

Renaissance Bass

software audio processor

User's Guide



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Chapter 1 - Quickstart

Waves created the Renaissance Bass to answer the demands of the market: an easy-to-adjust processor that delivered a great sound, quickly.

Renaissance Bass uses patented technology that Waves developed for the original MaxxBass processor. Over the years we've been able to refine the algorithm for many licensing agreements, and felt it was time to bring the fruits of our labor back to the pro audio world, where it all started. Therefore, we created the Renaissance Bass processor, with significant improvement in the psychoacoustic bass performance, easier adjustment, and clip-free performance.

What is the secret?

Of course we can't tell you everything we're doing, but in general, the process is very simple.

The brain can reconstruct a “missing fundamental” from just the harmonics the ear is hearing. For example, if you have a radio with a small speaker, the bass guitar in a rock song, or the double bass in a concerto, can not be reproduced by that very small speaker, that is, the fundamental pitch is too low for that speaker to produce.

However, the harmonics are coming out of the speaker (they are higher than the fundamental of course, check your physics of sound book gathering dust on your shelf for a lot more information). Your ear can hear these harmonics, and the “hearing mechanism”, more like “hearing software” of the brain recognises that these harmonics are related to each other (i.e., correlated), and reconstructs the missing fundamental.

Therefore, you hear the low bass note, even though it is not coming out of that speaker. This phenomenon has been well known for centuries (pipe organ builders use exactly this technique to emulate very long pipes that might have been too expensive for the owner).

Waves created the MaxxBass algorithm to do exactly this, taking the very low bass (user controllable) and creating harmonics that can be added into the signal (variable by user). Waves has patented this technology, refined it, and has put it into the Renaissance Bass processor.

Chapter 2 - Controls

Signal flow in the Renaissance Bass is from the left to right, so it's easy to see how the original bass signal and the new harmonics are contributing to the total output.

On the left side is the meter for the Original Bass level.



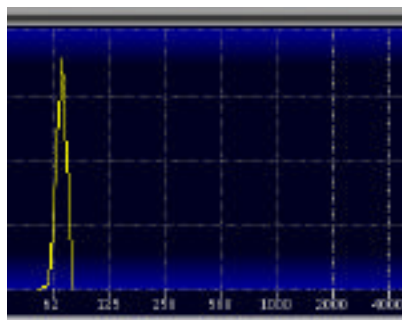
In the middle is the level meter for the Harmonics that are created.



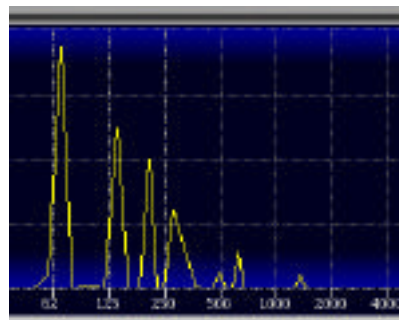
On the right side is the output meter, with infinite peak hold numbers at the bottom of the meters.



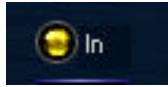
Here's a screenshot of a sine wave input to Renaissance Bass, without any Harmonics being added.



When adding the Harmonics, the same signal produces this output:



In/Out (Original Bass)



Switches the original bass (frequencies below the Freq value) in or out of the final output signal of the processor.

Intensity



This control is simply a level control of the Harmonics that are generated. It ranges from -24dB to +24dB. The zero reference level (0.0) is just a rough approximation for most systems to achieve a perceived equal bass level. For example, if you completely remove the Original Bass (the In/Out button is set to Out), an Intensity setting of 0.0 will very roughly give you equal perceived bass by using only Harmonics. Of course this will change a great amount depending on the source material, your speakers, the room you are in, and so forth. It's not a recommended starting point, it's just the middle of the control range.

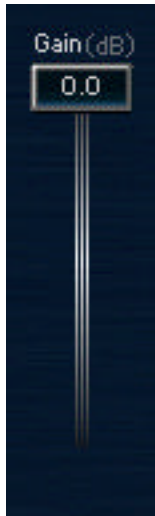
The higher the Intensity value, the more Harmonics are added to the output signal.

Freq



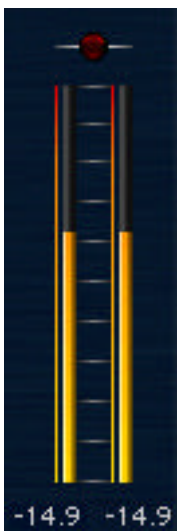
This simply controls where the process begins (much as in a crossover). Therefore, with the setting shown above (65Hz), all frequencies below 65Hz will have harmonics generated by the system and added by the Intensity control.

Gain



The output gain control, which is reflected in the output meters immediately beside the gain control.

Output meters



These meters show the output level of the processor. Just below each of the meters are infinite peak hold numeric indicators, showing the highest peak (sample accurate) since the last reset. To reset, just click the meters anywhere. There's lots more information in the WaveSystem manual, which explains common controls and amazing shortcuts that are found in every Waves software processor.

At the top of the meters is a clip light. Click it to reset.

Chapter 3 - Basic Adjustment Procedure



Adjusting Renaissance Bass is basically the same, no matter the application. What you want to do is enhance the perception of bass frequencies in a “proper” mix. It doesn’t depend on the speakers you have (we are assuming that you are using widerange speakers for monitoring). It depends only on your ability to use this tool as in any other (such as EQ, compression, etc.) and to use it in a reasonable way to get a balanced sound.

Mixing or mastering

Let’s suppose the bass guitar of a mix is a little low.

Instead of adding EQ, which would boost the bass and surrounding harmonics, and boost other instruments in the same range as the harmonics, use Renaissance Bass. By taking all the frequencies below, say 100Hz, and creating new harmonics that are laid on top of any other sounds, the bass guitar will be heard more clearly, without becoming muddy from boosting other instruments at the same time.

Here are the steps for adjusting the previous scenario:

In a multitrack mix, you can insert Renaissance Bass on just the track (recommended in this example), or you can insert it on the 2-mix (master output), as you would do in a mastering application.

- Set Freq to 100Hz.
- Adjust Intensity to a low level (say, -10 or so)
- Use the Bypass control to compare between the harmonically-enhanced signal, and no processing.
- Adjust Freq and Intensity for desired effect.

In this case, a low level of Intensity is probably enough, but of course it depends on the problem you are trying to fix.

Fixed installation adjustment

A very different situation would be for a playback system that has a specific speaker system that does not have good bass, such as a kiosk, a commercial installation, an art installation, or any situation where you know exactly what speakers will be used, and have one with you to do the mixes with.

For example, you are doing sound for a theme park such as Disneyland, and the speakers are 5" drivers that have a cutoff frequency of about 110Hz. You want to extend the bass response from these speakers, and you know that only these speakers will be used.

Now you can do a more severe adjustment to the sound, knowing that the playback will be on this particular system by completely replacing the low bass with harmonics. This keeps the small speaker from trying to reproduce the low frequencies, saves amplifier usage, all while sounding better than the speaker can actually sound!

- Set Freq to the cutoff frequency of the playback speaker (in this example, 110Hz)
- Set Intensity to 0.0, then move upward until the bass is heard in a balanced way.
- Fine tune the Freq and Intensity for the smoothest bass response. Frequency sweeps can be used, as well as the source material you are mixing.