switching it off (default) will result in a more balanced tone for the full gain control excursion with a mellower attack.

Shape: this switch changes the saturation behaviour of the Lead channel. When switched on (lever up) the overall gain will increase and the high-frequency roll off will be reduced, making the distortion more aggressive and saturated.

Presence: this control changes the response of the higher frequencies on the Lead channel. In most hi-gain amplifiers, presence controls are filters acting in the feedback loop between the power amp and the phase inverter stage. In The Anvil instead, the Presence control acts as an additional tonestack control, passive and not feedbacked.

Rear Panel Controls

In The Anvil rear panel you'll find controls to manage the plug-in to suit your system and 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, The Anvil 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 at disposal (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 guitar signal going through the virtual circuit. It is really important not to underestimate this control, since it is the key to have The Anvil reacting correctly to your guitar and playing. In fact, we can safely say that this is the most important control to get the best out of The Anvil.

What's the correct way to use it, then? Let's start from your 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 Anvil 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 guitar 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 The Anvil. 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.

Every tick you see under the Input Level slider, represents a variation of 0.25. For example, if your pickup has a maximum output of 1.5V (so 3V peak-to-peak), you'll need to set the slider at the 2nd tick moving it to the right. By doing this, your input will be multiplied by 1.5 ($1 + 0.25 + 0.25 = 1.5$), so The Anvil will not be fed with a 1.0V maximum signal, instead, it'll get a $1.0V \times 1.5 = 1.5V$ maximum signal, which is the correct value to match your pickup specifications.

If you are using a single coil, instead, and its maximum output value is, let's say, 0.5V, you'll need to lower the input level by moving the slider to the second tick to the left. This will make The Anvil react like the input signal is 0.5V, or $1V \times 0.5$ ($1 - 0.25 - 0.25 = 0.5$).

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 The Anvil with your guitar pickups, need to be

made after the AD conversion, using the Input Level control.

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

Tips for “digital” guitarists

- Always use the high impedance (Hi-Z) input of your sound-card (when featured). This will ensure less noise and signal loss. Most real (pre)amplifiers and stomp boxes, have an input impedance of 1MegaOhm, so it would be a good idea to get a sound-card with 1MegaOhm input impedance to use 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 electronic circuit, cables and sound-card settings.
- In almost all cases, amp sims and stomp box simulators don't introduce noticeable latency. The Anvil doesn't introduce any noticeable latency. If you're experiencing latency issues, check your sound-card settings (specifically reduce the “Input Buffer Size”).
- The Anvil is a preamplifier simulator, so it needs a cabinet simulator after it, to sound like a real mic'd tube amplifier. There are numerous free and commercial cabinet simulator plug-ins available, so make sure to place one (and only one!) of them right after The Anvil.

Acknowledgments

Ignite Amps wants to thank [Andy Zeugs](#) once again, for inspiring this work, helping us with his tests and opinions and providing tracks processed by the real hardware as a reference during the development of the plug-in.

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 The Anvil and for reading the f***ing manual! :-)

Sincerely
The Ignite Amps Crew

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