



COMPRESSION

EVERYTHING YOU NEED TO KNOW



Jonathan Herrera

COURSE BOOK

SCOTTSBASSLESSONS.COM



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INTRODUCTION

The term ‘bass compression’ is one that as bass players we hear an awful lot, but can still leave us scratching our collective heads.

Where a distortion box does exactly what it says on the tin, the use of a compressor is altogether subtler and perhaps a bit mysterious. So what does it all mean? And how concerned should we be when the sound engineer says “don’t worry, I’ll put a compressor on it”?

Whether your encounters with compression come in the studio or onstage, this course is designed to help you understand the critical impact it can have on your tone.



MEET JONATHAN HERRERA

Jonathan Herrera is a graduate of the University of Southern California and the Los Angeles Music Academy and the former Editor-in-Chief of Bass Player Magazine.

His playing credits include: Fantastic Negrito, Zigaboo Modeliste, Stanley Jordan, Brain, Oz Noy, Garaj Mahal, Cathedrals, Miguel Migs, Cyrus Chestnut, Jon Fishman, Steve Turre, Moetar, and many more.

In addition to Jonathan's extensive performing experience, he's a sought-after clinician and teacher. He's a former Artist-In-Residence at LAMA, visiting faculty member of the California Jazz Conservatory, and has taught clinics and lectured at Stanford University, Bates College, USC, Musician's Institute, Crossroads, and Bass Player LIVE! He runs a full-service recording studio, Dime Studios, in Oakland, California.



LESSON 01

WHAT IS A COMPRESSOR?

Compressors are often grouped with effects called Limiters, which 'limit' a signal from passing a certain point. Let's start with the basic principle of compression, which is to maintain a consistent signal level across the bass spectrum.

Compressors make loud passages quieter and the quiet bits louder, and they allow significant control over the intensity and character of this process. A bass signal with a narrower dynamic range will sound punchier, and easier to place in the mix.

This is something that a lot of live-sound engineers aim to achieve, as it makes their life easier if they can flatten your bass sound and not have to cope with the full dynamic range of the instrument – so much so that they will usually have a channel automatically set up for bass, with a compressor set for fast attack and medium release to compensate for them having to keep reaching for the volume fader!

The aim is to make every note audible and sit comfortably in the mix. All good things bass-wise.

LESSON 02



HOW DO COMPRESSORS WORK?

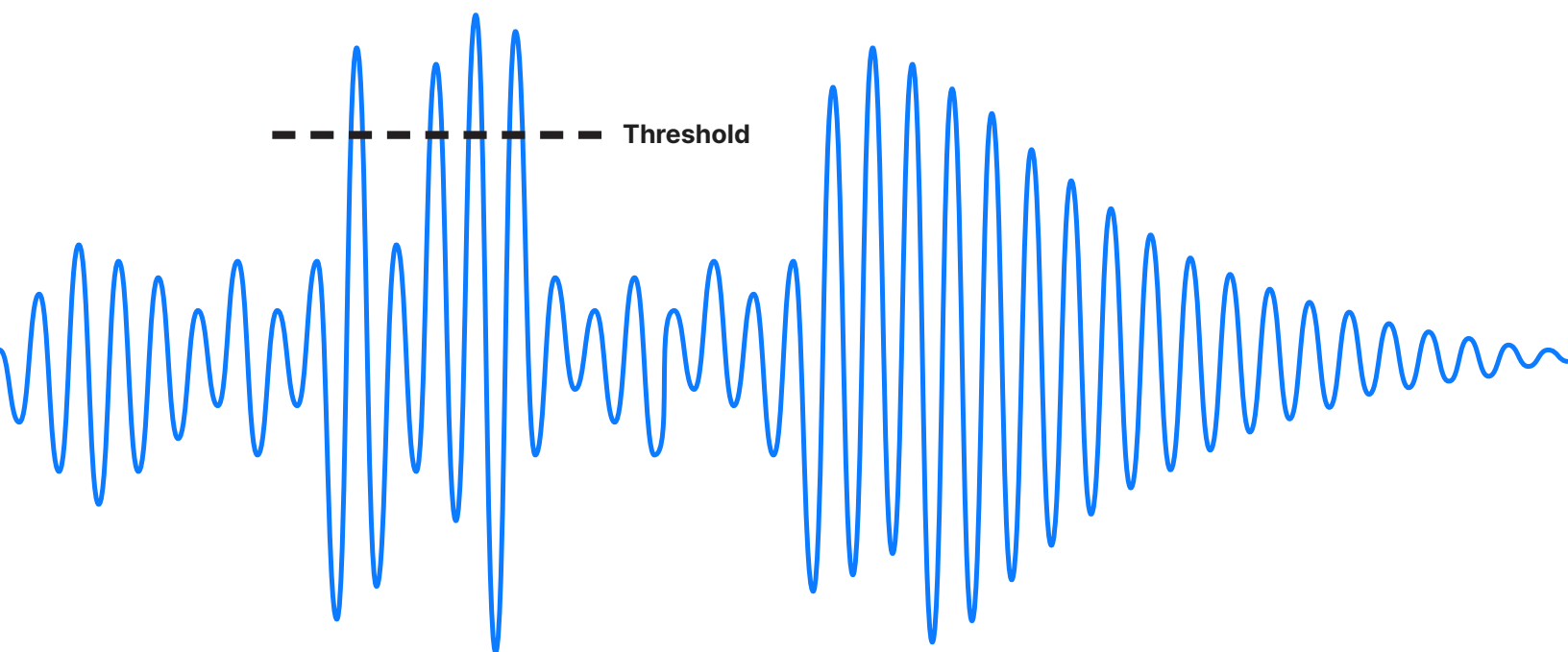
A compressor controls the dynamics of a bass (or any other instrument) by limiting the signal peaks according to settings adjusted by the user. There are many types of compressors, but they all perform the main function of reducing the peaks in an input audio signal.

But why would we want control over our dynamic range outside of how we approach the instrument technique-wise while playing?

The reason is, as human beings, it's practically impossible for us to perform a passage with the absolute evenness and balance that we may be trying to achieve for a specific song or section. There could be variances in attack or note volume that can cause a track to lose momentum and energy, or simply just sound a little unbalanced. Luckily, the compressor is here to help.

In short, a compressor reduces the gain of any part of an audio signal that exceeds the set threshold level, thereby making the signal more even with the rest. Along with this function, there are other controls like ratio, attack, and release that help us to be able to “shape” our notes further.

We'll delve into each one of these controls in the following lessons to get a clear understanding of how each one affects the bass signal.



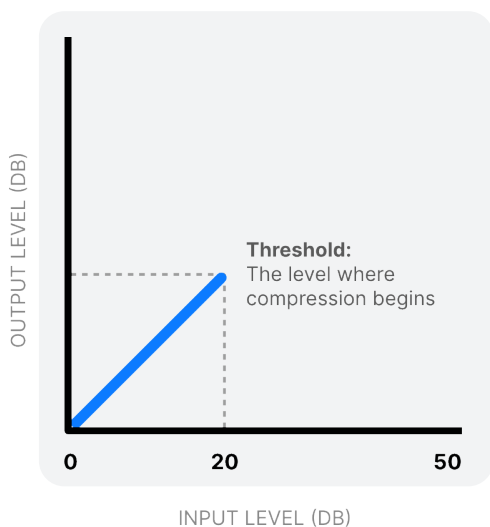
LESSON 03

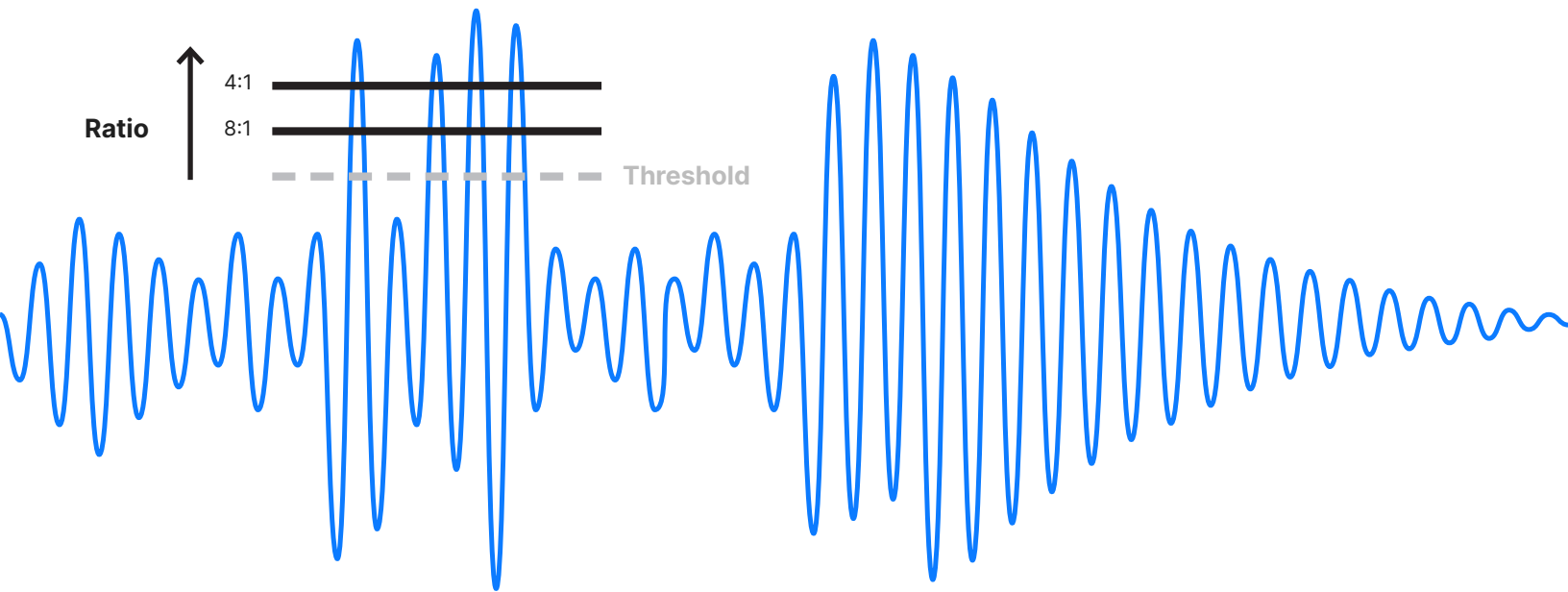
THRESHOLD

The **threshold** control sets the level at which compression starts to take place. If the threshold control is set low (i.e. turning the control anti-clockwise), more of your signal will be subject to the compression effect. If it's set high, the compressor will only affect the loudest parts of your signal.

Too much compression can cause the signal to sound dull and lifeless, so go easy with this control unless you're after a heavily squashed sound.

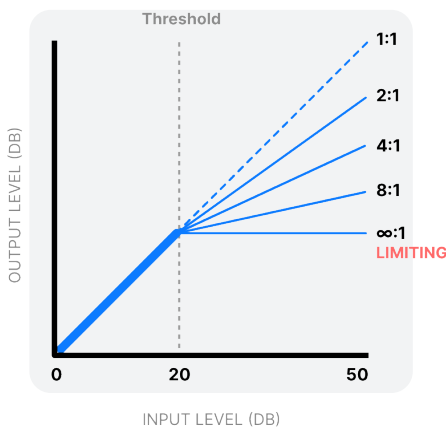
Not all compressors have a threshold control. In which case, experiment with the input level until you hit the pre-existing threshold of the compression device.





LESSON 04

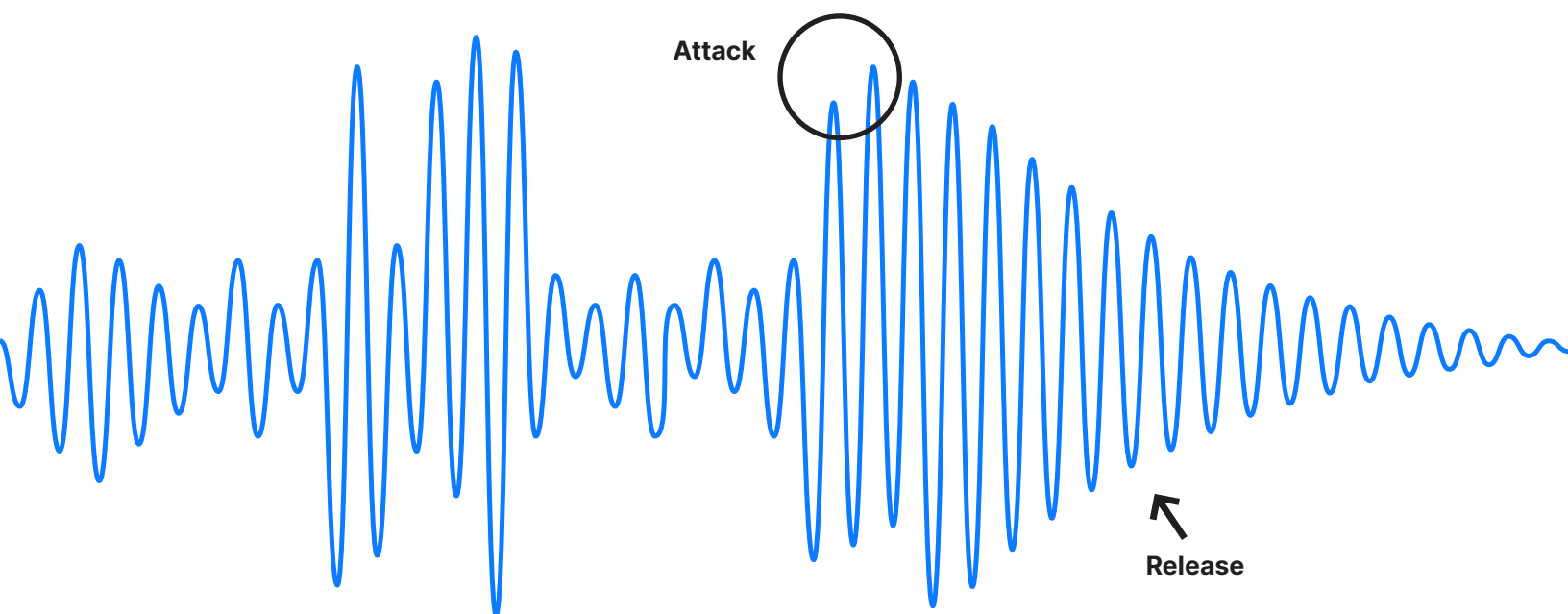
RATIO



In tandem with the threshold control, the **ratio** control can be thought of as the overall intensity of the effect, which is most often measured as a ratio of altered signal to unaltered, hence the control's name. For example, a 6:1 ratio means that if an input signal is 6dB over the threshold, only 1 dB is going to be allowed to reach your amp or mixer. With a 10:1 ratio setting (we're cranking it up now) for every 10 dB that goes in, only 1 dB can leave. That's seriously compressing your signal. Signals below the threshold point have a ratio of 1:1; i.e. there is no change between input and output.

Low compression ratios are gentle, while extremely high ratios, sometimes expressed as 'infinity:1,' prevent the signal from ever exceeding the threshold. But don't be fooled, as carefully setting the threshold and ratio, even though controlling the signal level, can actually result in an increase in perceived loudness, as the bass starts to sit more evenly in the mix. This is especially true when adjusting the output level to bring the gain back up.

Typically, for a bass signal that needs some compression, a softer ratio of between 2:1 and 4:1 works well. That's at least a great place to start.



LESSON 05

ATTACK & RELEASE

Attack Time

Attack relates to the speed at which the compressor comes into action, but it works in reverse. So, if the attack control is set at maximum, the attack is slower. Set at zero will produce a faster attack. Governing the attack time means you can dial in a smooth-sounding transition into the compressed phase of the signal.

Release Time

The **release** phase occurs after a signal begins to decay beneath the threshold. It describes the time it takes for the uncompressed or 'unity' gain to return to the signal. A very clipped sound can be achieved with both the attack and release set to zero, as the release of the note is kept to its shortest length and not allowed to fade. If you play quietly with this kind of setting you are very likely to hear 'dropouts' in your sound, as the attack kicks in straight away and the release cuts the sustain short and flattens the output.

↑
Makeup Gain

Compressed



LESSON 06

MAKEUP GAIN

While the common perception of compression is that it imparts a greater sense of overall loudness to a signal, it actually results in a lower output than the input.

Makeup gain compensates for this reduction to achieve the desired output level. It simply boosts the level of the entire compressed signal.

LESSON 07

SETTINGS

Now we're starting to get a picture of just how much work the humble compressor has to do and how much our playing style can influence its effect. Our playing style is at the heart of careful use of compression, in that we have to make it work for us, rather than letting it get in the way of our tone or compromising our performance. But we shouldn't be at all daunted when putting it into practice.

Compressors can do wonders for slap tone, make fingerstyle passages sound smooth and even, and in the hands of a good engineer, really help carve out a bass' ideal presence in a mix. Live, they can be invaluable in concert with other effects, especially those that seem to occasionally explode with unruly transients. Whether your encounters with compression come in the studio or onstage, take time to understand the critical impact it can have on your sound.

The order in which you place your compression within the signal chain can also have a big effect on your overall tone. Compression effects tend to come first in your signal chain because you generally want any changes in dynamics to happen before more extreme signal changes.

LESSON 08

COMPRESSION IN THE STUDIO



As with every effect, when it comes to compression we all have our own personal preferences. There is no right or wrong – it's all down to using our ears, experimenting with, and getting used to, how the controls interact with each other and how we apply it to our playing style.

One thing to make clear is that we don't have to use compression at all. Some of us will never feel the need to own a compressor, but in a recording studio situation it always helps to have a grasp of what the equipment actually does, rather than just leaving it all to the sound engineer.

LESSON 09

CLASSIC HARDWARE MODELS

Tube Compressor

A tube compressor utilizes an array of vacuum tubes to alter gain, with the compression effect coming from a tube configured in a 'variable-mu' state, in which the grid-to-cathode voltage varies to alter gain. This older method usually results in slow attack and release times and fairly gentle ratios.

All those tubes (and the accompanying input and output transformers) impart a distinctly 'tube-y' sound, meaning warmth, subtle distortion, and a buttery response that's hard to duplicate with other methods.

The all-time classic variable-mu compressor is the **Fairchild 670**.



LESSON 09 (continued)

Optical Compressor

With an optical compressor, the compression effect is achieved through the use of a light-sensitive resistor and a small lamp, pointed directly at the resistor. As the input signal level increases, the lamp shines brighter, producing greater resistance in the light-sensitive component. The resulting sound is often characterized as smooth and transparent. The most famous optical compressor is the **Teletronix LA-2A**, now produced by Universal Audio.



VCA Compressor

Voltage-controlled amplifier compressors (VCA) use a uniquely configured solid-state amplifier circuit to govern gain according to a control voltage. In a VCA compressor, the control voltage is the input signal itself. VCA compressors are generally considered the cleanest and most transparent of compressor types. A particularly beloved example is the **dbx 160**.



LESSON 09 (continued)

FET Compressor

Another common solid-state design utilizes Field Effect Transistors (FETs), semi-conducting devices that emulate the response curve and distortion characteristics of tubes.

FET compressors are reliable and sound relatively bright and clean. The classic example is the **UREI 1176**, now also produced by Universal Audio.





COURSE SUMMARY

With these nine lessons, we hope that we've helped to demystify the world of compression, and to show how easy it can actually be to get to grips with the basic principles, and how the individual settings work in conjunction with each other. 'Threshold' and 'ratio' are really just different words for level and output, so once you understand the terminology, you will begin to feel more comfortable in putting the compressor into practice.

Taking the time to experiment with a good stompbox compressor, or even a rackmount unit or software, can pay dividends, and you will find that getting to grips with the controls and how they affect your sound will soon become second nature. You might also find that adjusting the way you play will make your compressor work differently.

The aim is to make it work for your sound, and not against it. So experiment as much as you can to see how your playing and the compressor interact with each other. After all, this is our precious sound we're talking about!

