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# YOUR MIX SUCKS

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THE COMPLETE MIX METHODOLOGY  
FROM DAW PREPARATION  
TO DELIVERY

Special edition by  
**Marc Mozart**  
in cooperation with  
**Waves Audio**



[www.mixedbymarcmozart.com](http://www.mixedbymarcmozart.com)

## FOREWORD TO THIS SPECIAL EDITION

The first edition of this book was written in 2014. It was followed by mix templates and channel strip libraries for your DAW that contain all the principles, signal chains and methods used in this book ([MIX TEMPLE PRO](#)). I've been a Waves-user since 1995, and the majority of the plugins I'm using these days are still from Waves, so obviously one of the most common questions I have received over the years was:

*"Which Waves plugins do you recommend I should use?"*

I am extremely honored and happy to collaborate with Waves on this [special edition](#) of my bestseller. Waves is the company that made audio plugins popular and widely accepted. They have defined an entire category and keep pushing the boundaries. For these reasons, this book is a complete package by delivering plugin examples and recommendations for the various applications throughout the book chapters. Special thanks to Mick Olesh, Oran Moked, Yotam Livny and the entire Waves-team!

Strategically planned as this book might look, it started out by many of my friends asking me the following or a similar question almost every day:

*"Hey Marc, you know I've been doing this for a while. I'm really happy how my songs turn out, and I've come a long way as a producer. But to be totally honest: my mix sucks. Do you have any basic advice how I can improve my mixing?"*

The content of this book is the full version of what I would say on such occasions. Many people still reckon that mixing is "turning knobs 'til booty shakes" or "some levels, compression and EQ, until it all sounds right".

In this book, we explore things a little more systematically. We talk about cause and effect, why things have to be done in the right order, and what path to work your way through to a great mix. The solution lies in the process and the order in which you sort out things.

If you don't have a methodology, your mix can suffer from a severe "**domino effect**". Which of course is an analogy for one bad decision triggering a series of follow-up effects, and while you're working towards finishing your mix, what started as a small problem will accumulate and get worse. For example: A bad listening environment will inevitably lead to wrong mixing decisions that you'll be busy correcting all the way through - instead of really focusing on the actual creative elements of mixing. You're getting all frustrated about the outcome of your mix, while in reality, you had no chance getting it right under the given circumstances.

Later on, when you check your mix in the car, in a club, or even at the mastering studio, it's too late. I fully trust that you have the ears to hearing something is wrong with your mix, but your problem has gotten out of hand with a series of follow up decisions based on the wrong assumptions. A good methodology helps to avoid domino effects by dealing with fundamental problems first. It's also supporting your creativity and intuition, because all of a sudden you're not putting out fires all the time, you're making real progress.

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## A DIFFERENT LOOK AT COMPRESSORS

We all have a basic idea of what a compressor does and how to use it, right? I've googled "what does a compressor do?" and the "top"-results are pretty much all similar but still **wrong**. Something along these lines:

*(...) "Compression is the process of lessening the dynamic range between the loudest and quietest parts of an audio signal. This is done by boosting the quieter signals and attenuating the louder signals." (...)*

In the following we talk about compressors as a tool to shape the tone of a signal via adding harmonics. There is of course still some level correction involved, but as pointed out in chapter 7, correcting drops or peaks of level at the source is preferable to using a compressor for that.

Personally, I think of different models of compressors in terms of "how they feel". The choice becomes intuitive, as a compressor imparts a distinct characteristic on a sound and pushes it into a sonic direction.

It took me **years of practice** to develop the feel for certain types of gear, but with so many different flavors of classic tones available in plugin form today, it's definitely worth looking at the most important designs out there. The following is an analytic look into popular compressor plugins and their characteristics and for this I have designed a test setup.

## TEST SETUP & PROCEDURE

Let's run some popular compressor plugins through a test setup and procedure, then look at what the results tell us! (BTW, you can [download](#) this test-setup for your DAW on my website) The test-oscillator in Logic Pro X feeds a compressor with a test-tone that runs through the following routine:

- The test tone is a sine-wave. As you know, a sine-wave has no added harmonics
- We cycle through the following tones 55Hz, 110Hz, 220Hz and 440Hz
- Then a sweep from 20Hz to 20.000Hz, ending the cycle with a 100Hz tone



*Click the screenshot to watch the video.*

Also, you can [download](#) this test-setup for your own audio experiments

We cycle through this 3 times, with rising levels:

### 1st Cycle

- Oscillator hits compressor with -18dBFS of level
- Compressor threshold is set **just before compression** kicks in so the compressor does not compress (unity gain)

### 2nd Cycle

- Oscillator hits compressor with -12dBFS of level. That is 6dB more than on the previous cycle
- Compressor settings stay the same, but of course compression does kick in!



### 3rd Cycle

- Oscillator hits Compressor with -2dBFS of level (another 10dB added on top of the previous cycle) to show the plugins behaviour under "high level"
- The settings remain the same, but now compression is obviously hitting quite hard!
- The upper track you can see in the videos is the automation curve for the test oscillator's frequencies and levels, the lower track shows two different analyzers after the output of the compressor displaying the frequency spectrum in realtime

BTW: -18dBFS in your software is a **great** average level for your recordings and signals in all situations. It assures clean and pristine sound and compatibility with all plugins.

### Summary:

On the first cycle, the compressor doesn't actually change the level of the signal, on the 2nd cycle there is some compression, on the 3rd cycle there is a lot of compression. Every cycle ends with a static 100Hz tone – so we can see the amount of harmonics the plugin adds on top of a static sine-tone on the analyzer as follows:

- 2nd harmonic = 200Hz
- 3rd harmonic = 300Hz
- 4th harmonic = 400Hz
- 5th harmonic = 500Hz
- nth harmonic =  $100\text{Hz} \times n$

Just for reference, here's a [video](#) of what the test procedure looks like with **no compressor** inserted in the signal path. As you can see, the analyzer just shows basic sine-tones, with no added harmonics. In music theory and physics this is called the 1st "harmonic", the term for the original frequency of the sine-tone. On all of these tests, I've raised the level feeding the analyzer by a few dB and reduced it by the same amount after the analyzer for the sake of making the harmonics more visible.

# THE ROYAL HARMONICS ORCHESTRA

## WAVES PUIGCHILD COMPRESSOR

To give you a proper contrast – here's what the same test looks like with the **Waves PuigChild Compressor** inserted, a plugin modeled after a rare vintage Fairchild 670 compressor owned by mix engineer Jack Joseph Puig – as some of you might know, one of the most expensive and sought after vintage tube compressors on the market.



The [Waves PuigChild 670 Compressor](#)



Click the screenshot to watch the video:  
[The Waves PuigChild 670 compressor harmonics test](#)

You can already see the 2nd and 3rd harmonic even when the compressor doesn't compress at all, but the more harmonics are added the harder we drive the signal into compression. At 1:13 in the video clip, I can count a total of **12 harmonics**.

Note: the lower the sine-tone, the more harmonics show up – however, above the higher midrange, we only see the 2nd and 3rd harmonic appear on the analyzer which might explain the ever pleasant sounding characteristic of this plugin.

If you look at the rich harmonics added by the Fairchild, you start understanding how it gives a dull bass-sound or a 808 subsonic kick a richer frequency spectrum. This is very useful as it can help low end sounds to **translate better** on smaller systems (think laptop, tablet, smartphone, kitchen radio).

If your signal is well-leveled and even, you can alter its tone by how hard you drive the signal into compression. We've already discussed parallel compression in the previous chapter – imagine a setup where you're bringing the same low 808 kick into two mixer channels. Keep the first channel unprocessed, push the second channel hard into a tube compressor like the Fairchild – the added tube channel will help the source come through on smaller systems and adds a nice texture to a sound that's pretty close to a sine-tone.

On the parallel channel you can even cut off the low end and just add the harmonics (of course cut off **post compression**). Essentially, what the added harmonics do is adding frequencies to the original sound that weren't there before.

## PUT THE COMPRESSOR IN THE MIDDLE OF THE SIGNAL-CHAIN

A typical signal chain around a compressor like the Fairchild would look like this:

### Source Signal

1. **Surgical EQ**: to remove unwanted frequencies
2. **Compressor**: adding harmonics
3. **EQ**: for color and tonal balance

## PRE COMPRESSION: SURGICAL EQ REMOVES UNWANTED FREQUENCIES

It's very important to put an **EQ before** the compressor. Use this EQ to remove unwanted frequencies. Typical example would be a **High Pass Filter** that removes rumbling impact noise on vocal recordings. We don't want the compressor to add harmonics on top of a rumbling noise at 30Hz!

Same goes for unpleasant room resonances – find them using a narrow EQ boost then set a small notch to remove them. This so-called "surgical EQing" works best with digital EQs.

## POST COMPRESSION: EQ FOR COLOR AND TONAL BALANCE

Going back to the example of a low 808 subkick, which is a sound that is very similar to the sine-tone used in our test, there would be no point in EQing a pure sine-tone. You can't add frequencies that are not there – in contrast to a tube compressor, an EQ does **not generate** any frequencies, it can only adjust the tonal balance of the given frequency-content.

There are of course exceptions to that with EQs modeled on analog circuits but the point I'm trying to make is that plugins modeled on **analog compressors** can be great tools to shape the tone of a source.

With that, we have once again turned common audio-knowledge upside down:

- **Compressors can add color** to any frequency
- **EQs are static**, all they do is adjust the **tonal volume**

That rule is of course not totally holding its own once we look at a few more types of compressors. What we're interpreting in this article focusses on frequencies and harmonics, which is just one aspect of compressors.

The other one is the actual ability of a compressor to level, limit or "grab" a signal, and at what speed it does this.

## WAVES CLA-2A COMPRESSOR/LIMITER

The [Waves CLA-2A](#) is modeled on the legendary electro-optical tube compressor. The design of the later appearing 3A is based on the CLA-2A. We can see some light amounts of 2nd and 3rd harmonic added once it compresses 5dB and more. The Waves CLA-2A is typically being used to control **bass, backing vocals or lead vocals**. A fairly slow and gentle tube compressor.



The [Waves CLA-2A](#)



Click the screenshot to watch the video:  
The [Waves CLA-2A Compressor harmonics test](#)

## WAVES CLA-3A COMPRESSOR/LIMITER

The [Waves CLA-3A](#) is named after the early 70s solid-state unit. The CLA-3A adds only **one harmonic** (the 3rd one) that is visible on the analyzer. The [Fairchild](#) and the CLA-3A could co-exist in a signal chain.

Just as an example, you can use the CLA-3A to even out levels, then hit the Fairchild. The CLA-3A is typically used as leveller for **bass, guitars and even vocals**. It's less suitable for percussive sounds – it's not fast enough to control or "grab" a drum sound.



The [Waves CLA-3A Compressor](#)



Click the screenshot to watch the video:  
The [Waves CLA-3A Compressor harmonics test](#)

## WAVES CLA-76 "BLUEY" COMPRESSOR/ LIMITER

The [Waves CLA-76](#) "Bluey" is modeled after an early version of the famed mid-60s 1176 Class A line level limiting amplifier. The 1176 displays **extremely rich harmonics** once you drive it into compression - the analyzer shows the 3rd, 5th, 7th, 9th and 11th harmonic at 1:11 in the video clip. In comparison to the Fairchild, it

sounds a lot more aggressive and levels super fast. That makes the 1176 very flexible – it can be used on almost any source. Like the Fairchild, the 1176 is a true studio classic and it would be worth writing a dedicated chapter about it. You could mix an entire project exclusively with a couple of those.

One of the things it works very well for is making **vocals aggressive** and bring them upfront. When I use it, it's often not the only compressor in the chain, I'm usually running another compressor for leveling before the 1176, as discussed in the chapter on mixing vocals.



The [Waves CLA-76 "Bluey" Compressor](#)



Click the screenshot to watch the video:  
The [Waves CLA-76 "Bluey" Compressor harmonics test](#)



## WAVES CLA MIXHUB WITH BUILT IN BLUE-STRIPE COMPRESSOR

The [Waves CLA MixHub](#) is a channel strip modeled on [Chris Lord-Alge's](#) SSL console and includes a compressor that is switchable between the classical SSL Channel Compressor and CLAs 1176 Bluestripe which is showing different harmonics in the video clip.

Contrary to the CLA-76 plugin, we are seeing 2nd, 3rd and 5th harmonic on the analyzer when running our test on this channel strip which of course includes the Mic-pre, EQ and VCAs of CLAs mixing console.



The [Waves CLA MixHub](#)



Click the screenshot to watch the video:  
[The Waves CLA MixHub Compressor harmonics test](#)

## SSL G-MASTER BUSS COMPRESSOR

This is of course one of the most famous compressors ever built, and definitely the [most popular compressor for the mix bus](#). Solid State Logic included it in all of their 4000 and 9000 consoles, and engineers use it all the time. Waves teamed up with SSL to create one of the first true emulations of an original hardware, and this plugin (as part of the [Waves SSL-bundle](#)) is now a classic, just like the original [SSL 4000E](#) and [G-Series consoles](#).

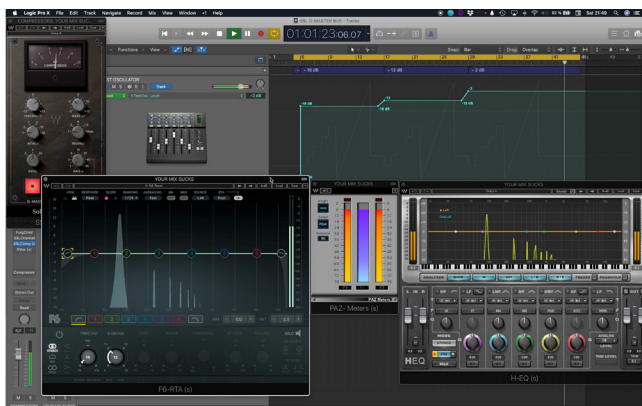
It does – of course – a great job leveling a signal, shows zero harmonics when it doesn't compress, and starts adding the 3rd, 5th, 7th and 9th harmonic once it compresses a few dB. At 10dBs of compression we can clearly see 3rd, 5th, 7th, 9th, 11th and 13th harmonics in the video clip (at 1:12). The trick with the SSL Buss Compressor is that it hits compression on the peaks of your finished mix, e.g. the kick drum. What happens is that the SSL "grabs" and reduces the peaks in a very clever way, while adding harmonics to them.

The SSL buss compressor controls the dynamics and enriches the signal above the threshold with harmonics, almost like compensating for the lost level.

This effect has widely been described as mix bus "glue" and is the reason why everybody loves SSL Buss Compressors. When I use it on the mix bus, I usually compress my mix only by 1 or 2dB max, but that of course depends on the material.



The [Waves SSL G-Master Buss Compressor](#)



Click the screenshot to and watch the video:  
The [Waves SSL-G Master Buss Compressor harmonics test](#)

## SSL E-CHANNEL COMPRESSOR

The compressor of the [SSL E-Channel](#), also a part of the [Waves SSL-bundle](#), adds a healthy portion of 3rd, 5th, 7th and 9th harmonics, and is capable of controlling and "grabbing" percussive signals like no other compressor.

Widely used by famous mix engineers on Kick, Snare and any type of percussion – the SSL gives drum sounds a prominent place in the mix, **making drums punchy and cut through**.



The [Waves SSL E-Channel Compressor](#)



Click the screenshot to watch the video:

The [Waves SSL-E channel Compressor harmonics test](#)

## WAVES DBX® 160 COMPRESSOR / LIMITER

The original dbx® 160 was based on the VCAs developed by dbx themselves, very similar to the ones used in the first SSL 4000E-consoles. The video clip shows only a moderate level of a 3rd harmonic once it compressors a few dBs.

This compressor works well on **bass sounds** or **bass guitar**, but can be used on many other sources. A work-horse in live setups over many decades.



The [Waves dbx® 160 Compressor](#)



Click the screenshot to watch the video:

The [Waves dbx® 160 Compressor harmonics test](#)

## WAVES API 2500

In my test setup the [Waves API 2500](#) shows absolutely zero visible harmonics. It still has its very own characteristics of course, but it shows that modern analog circuits can sound extremely **neutral** and clean.



The [Waves API 2500 Compressor](#)



Click the screenshot to watch the video:

The [Waves API 2500 Compressor harmonics test](#)

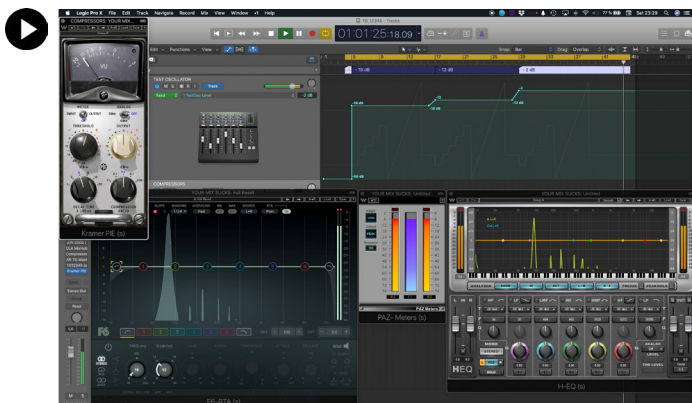
## WAVES KRAMER PIE COMPRESSOR

The [Waves Kramer PIE Compressor](#) is modeled on a vintage **Pye compressor** similar to the one used at London's Olympic Studios during the classic rock era. It starts adding a 2nd harmonic even when not compressing and ends up showing 2nd, 3rd, 5th, 7th and 9th harmonics at around 10dB of compression.



The [Waves Kramer PIE Compressor](#)





Click the screenshot to watch the video:  
 The [Waves Kramer PE Compressor harmonics test](#)

## WAVES ABBEY ROAD TG MASTERING CHAIN COMPRESSOR

This processor is modeled after the EMI TG12410 Transfer Console used in all of Abbey Road's mastering suites since the early 70s to this day. The test setup is slightly different from the previous ones, as this plugin contains a limiter for mastering, not a compressor. As expected, it shows extremely **neutral behavior**, with only a small amount of 3rd harmonics once it starts limiting.



The [Waves Abbey Road TG Mastering Chain Compressor](#)





Click the screenshot to watch the video:

The [Waves Abbey Road TG Mastering Chain Compressor test](#)

## EMI TG12345 CHANNEL STRIP COMPRESSOR

This is a [channel-strip](#) modeled on a true classic - the console used to record and mix recordings by the Beatles, Pink Floyd, and many others in the 60s and 70s. I am using the drive knob featured on the plugin to show some **serious distortion** and **harmonics** kicking in when the level of the oscillator hits maximum.

The test setup for this run is not directly comparable to the previous ones as compression would set in already at very low levels and I suppose the mix knob of the dynamics is the way to blend in clean with compressed sounds on this channel-strip.



The [Waves EMI TG12345 Channel Strip Compressor](#)



Click the screenshot to watch the video:  
 Waves [EMI TG12345 Channel Strip Compressor harmonics test](#)

# HI THERE!

Thanks for stopping by – my name is [Marc Mozart](#), mix engineer, award-winning music producer and director of the social media- and music agency "Mozart & Friends". I grew up in a musicians family, recorded and mixed music since my early childhood, cutting reel to reel-tape with a razor-blade, and got my first major breakthrough in Frankfurt during the rise of German Techno and Eurodance-Music in the early 1990s. Later on, I spent time in New York, worked and teamed up with various A&R-managers and producers from P.Diddy's "Bad Boy"-camp as well as Izzy Zivcovic, who later on managed Kanye West. In the 2000s, together with the Mozart & Friends-team of music producers and songwriters,

I have produced, written and remixed more than 70 charting bestsellers around the world. This includes No. 1 singles and albums which received multiple gold/platinum awards. In 2014, I wrote the e-book "YOUR MIX SUCKS", which is now one of the leading books of our time on the topic of audio mixing and mastering. In 2019 I teamed up with Waves to create a special "YOUR MIX SUCKS" Waves edition.

I'd like to invite you to join me on [Facebook](#), [Instagram](#), [YouTube](#) and [LinkedIn](#). I am using all aforementioned channels as well as my podcasts (available in [English](#) and [German](#) language) to deliver a lot of free audio mixing and social-media marketing know-how for producers, DJs, singer/songwriters and audio engineers. Also, all legitimate buyers of the e-book receive a year of **free mix feedback** from me - you just e-mail me your track to [feedback@mixedbymarcmozart.com](mailto:feedback@mixedbymarcmozart.com) and I'll come up with some quick suggestions for improvement. Of course, you can use that same e-mail for all sorts of feedback, questions and whatever you need from me.

Marc Mozart, August 2019

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