IGNITE AMPS
engineering for the moshpit

NRR1 VST PLUG-IN

USER MANUAL

Summary

Introduction

NRR1 is a digital emulation of a three channels tube preamplifier for guitar. It has been developed to accurately model its real harware counterpart, built for Fleshgod Apocalypse guitarist Cristiano Trionfera by Ignite Amps, back in 2009.
The NRR1 core circuit is mainly based on a famous boutique preamplifier made in '88, modded to suit Cristiano's needs in the best possible way.

It can deliver tones from jazzy clean, to blues or rock crunch, to modern bonecrushing metal rhythms and leads, with everything in between.
Tonestack, gain and volume controls are separated for every channel, to ensure maximum fine tuning possibilities and versatility.

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.

NRR1 is meant to be used as a guitar preamplifier for live playing and jamming, tracking or mixing inside hosts capable of VST Plug-Ins support.

Installation

To install the NRR1 VST Plug-in, just copy the file **NRR1.dll**, found in the archive you've downloaded from www.igniteamps.com, into your VST Plug-Ins folder (e.g. C:\Program Files\Steinberg\VSTPlugins).
After that, you should (re)start your favourite VST host, making sure it re-scans your VST Plug-Ins folder to recognize NRR1 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 NRR1 entry in your VST Effect Plug-Ins list inside your host.
You're now ready to rock!

*Note: if you have an old computer and you can't get NRR1 to work by following the above guide, maybe your system doesn't support SIMD instructions. In this case, instead of copying NRR1.dll into your VST Plug-Ins folder, please copy the file named **NRR1_NoSSE.dll** which doesn't feature SSE optimizations.*

ATTENTION: *Do **NOT** copy **both** files (**NRR1.dll** and **NRR1_NoSSE.dll**) into your VST Plug-Ins folder! Copy only the right one according to your system specifications.*

Main features

- Dynamic 12AX7 / ECC83 coupled triode stages analog modeling
- Three channels: clean, rhythm and lead, each with fully separated controls
- Selectable Mono / Stereo processing support
- Selectable oversampling rate (up to 8x)
- Global input / output level controls
- Double precision floating point operations support
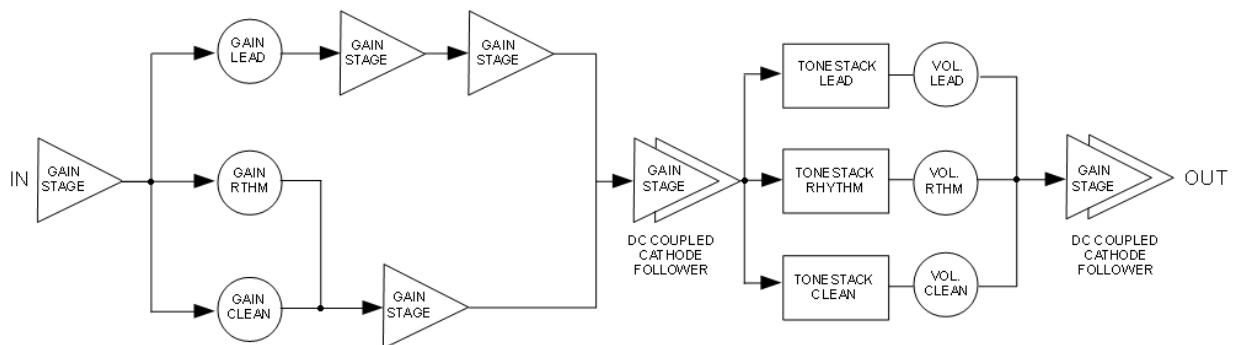- Fully automatable controls

NRR1 Circuit Diagram

Fig. 1 - NRR1 Circuit Diagram

Graphic User Interface

Fig. 2 - NRR1 Front Panel

Fig. 3 - NRR1 Rear Panel

As you can see from the screenshots (fig.2 and fig.3), we've decided to make NRR1 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 a real rack preamp 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 NRR1 you'll find all the controls you're used to see in every classic guitar (pre)amplifier:

- **Channel Led**: lets you choose the channel you want to use. Just click on the channel led to switch to that channel.
- **Gain**: controls the amout of gain / saturation of your sound. In Clean and Rhythm mode, it influences the overall perceived output volume more than in 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 NRR1 (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.

Peculiar 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. Giving the fact that this channel has more gain than the Clean, 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.
- **Boost**: this switch is not featured in the real hardware, since the nature of the circuit makes it impossible to use this control without affecting the Clean channel too.
  In the digital world, anyway, we had the chance to make it work without affecting the Clean sound, so we decided to add it.
  Sound-wise, as the name says, it is a gain boost which pushes lows and mids more into saturation, resulting in a fatter and fuller crunch sound, suitable for hard rock or even metal with a proper boost (like an overdrive pedal) in front of the preamp.

Lead channel

– **Bright**: some may have heard about the "*Warren Haynes mod*" applied to a famous boutique hi-gain amplifier: the bright control of this channel does the same thing, it controls the attack and picking response of the Lead channel and it can be really useful to prevent the distortion getting too muddy. In this channel only, the bright control effect is dependant on the gain control setting. If you set the gain at full, the bright capacitor will be bypassed, so, switching it on and off won't make any difference on the final sound.
It is worth noting that in most of the modern hi-gain amplifiers, this control is always active and not switchable, that's why we've initialized it as active by default. Switching it off will result in a more balanced tone for the full gain control excursion, but at high gain settings, it may lead the distortion to get muddy.
– **Shape**: this switch changes the tonestack response of the Lead channel. When switched on (lever up) the high-mids will be more present, making the distortion more aggressive. When switched off (lever down), it will give a gentle scoop on the mids, resulting in a smoother tone, with a softer attack.

Other Front Panel Controls

– **Mono / Stereo**: lets the user select the processing mode of the plug-in. It is extremely important to note that a complete stereo separation, and so <u>a correct stereo image preservation, is only possible when NRR1 is placed on a stereo bus and fed with a stereo signal with left and right components panned at 100%</u>. Feeding NRR1 with two DI tracks panned at less than 100% left and right, will not preserve the correct stereo separation of the tracks at the output.
Stereo Mode will obviously double the CPU load of the plug-in, as the two audio channels are being implicitly processed by two separated instances of NRR1.
– **Bypass**: simply bypasses the plug-in, avoiding any processing.
– **Panel Switch**: placed at the extreme right side of the GUI, it allows the user to switch between front and rear panel controls

Rear Panel Controls

In the NRR1 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, NRR1 will process your signal at 44100 x 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 factor, 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 after switching

between different oversampling values. A good practice would be to run the plug-in at 4x or 2x during mixing to 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 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. <u>It is really important not to underestimate this control</u>, since it is the key to have the NRR1 reacting correctly to your guitar and playing. In fact, we can safely say that <u>this is the most important control to get the best out of the NRR1</u>.

What's the correct way to use it, then? Let's start from your guitar signal: as you surely know, when you play, the pickup output going into your soundcard 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 convertion will be, keeping also the signal-to-noise ratio at the higher value possible.

This means that, in order to get the best out of your soundcard, 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 to 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 value possible right before the clipping threshold of the converter, it will be represented as 1.0 inside your host and NRR1 will so 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 NRR1. 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 around the input level potentiometer 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 potentiometer at the 2nd tick moving it clock-wise. By doing this, your input will be multiplied by 1.5 (1 + 0.25 + 0.25), so NRR1 will not be fed with a 1.0V maximum signal, but with a 1.0 x 1.5 = 1.5V maximum signal which is the correct value to match the 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 turning the potentiometer to the second tick counter-clock-wise. This will make NRR1 react like the input signal is 0.5V, or 1V x 0.5 (1 – 0.25 – 0.25). Remember that the soundcard input level is meant to be always set so that you'll use the full AD converter headroom. Signal level adjustments to pair the NRR1 with your guitar pickups need to be made after conversion, using the input level control.

Please note that these concepts applies only when NRR1 is the first plugin of your guitar chain. If you are using another VST before the NRR1, like an overdrive pedal simulation, we suggest you to keep the NRR1 input level control at half (default) and tweak the pedal output accordingly to your sound needs.

- **Output Level**: this control lets you set the overall output volume of the plug-in. Keep in mind that it will affect all the 3 channels and remember also that while the Volume controls you find in the front panel may change the tonal response of the preamplifier circuit (as it has been previously explained), this control is totally transparent on your tone.

Generic tips for amp-sim users

- Always use the high impedance (Hi-Z) input of your soundcard (when featured). This will ensure less noise and signal loss. Most real (pre)amplifiers, have an input impedance of 1MegaOhm, so it would be a good idea to get a soundcard with at least 1MegaOhm input impedance to use amp sims at best.
- As mentioned above, make always sure to have the highest input signal before the AD conversion, avoiding clipping.
- Amp sims are not noisy, they do not add noise. In fact, they're a lot less noisy than real amps. If you have noise issues, check your guitar electronic, cables and soundcard settings.
- Amp sims simulate amplifier circuits. Not all the amp sims have a cabinet simulation. In fact NRR1 doesn't have one, so you have to use a cabinet simulation plug-in right after it. Convolution plugins loaded with cabinet impulse responses (IRs) are the best choice in this case.
- In almost all cases, amp sims don't introduce latency. If you're experiencing latency issues, check your soundcard settings (specifically the input buffer size).

Acknowledgments

Notes:

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