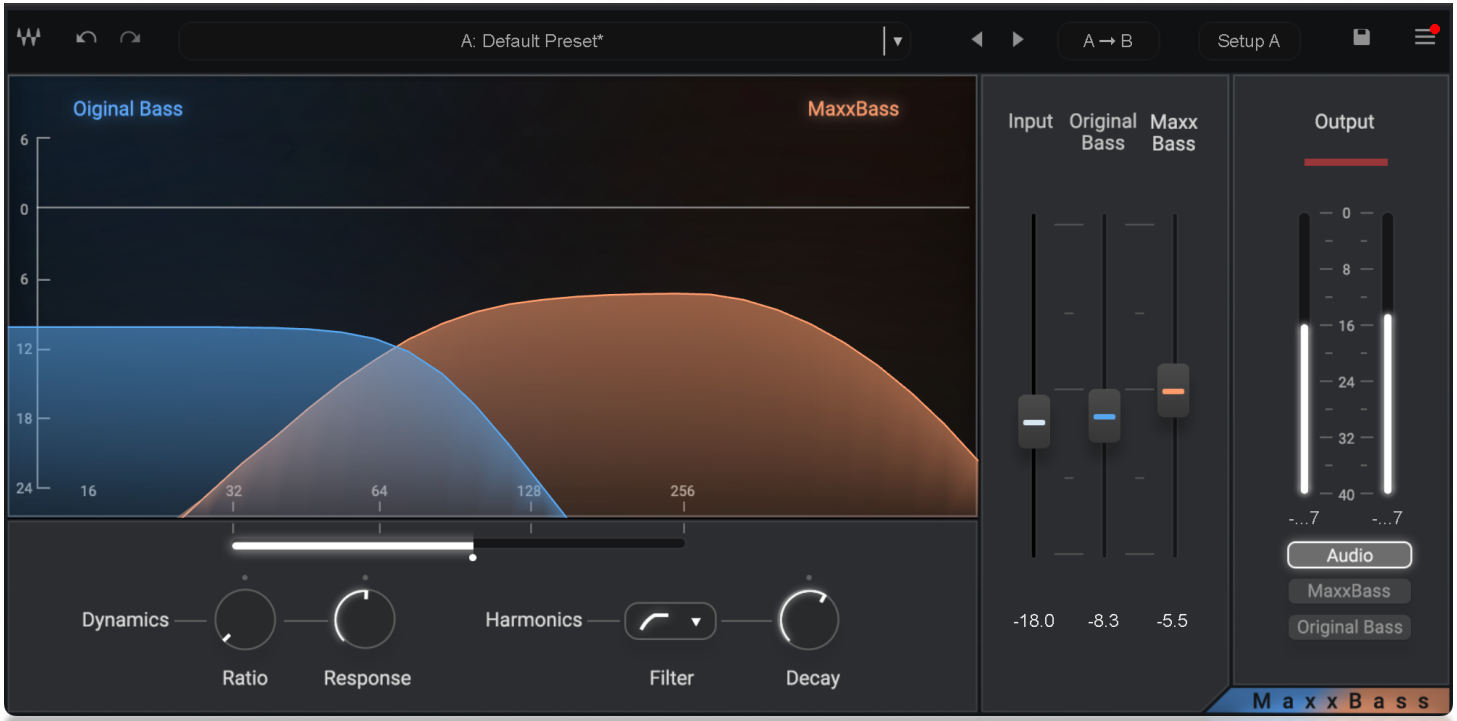
MaxxBass

User Guide



Maxx Bass User Guide

What is MaxxBass?

MaxxBass is a psychoacoustic tool that enables you to play the lush low-frequency parts of a mix through loudspeakers that aren't really capable of reproducing such bass sounds. Sometimes a mix sounds great in the studio, but it lacks low end when played on smaller (or cheaper) loudspeakers. What's more, the bass that you do hear may sound inarticulate or loose. If you try to "help things out" by increasing the bass in the mix using EQ, you'll likely make things worse. This not only changes the balance of the mix, but also places additional strain on already overloaded speakers and electronics.

MaxxBass provides deeper, better bass without changing the mix. It passes only those frequencies that the loudspeakers can handle. It then calculates the fundamental frequency, strips away some of the original bass that's below the speaker's range, and adds the harmonics of the fundamental. Your hearing is more sensitive to mid and high frequencies than to the extreme bottom; your brain processes these harmonics and perceives the missing fundamental. The result is a rich sound that the loudspeakers wouldn't normally be able to reproduce.

MaxxBass is also used to enhance and tighten mixes intended for full-frequency, high-quality sound systems. There's no need to change the way you mix.

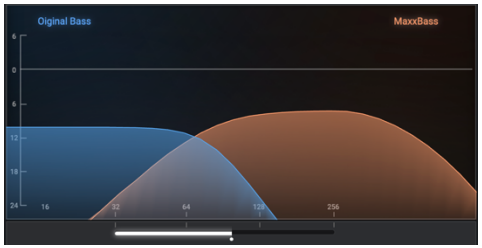
MaxxBass can extend the perceived frequency response of a speaker by about two octaves below its physical limitations. The result is a surprisingly natural-sounding bass without bass-boosting artifacts.

To provide more control of the harmonics that are created, a Highpass filter can be switched in, along with an upward compressor. These are useful when mixing for a specific set of speakers or systems, such as those in commercial installations, theme parks, kiosks, and so on. The decay control can also focus the effect for these specific types of systems.

Even though it may sound obvious, MaxxBass can be overused! However, with judicious use, MaxxBass can extend the range of the master mix, sharpen the bass line, and enhance playback on smaller systems. You can even use it for special effects.

Controls

THE MAXXBASS GRAPH



The **MaxxBass Graph** illustrates the Original Bass sound (blue) and the generated Maxx Bass sound (orange). The Frequency slider controls the crossover point. All frequencies below this point will have harmonics created for them; all frequencies above this point will be passed to the output unaltered. The Highpass Filter Selector sets the slope of the MaxxBass signal.

MIX SECTION

Input Fader: Controls the input level.
Range: 0 dB to -infinity

Original Bass Fader: Adjusts the level of the low-frequency parts of the original signal. This curve is illustrated by the blue area in the graph.
Range: +12dB to -infinity

Harmonics Fader (MaxxBass): Controls the level of the generated harmonics in the output mix. This is illustrated by the orange area in the graph.

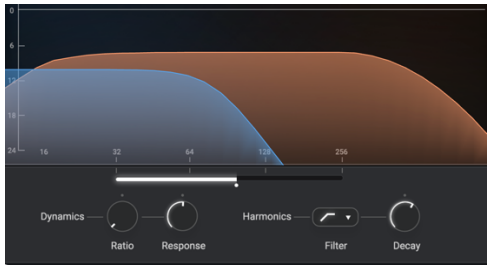
Range: +12dB to -infinity

HARMONICS SECTION

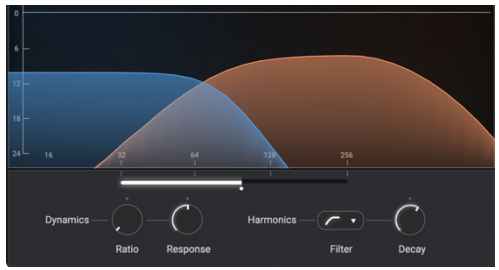
Highpass Filter Toggle: Removes low frequencies from the generated harmonics. First position is a 6 dB/oct filter at 16 Hz (basically to remove DC and very low-frequency components). Second position is a 12 dB/oct filter at the selected frequency on the graph. Third position is a 24 dB/oct filter at the selected frequency on the graph.

Default is 12 dB/oct.

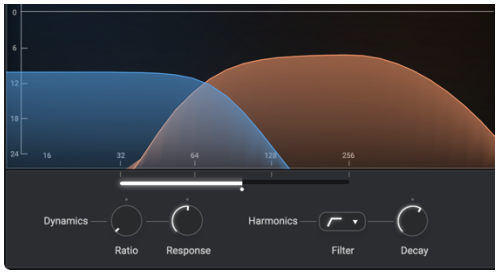
HIGHPASS FILTER SETTINGS



The wideband filter leaves a large portion of the generated bass signal unaltered, extending all the way to DC. It can be used for extreme effects where a hyperextension of the low frequencies is desired.



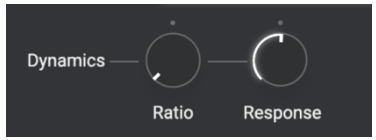
The middle position (default) provides a 12dB per octave rolloff at the selected Frequency, and is ideal for most mastering situations.



The third position provides a 24 dB per octave rolloff at the selected Frequency. This position is a good starting point for situations where you are mixing for a specific small speaker system. It removes almost all very low frequencies from the Harmonic output, allowing greater levels while reducing the risk of pushing the transducer too far.

Decay: Controls the progressive decay rate (in level) of each succeeding harmonic in the series. Higher values (approaching zero) result in a generated harmonic spectrum that is “richer,” but which may sound blurred on some systems. Lower values (lower negative numbers) are more natural for full-range systems, but may be less audible on smaller speakers. Range: -9 to -24

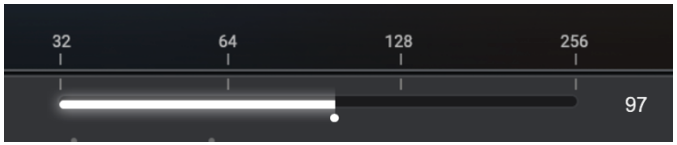
Dynamics Section



Ratio: Varies the compression of the generated harmonics. This is an upward compressor, so as the ratio is increased, the level of the harmonics also increases, but with reduced dynamic range. For increased ratios, you will probably need to reduce the Harmonics level fader. A 1:1 ratio has no compression, so the harmonics have the same dynamic character as the Original Bass.

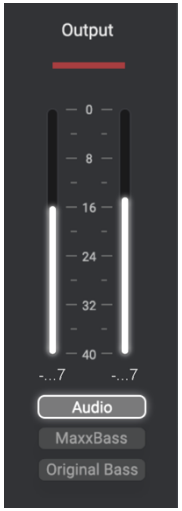
Response: Controls the attack and release of the harmonic generation, in milliseconds. Faster times makes the harmonics respond more quickly.

Frequency



The frequency of the crossover between the Original Bass and MaxxBass signals. The number on the right identifies the current value. Range: 32 Hz to 256 Hz

Monitor Selector and Meter



The output meter displays the level of the source selected in the Monitor Selector panel. Peak level is shown beneath the meter. Clipping is indicated by the red button at the top. Click anywhere on the meter to clear peak level and clipping.

Range: -40 dBFS to 0 dBFS.

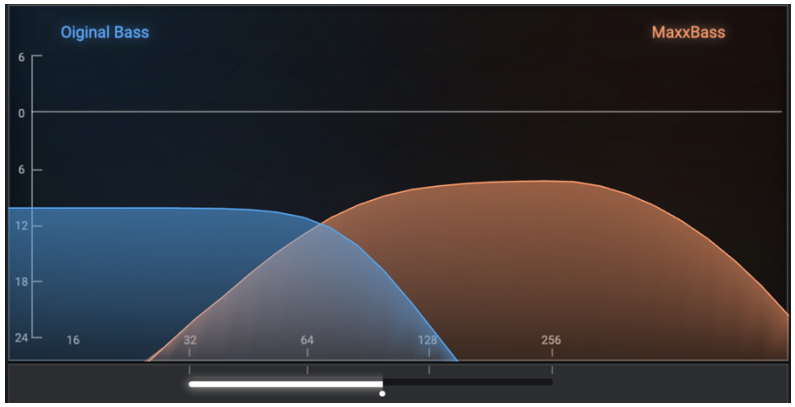
Monitor Selector

Selects the source for meter and audio monitoring.

- **Audio** is the combined output signal.
- **MaxxBass** solos the MaxxBass (harmonics) signal.
- **Original Bass** solos the original low frequencies that you are removing from the input signal.

Mixing and Mastering with MaxxBass

The “missing fundamental” psychoacoustic illusion can be used for mixing and mastering to enhance the bass response on any playback system. It can tighten and focus the bass when the mix is monitored on professional-quality playback systems and ensures adequate bass sound on systems with small speakers, such as those in cellular phones, tablets, computers, and commercial installations.



For studio-quality mixing and mastering, simply mix some of the MaxxBass harmonics into the signal by raising the Harmonics level fader. You might want to lower the Original Bass level by a few dB as you replace its signal with the MaxxBass signal. Try to maintain the same amount of bass you’d normally use—otherwise, you run the risk of overusing the effect, just as you might with any processor in your studio. When used judiciously, MaxxBass processing will not have any negative impact on the mix.

We recommend that you start with the default settings. Increase the Harmonics fader to add harmonics to the mix. Aim for a smooth, warm bass response that sounds balanced—not more than you would normally use. Audition the mix on several different loudspeakers to ensure that the bass is stable on several full-range, quality systems.

Mastering

Unlike EQ or multiband compression, MaxxBass helps you perceive the bass better by adding harmonics that are less susceptible to transducer limitations, or the sensitivity of hearing. Since our hearing is more sensitive to higher frequencies, the “encoding” of low frequencies into higher MaxxBass harmonics will let the bass be heard better on all systems.

Mastering for General Playback

Assuming you’re working on a good full-range system, master as you would without MaxxBass for a well-balanced sound. We recommend placing MaxxBass as the first processor in your mastering chain, so it can restore the mix to the low-frequency balance that you wished it had in the first place. In this way, you can think of MaxxBass helping to “fix” the mix before applying the remainder of your mastering processes, such as EQ or compression.

When to use MaxxBass

- To fatten the bass of a good mix.
- To sharpen the bass.
- To give the bass better presence.

If, however, you have a spectrally imbalanced bass, then EQ will be better. In other words, if the bass response of your mix is uneven (e.g., too much at 80Hz, not enough at 200Hz), then EQ is the better tool.

On the other hand, using EQ to try to do the job of MaxxBass will also boost the low frequencies of other instruments like drums, guitars, and keyboards, which will only muddy the mix. What you want is a smooth low end, with appropriate presence in the bass line. Trust your ears—if MaxxBass does not seem to solve the problem, then you may want to try careful EQ instead.

MaxxBass Mastering Guidelines

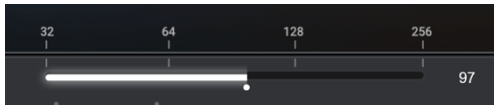
Input Control

Processing from the MaxxBass system can create large increases in peak values. If you have a high-level input signal, you should probably reduce the Input level by 6dB or so to allow some headroom. The infinite peak-hold input meters and clip indicator will help you determine how much headroom you have.

MaxxBass Level (Harmonics)

Gradually increase the Harmonics level fader. To sharpen the bass line, values from -18 to -8 might be valid, depending on the source. Exaggerate the level slightly, then back off. A little goes a long way!

MaxxBass Frequency



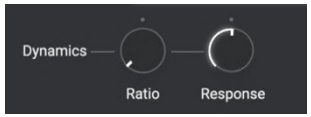
Adjust the Frequency control to help focus the effect, usually between 50 Hz and 90 Hz. If the mix has a very dull sounding bass, then the Freq setting can be low. For presence enhancement, you should try a higher setting.

Harmonics Section

To control the created harmonics, the **Decay and Highpass** controls let you adjust the high and low ends (respectively) of the spectrum. We suggest that you begin with the middle filter setting (12 dB per octave). It provides ample harmonics without interfering with a good mix.

Adjust the **Harmonics Decay** for the clearest enhancement of the bass signal. As you adjust it, you can see the right edge of the orange Harmonics curve move, showing the relative levels of the higher harmonics.

Dynamics Section



MaxxBass creates harmonics that have the same dynamic range and character as the Original Bass. However, you can change this for better enhancement or special effects.

Ratio and **Response** controls let you alter the dynamic nature of the harmonics. There is a compressor in the MaxxBass processor that affects only the harmonics, not the Original Bass.

When the Ratio control is set to 1:1, then the dynamics of the harmonics are approximately the same as the Original Bass. Increasing the ratio will compress the harmonics with an “upward” compressor, so the MaxxBass harmonic levels will increase as the Ratio is raised.

Change the Response value, and the compressor will react to the Original Bass signal faster or slower. Response affects both attack and release simultaneously and is calibrated in milliseconds (ms). Fast (smaller) values give a tighter, punchier sound; slower (larger) values are “looser.” Slow response values can be perceived as a less accurate bass response, especially for fast attack sounds (such as kick drums), so you’ll probably want to select a faster response. For slower bass sounds (such as a jazz upright bass), a slower response usually is usually better.

The response of the compressor is a subtle adjustment. You might find it easier to hear what it does by monitoring only the MaxxBass signal.

Using MaxxBass for Small Speaker Systems

If you are mixing for mobile devices, televisions, or other products with small or inferior loudspeakers for a specific system, such as a kiosk or commercial sound installation, you can extend the range of that system by replacing most of the original bass signal with the MaxxBass signal.

Play the sound at a level that is representative of what you will use in the venue. Begin with the MaxxBass fader at zero. Lower the Original Bass fader to remove most of the bass signal. Starting at 200 Hz, slide the Frequency value downward until you stop hearing any improvement in the sound, then move it back up just slightly.

All frequencies below this point will be removed from the signal, and MaxxBass will create harmonics above this point that will replace them. You can increase the MaxxBass value, but be careful not to overdo it.

On the Harmonics panel, select the third high-pass filter (24 dB per octave). Set the Delay based on the space you're in and your personal preferences.

In the Dynamics panel, set the Ratio to 2:1. This will provide a gentle upward compression of the MaxxBass sound. Adjust the Response (attack and decay speeds) as needed for the content of the material and the acoustics and size of the room.

MaxxBass for Installed Systems

If you're mixing or mastering for a specific audio system or installation—such as kiosks, commercial sound systems (PA systems, exhibitions, etc.)—you can use MaxxBass to improve the system's bass response. These systems generally have a limited bass response due to speaker, that is, they physically cannot produce strong low bass.

For these applications, there's no reason to include the Original Bass at all below the physical response of the speaker(s). As a general guide, here are approximate cutoff frequencies for various systems:

- Laptop computers 200Hz
- Multimedia speakers (3") 110Hz
- TV speakers 90Hz
- AM radio 80Hz

When adjusting for a specific set of conditions, rather than for a general case like “small speakers,” it’s best to monitor using the same loudspeakers and electronics that you will use onsite—and ideally in the same room. This provides the most accurate calibration.

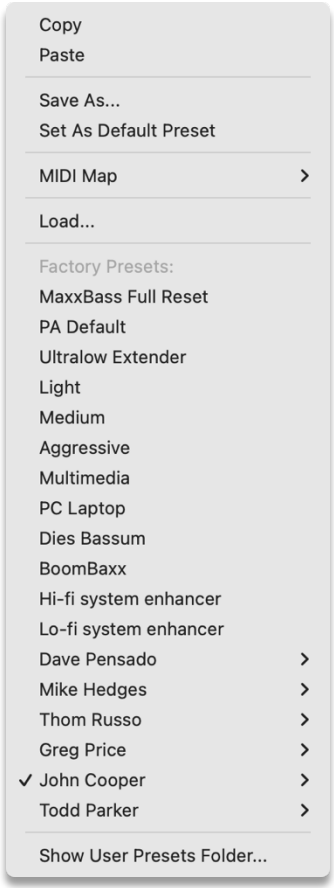
To Create the MaxxBass Signal for This System

- Set the Monitor mode to Original Bass. Starting at 200 Hz, slide the Frequency downward until you don’t hear anything from the speaker, then come back up just slightly. Now set the Monitor back to Audio mode.
- Place the MaxxBass signal to 0.0 as a starting point.
- Set the Highpass filter to the third position (24 dB/oct).
- Set the Ratio to 2:1 as a starting point.

We recommended using the Waves L1-Ultramaximizer after MaxxBass in the signal chain. This allows you to recover any level lost by having to reduce the Input level. With L1, you can increase the level to the small speakers even more. Since it is a brickwall limiter, L1 increases RMS levels without increasing the peak levels (in other words, it reduces the peak-to-RMS ratio of the signal). This combination is ideal for system-specific mastering or mixing.

Presets

Use the bar at the top of the plugin to save and load presets, compare settings, undo and redo steps, and resize the plugin. To learn more, click the hamburger icon in the upper-right corner of the window to open the WaveSystem Guide.



There is a wide assortment of Waves factory presets and artists' presets. Click the Load menu in the WaveSystem toolbar and select a preset from the list.

Listed below are some factory presets, which are intended only as starting points, not actual solutions. You should always adjust each setup based on your source material.

Mastering Setups

Ultralow Extender is only for when you need a large-scale increase in the depth and range of the bass. The Highpass filter is in Wideband mode, so a lot of very low frequencies are present in the output.

Light adds a small amount of Harmonics, with light compression and medium Decay settings. This is an excellent first step for mastering.

Medium is based on Light but features a bit more compression and a higher Decay value.

Aggressive is primarily comprised of the Harmonics signal. It uses heavy compression, a Decay value that produces a richer spectrum, and a fast Response.

Small Speaker Setups

Multimedia is optimized for small multimedia speakers without subwoofers—like the common 3- and 4-inch (60 and 80 cm) speakers supplied with many PCs. Note that the Original Bass is completely off. Adjust the Frequency control for the best sound.

PC Laptop is designed for preparing system sounds that will be played back on the very small (1.5 inch or 30 cm) speakers found in many laptops

BoomBaxx is designed to enhance playback on small and medium-sized portable music players.

Lo-fi System Enhancer can dramatically improve playback on medium-sized, medium-range systems—such as low cost stereos, commercial sound systems, and kiosks. Note that the Original Bass is completely off, but the Frequency setting is lower than the Multimedia setup default.

Effects

Dies Bassum (faux Latin for "Day of Bass") is intended only to be used to entertain friends, frighten small animals, or make remixes that pop some subs at the club. Caveat emptor!

Choose **Ultralow Extender** when you need a large-scale increase in the depth and range of the bass. The Highpass filter is set to Wideband mode, allowing a large amount of very low frequency in the output.