



MaxxBass

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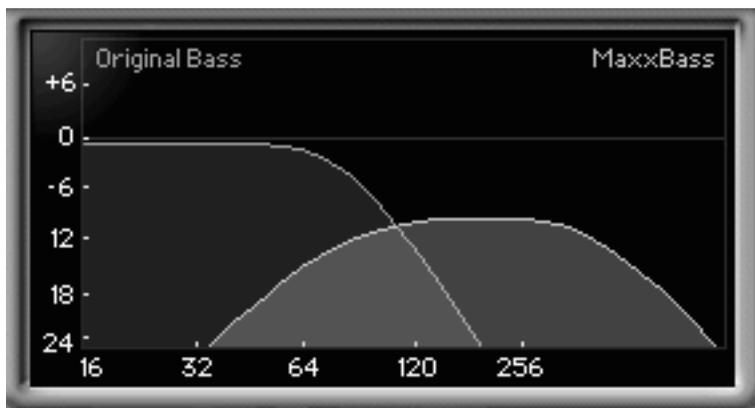
Chapter 1 - Quickstart for MaxxBass™

Mixing and Mastering

MaxxBass creates harmonics that you can add to the signal. These harmonics trick the ear into perceiving low bass frequencies that may not actually be present in the output.

This psychoacoustic illusion can be used for mixing and mastering to enhance the bass response for playback on any system. MaxxBass can also be used to mix for installed systems, such as commercial sound systems, theme parks, outdoor distributed systems, personal stereo systems, and more.

For mastering and mixing, simply mix some of the Harmonics into the signal by raising the Harmonics level fader. You might lower the Original Bass level a few dB as you replace its signal with the MaxxBass signal. Try to make the mix have the same amount of bass as you normally would, otherwise you run the risk of over-using the effect, just as you might with any processor in your studio.

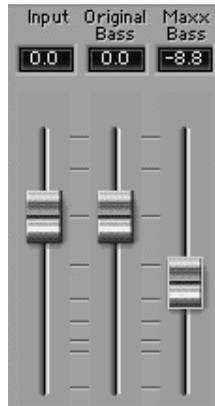


Recommended settings to start with for mixing and mastering are the defaults. Simply increase the Harmonic fader to add to the mix (shown by the yellow curve in the graphic). The best Frequency will be usually between 60 and 100. Your goal should be a smooth, warm bass response that is balanced, not more bass than you usually would use.

Using MaxxBass for small speaker systems

This is a special case for MaxxBass. Most people will mix for normal, full-range speaker systems (you want your mix to sound good everywhere). However, if you are mixing for a specific system, such as a kiosk, theme park, commercial sound installation, special radio mixes, etc., you can extend the range of that system by replacing almost all of the original bass signal with the MaxxBass signal.

By doing this, you remove most of the Original Bass signal (take the fader down to the bottom), and putting the Maxxbass signal to 0.0dB (unity gain). You should be listening through the system that you are mixing or mastering for!



Select the third Highpass filter setting (the one with the steep corner). Set the Ratio to 2:2.



Starting at 200Hz, slide the Frequency downward until you stop hearing any improvement in the sound, then move it back up just a little. All frequencies below this point will be removed from the signal, and MaxxBass will create harmonics above this point that will replace them.

Adjust the Decay setting for best enhancement.

Chapter 2 - How does MaxxBass work?

Even though you can hear a bass guitar from a small speaker, you are not hearing the main note -the fundamental frequency. This is simply because the speaker can not physically produce such a low pitch.

However, the harmonics of the bass guitar are indeed coming from the speaker, and your ear interprets these harmonics and creates the “missing fundamental” inside your head. This is a well-known psychoacoustic phenomena. MaxxBass takes this phenomena to the maximum, and gives you control of it.

Using this principle, MaxxBass can extend the perceived frequency response of a speaker about two octaves below its physical limitation.

What MaxxBass does

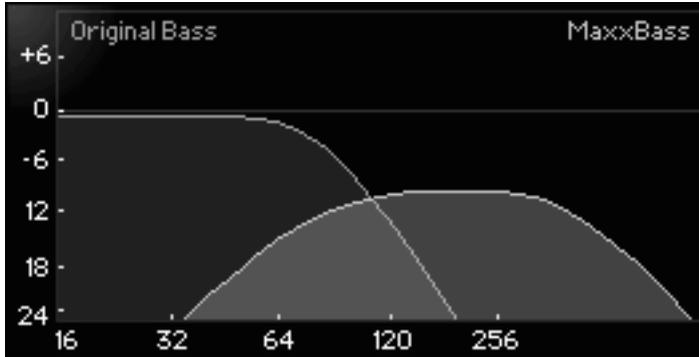
The input signal is split into two parts; the crossover Frequency determines the split point.

High frequencies are merely passed to the output (to be added back to the bass). The bass signal is analyzed by the MaxxBass processor, which creates a specific series of harmonics of these low frequencies. Since the dynamics and the loudness of the original bass are duplicated in these harmonics, the result is the most natural-sounding enhancement of the original bass.

The MaxxBass Harmonics and the Original Bass can be mixed in any proportion at the output.

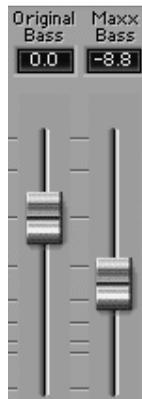
To provide more control of the harmonics that are created, a highpass filter can be switched in, plus an upward compressor. These are very useful when mixing for a specific set of speakers or systems, such as those in commercial installations, theme parks, kiosks, etc. The decay control can also focus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

Chapter 3 - Controls



The MaxxBass Graph

Frequency - controls the split point of the crossover. All frequencies below this point will have harmonics created for them; all frequencies above this point will be passed to the output.



Output section

Harmonics fader - controls the level of the generated harmonics in the output mix. Ranges from +12dB to -infinity.

Original Bass fader - controls the level of the lowpassed bass signal in the output mix. Ranges from +12dB to -infinity.



Monitor button - selects between Audio (the normal mixed output), Harmonics (the signal created by MaxxBass), and Original Bass.

Harmonics section



Highpass filter toggle - removes low frequencies from the generated harmonics. First position is a 24dB/oct filter at 16Hz (basically to remove DC and very low frequency components); second position is a 12dB/oct filter at the selected Frequency on the graph; third position is a 24dB/oct filter at the selected Frequency on the graph. Default is 12dB/oct.

Decay - controls the progressive decay rate (in level) of each succeeding harmonic in the series. Higher values (approaching zero) means the generated harmonic spectrum is “richer”, which may sound blurred on some systems; lower values (lower negative numbers) are more natural for full-range systems, but may not be as audible on smaller speakers.

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 increase, but with lessened dynamic range. For increased ratios, you will probably need to reduce the Harmonics level fader. The ratio 1:1 has no compression, so the harmonics have exactly the same dynamic character as the Original Bass.

Response - controls attack and release of the harmonic generation, in milliseconds. Faster times makes the harmonics respond quicker.

Chapter 4 - Mastering with MaxxBass

Even though it may sound obvious, it is important to state that MaxxBass could 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 use it as a mastering tool, a channel insert, or even for special effects. This chapter addresses the use for 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 have a good full-range system, it’s important for you to know the best results will be for you to not master any differently than you would without MaxxBass. That is, you master or mix as always, for a well-balanced full-range sound.

We recommend that MaxxBass be first in the mastering chain, so that it restores 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 make the mix be “fixed” before 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 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 (too much at 80Hz, not enough at 200Hz), then use EQ.

On the other hand, using EQ to try to do the job of MaxxBass will boost other instruments’ low frequencies, such as drums, guitar, 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 using MaxxBass does not seem to solve the problem, then you should probably try careful EQ instead.

MaxxBass mastering guidelines

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 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.

The default settings of the plug-in are good starting points (as they should be!) and you should just gradually increase the Harmonics level fader to begin. To sharpen the bass line, values from -18 to -8 might be valid, depending on the source. Exaggerate the level some, then back off. A little goes a long way!



Secondly, adjust the Frequency control to help focus the effect, usually between 50 to 90. 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.



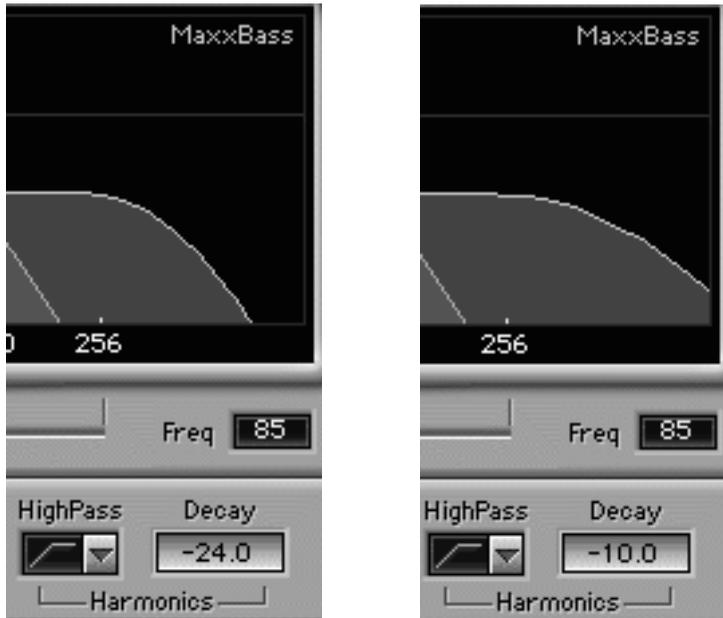
The MaxxBass level and the Freq are the key controls to getting a smooth and full bass response. As you get more sophisticated in using the effect, the Decay setting can let you affect the 'naturalness' of the enhanced bass.

Harmonics section

To give control of the harmonics that are created, the Decay and Highpass controls let you adjust the high and low end, respectively, of the spectrum.



To work with this, adjust the Harmonics Decay for the clearest enhancement of the bass signal. As you adjust it, you can see the right edge of the yellow Harmonics curve move, showing the relative levels of the higher harmonics.



The Decay control is subtle, but important, and rather source-dependant. With higher values (closer to zero), the number of harmonics and their levels is increased. If you have a high-input signal, and high Decay values, you may have internal clipping. Reduce the Input control to allow more internal headroom.

Highpass filtering of the harmonics give a wide range of options for the effect. The first position is



Wideband, which has a very large amount of extremely low bass in the Harmonics. The mid-



dle position (default) provides a 12dB per octave rolloff at the selected Frequency; the third



position is a 24dB per octave rolloff at the Frequency.

Using the Highpass control is really for specific situations, most of the time. The 12dB (middle) position is ideal for most mastering situations. Wideband setting can be used for extreme effects where a hyper-extension of the low frequencies is desired, such as film, effects, theme parks, special mixes for consumer distribution, and so forth. The 24dB (third) position is a good starting point for situations when you mix for a specific small speaker system; it removes almost all very low frequencies from the Harmonic output, allowing greater levels while reducing risk of pushing the transducer too far.

So, we recommend you use the middle (12dB) position for mastering.

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 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.

By changing the Response value, the compressor will react faster or slower to the Original Bass signal. Response controls both attack and release simultaneously, and is calibrated in milliseconds (ms). Fast (small) values give a tighter, punchier sound; slower (larger) values are “looser”. Sometimes this is perceived as less accurate a bass response, especially for fast attack sounds (kick drums), so you would probably select a faster response. For slower bass sounds (such as a jazz upright bass), a slower response usually is 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.

Chapter 5 - MaxxBass for installed systems

If you are mixing or mastering for a specific audio system, such as a planetarium, kiosk, commercial sound system (PA systems, museums, etc.), interactive exhibit, computer, and so forth, then you can use MaxxBass to improve the bass response of the system.

These systems generally have a limited bass response due to the size of the speakers, that is, they physically can not produce strong low bass.

For these applications, there is no reason to include the Original Bass at all below the physical response of the speaker(s). In general, you might find these frequencies as approximate values for certain types of speakers:

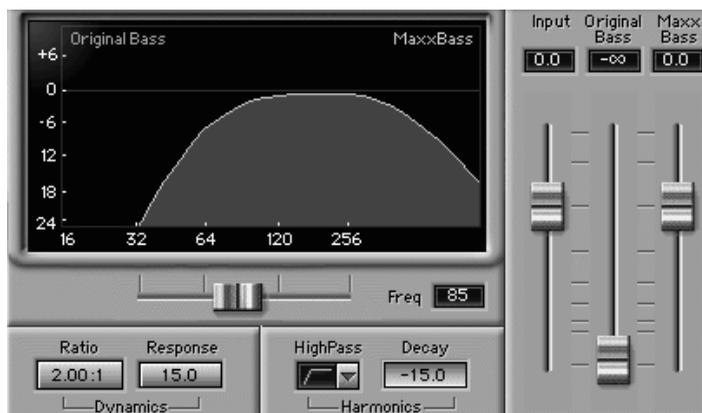
- Laptop computers 200Hz
- Multimedia speakers (3") 110Hz
- TV speakers 90Hz
- AM radio 80Hz

Here is how to determine the cutoff Frequency of a specific system that you are listening to:

- Place the Monitor mode into Original Bass.
- Starting at 200Hz, slide the Frequency downward until you don't hear anything from the speaker, then come back up just a little.
- Now put the Monitor back to the Audio mode.

Now, to create the MaxxBass signal for this system:

- Reduce the Original Bass level to the minimum (mute).
- Place the MaxxBass signal to 0.0 as a starting point.
- Put the HighPass filter to the third position (24dB/oct).
- Set the Ratio to 2:1 as a starting point.



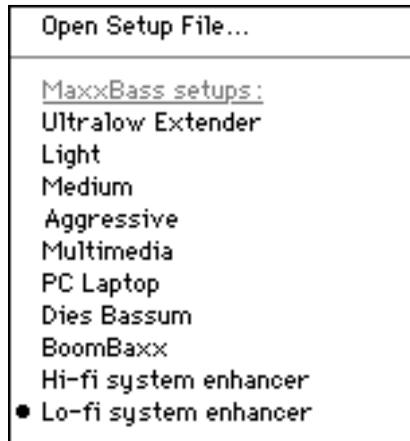
With these settings you should find that the bass response is improved by using the MaxxBass signal instead of the Original Bass, and that you can get an overall louder level (this is due to the fact that the little speakers are not challenged so much by the low frequencies they can not reproduce well).

Adjust the Frequency and Ratio for smoothest bass sound. Adjust the Decay for a warmer sound (values approaching zero, such as -10); be advised that higher Response values might produce internal clipping. In this case, lower the Input level.



Hint: It is recommended that the MaxxBass be followed by the Waves L1-Ultramaximizer so that you can get back any level you lose by having to reduce the Input level. In fact, with the L1, you can increase the level to the small speakers even more than that! The L1 increases RMS levels without increasing the peak levels (in other words, it reduces peak-to-rms ratio of the signal), as it is a brickwall peak limiter. This combination is ideal for specific-system mastering or mixing.

Chapter 6 - MaxxBass factory presets



Listed here are the factory presets of MaxxBass, which are intended only as starting points, not actual solutions. You must adjust each setup for the source material.

Mastering setups

- Light
- Medium
- Aggressive
- Ultralow Extender
- Hi-fi system enhancer

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 has a bit more compression, with a higher Decay value.

Aggressive is mostly comprised of the Harmonics signal, with heavy compression, a Decay value that gives a richer spectrum, and fast response.

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

Small speaker setups

- Multimedia
- PC Laptop
- BoomBass
- Lo-fi system enhancer

Multimedia is set for small multimedia speakers without subwoofers, such as the common 3 and 4-inch (60 and 80cm) systems supplied with many PCs. Note that the Original Bass is completely off. Adjust the Frequency control for best sound. You can use this for mixes that will be delivered via the Internet, for example, but you should check the mixes on full-range speakers and multimedia system that do have a subwoofer.

PC Laptop can be used for preparing system sounds that will be played back on the very small (1.5 inch/30cm) speakers in many laptops.

BoomBass was designed to enhance playback on small and medium-sized portable CD/cassette players.

Lo-fi system enhancer can dramatically improve playback on medium-size medium-range systems (such as low cost stereos, commercial sound systems, kiosks). Note that the Original Bass is completely off, but the Frequency is lower than the Multimedia setup default.

Effects

- Dies Bassum
- Ultralow Extender

Dies Bassum is faux latin for “Day of Bass” and should only be used to entertain friends, frightening small animals, or for remixers who just can’t resist trying to pop some subs at the club. Caveat Emptor.

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