Vocal EQ Cheat Sheet

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Vocal
EQ
Cheat Sheet

Introduction

From trained musicians to casual music fans, a vocal immediately connects with the listener. The sound of the human voice naturally stands out to us, since we're designed by nature to focus on it in a world of constant external stimuli.

Amazing vocals also have the ability to make a sub-par instrumental standout, while lyrics help give a song meaning. This is one of the main reasons a vocal is what sticks in the listeners mind.

So as you may already tell, it's key for them to sound right regardless of the scenario.

However, a lot of different steps go into perfectly mixing a vocal (such as compression and a balanced used of effects), but in this book we'll just focus on the most important step, equalization.

And before we dive in, it's worth being familiar with some common terminology that will help you guide your vocal mixing decisions and some important things to keep in mind.

First of all, you need to be aware that male vocals have multiple notable differences compared to female vocals.

For example, male vocals usually tend to be on the lower registers of the frequency spectrum in comparison to female vocals. Although, this doesn't mean that there can't be low female voices.

Vocals are also mixed quite differently from genre to genre, so the bottom line is: You need to be aware of the vocal range of the singer you're working with, and what you're trying to achieve stylistically.

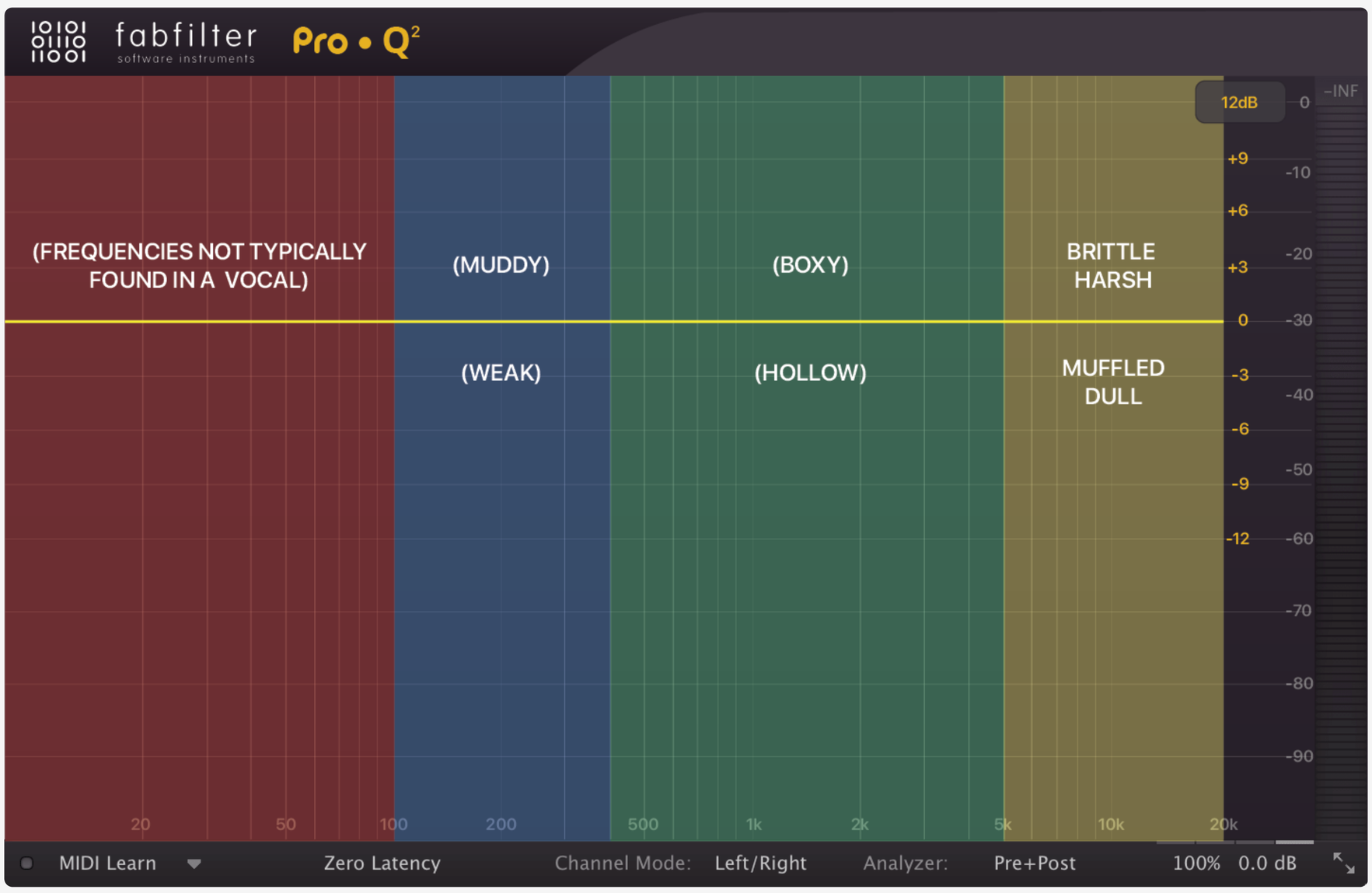
Luckily for you, some of the most common vocal mixing terms remain true regardless of the genre.

Vocal

EQ

Cheat Sheet

Introduction



The lowest frequencies of a vocal tend to be between 100 Hz and 400 Hz, depending on the vocalist. As we just mentioned, female vocals naturally tend to start higher than male vocals, but treat each vocal uniquely.

This range provides much of the “body” and “weight” of the vocal. Overloading this frequency range can cause a vocal to sound “muddy” and unbalanced, while not having enough of this range can cause the vocal to sound “weak” and unsupported.

Some of the most important frequency content in a vocal occurs from 400 Hz to around 8 kHz. The human ear is naturally more attentive to this range, as it accounts for much of the sound energy in the human voice.

1 kHz to 3 kHz tends to evoke emotion in the human brain, while 3 kHz to 5 kHz usually signals stress and danger (Crying babies, police car sirens, and ambulances actually have their most prominent frequencies in this range for a reason).

5 kHz to 8 kHz usually helps with the intelligibility of the vocals. It is worth noting that the upper frequency ranges, 8 kHz and above, are usually disregarded by people who study phoniatrics. This is because those upper frequencies only affect sibilance and how bright or airy the vocal may sound, they have no direct impact on the actual words.

You should NOT disregard them as a music producer though, upper frequencies are very important, especially in genres like pop music.

Vocal
EQ
Cheat Sheet

EQ'ing While Recording

"Record like there's no mixing, and mix like there's no mastering."

While we may commonly think of EQing as a step in the mixing process, EQing a vocal begins even earlier than that: during the recording process. An EQ is just a chisel that we use to shape a sound, and we need a solid block of marble before we start chiseling.

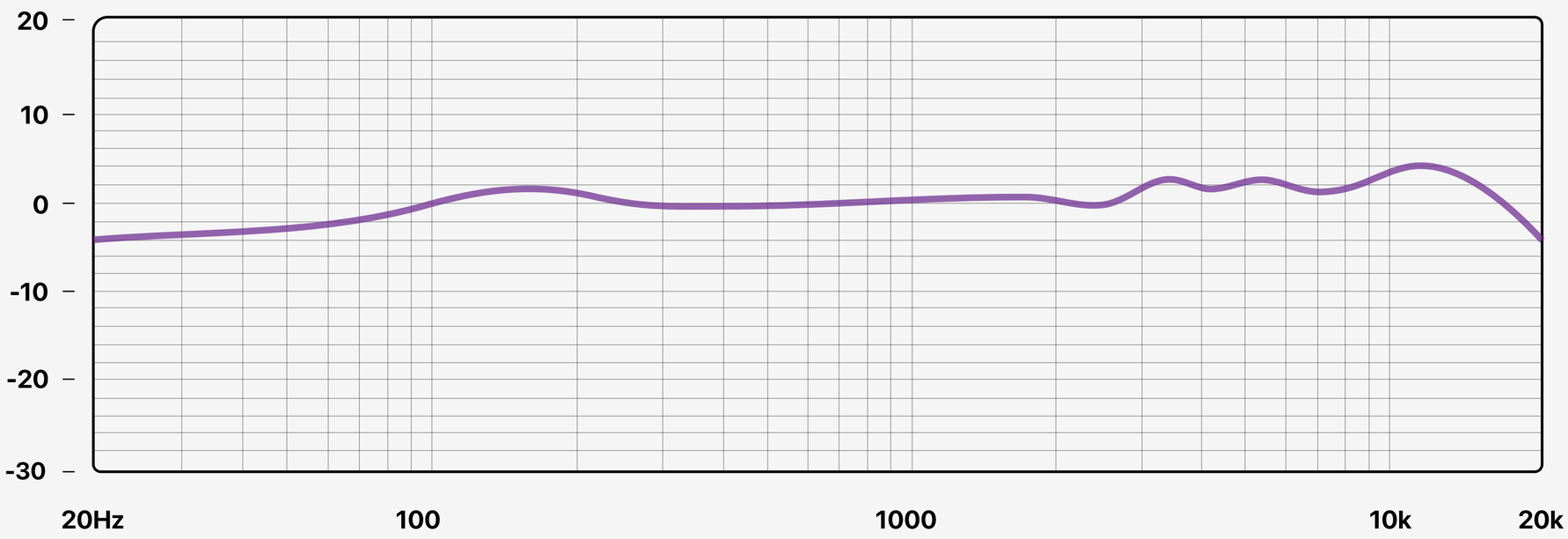
The recording stage is the time to create that perfect block of marble. No amount of EQ will be able to fix a poorly recorded vocal, so consider the recording stage part of your EQing.

A huge part of this is microphone selection. Each microphone uniquely boosts and attenuates certain frequencies, creating what's known as the mic's frequency response.

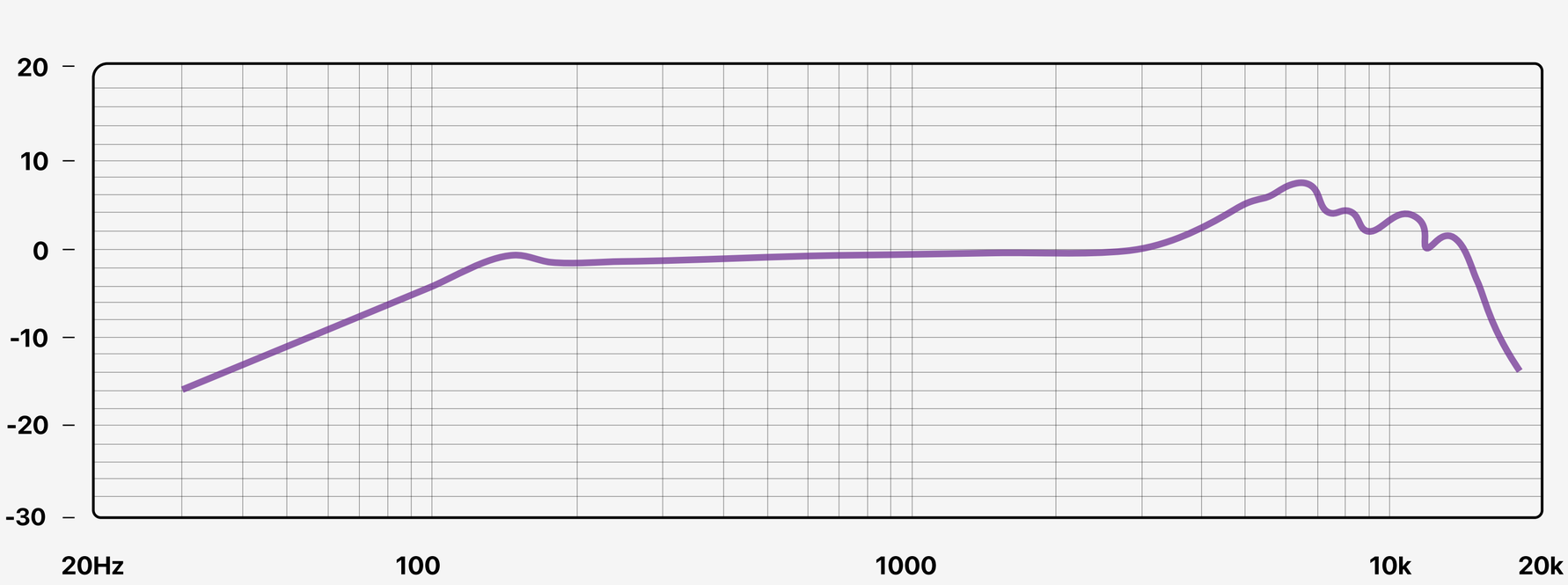
In other words, it's like having an EQ setting on your microphone that "you can't really get rid of." Some microphones actually have frequency responses that producers actively seek, but as you may imagine, those microphones are incredibly expensive for the most part.

One of the most common microphones in home recording studios, the Rode NT1-A, is fairly known for it's jagged high end for example.

RODE NT1-A



SHURE SM57

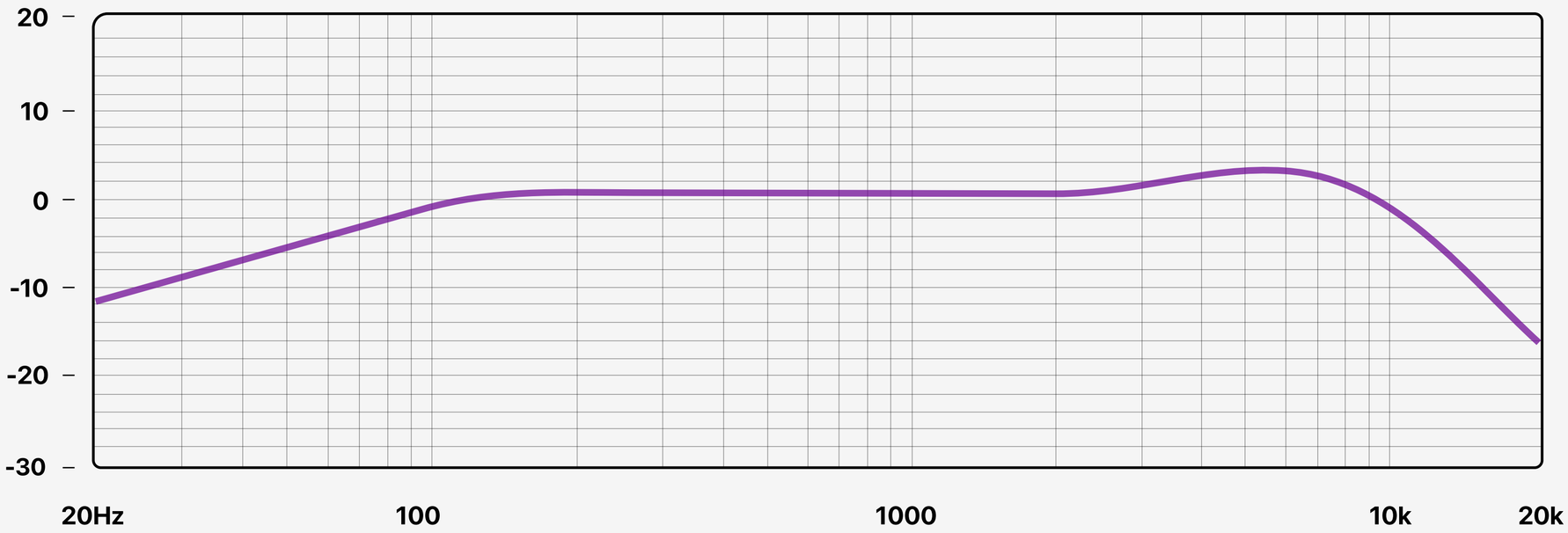


CYMATICS

Vocal
EQ
Cheat Sheet

EQ'ing While Recording

NEUMANN U87



These are some of the most common recording microphones that beginner producers or home studios may have and their frequency response charts.

Microphone placement also has an impact on the frequencies that end up in the recording. If the vocalist sings way too close to the mic, the low end will be emphasized. If the vocalist is far away from the mic, some lows and highs can drop out.

Having the vocalist sing from 5-8 inches away from the mic results in a nice, balanced recording. You can experiment with closer or farther mic placement for different sounds.

Incredibly, a lot of producers forget how important the performance is in terms of frequency content. If the vocalist sings monotonously and dully, it'll take a lot more EQ work to brighten the vocal up.

Make sure you motivate your vocalist properly and give her/him proper feedback while recording to make the most out of your session. You're going to have to work with the performance you get, so be sure to get the take you want before even worrying about EQ.

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Vocal
EQ
Cheat Sheet

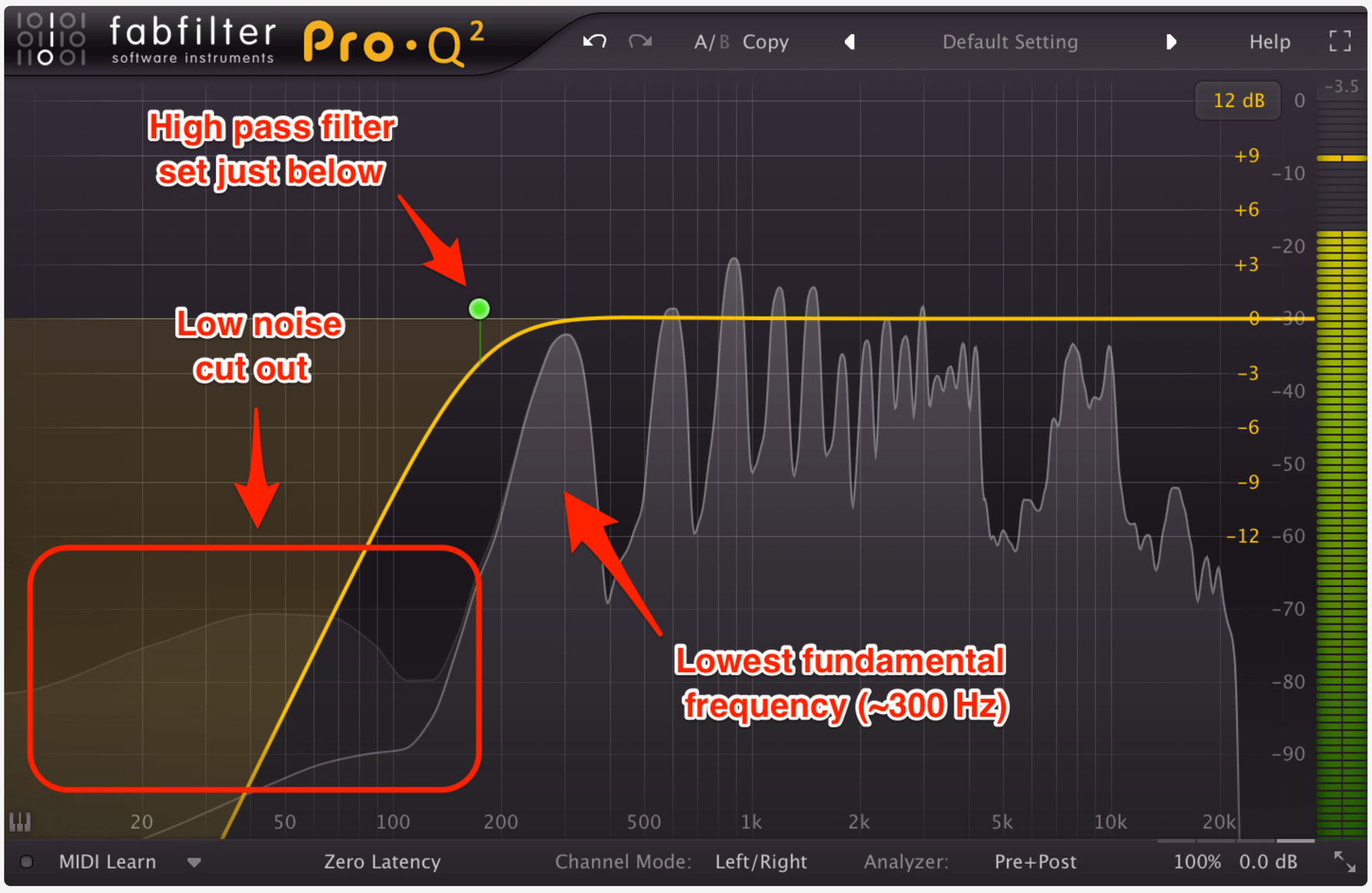
Subtractive EQ (Cutting)

It's worth starting this section by saying that as a vocal moves from note to note, problem frequencies can move around too. The cuts you make will also affect multiple notes differently as the EQ bands will stay in place while the vocal moves around.

You will have to trust your ears and assess whether you want to keep a static cut in the EQ, automate the bands to move along with the problematic frequencies, or use a dynamic EQ.

For the sake of simplicity, we will stick to static EQ cuts in this section.

It's usually a good idea to cut the deep lows out of a vocal. Even if the singer doesn't go into this range, the mic may have picked up room noise that sits down there, which can eventually overlap with elements like the bass or synths in the final mix.



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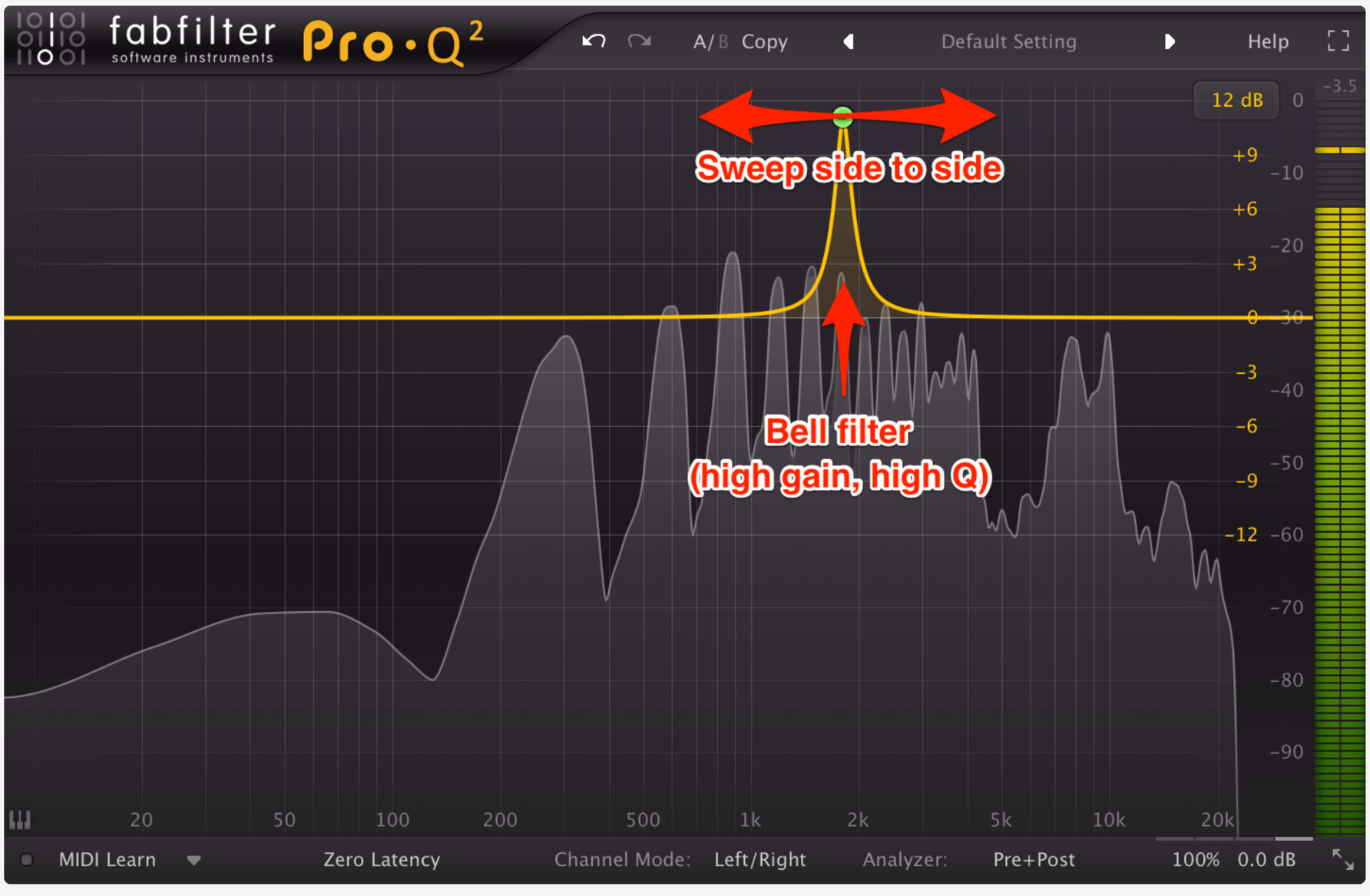
Vocal
EQ
Cheat Sheet

Subtractive EQ (Cutting)

Be sure not to use a broad Q or bandwidth on this high pass filter, as over-cutting can sterilize a mix and make it sound less professional. A slope of 12 to 18 dB/octave should work just fine.

Apart from cutting the lows, most other cuts should be done situationally if there's a specific problem that needs to be solved.

If you hear a problem but don't know where in the frequency spectrum it is, create a bell filter with a high Q value and boost it quite high. Sweep this narrow boost slowly from side to side.



CYMATICS

Vocal EQ Cheat Sheet

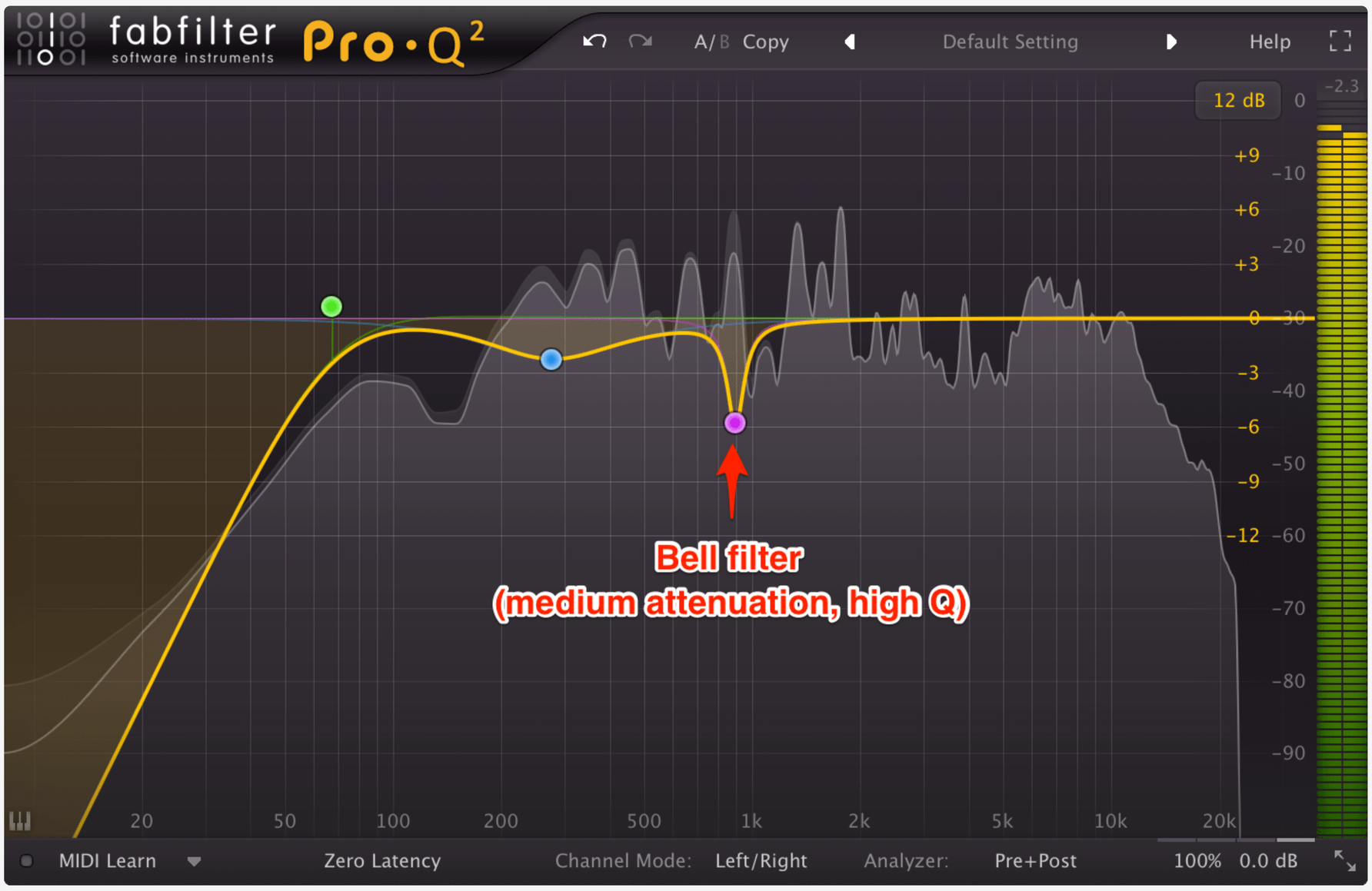
Subtractive EQ (Cutting)

Feel free to boost or attenuate as much as you need, but be sure not to go over the top. Keep using professional tracks as a reference or northern star to guide your mixing decisions.

Often times, you may hear a vocal described as nasal. This generally means that there are some resonant peaks between 500 Hz and 3 kHz. This nasal quality is often just a characteristic of the singer's voice, but can usually be handled quite easily.

Since we previously talked about creating the perfect block of marble since the get-go, mic placement can help tackle this issue without having the need to EQ.

Try getting your vocalist to sing off-axis and A/B the results.



Another problem that can come up when EQing vocals is sharp sibilance. Sibilance is the term used to categorize consonants that produce hissing sounds, like s, sh, ch, z, zh, and sometimes t.

Unfortunately, a pop filter won't tame these either, as they're meant to soften plosives; Sounds like b, d, g, p, and sometimes t and k. You can use the bell filter technique to find sibilance and attenuate it, but we'll go over de-essing later in this book.

Most times, a compressor will follow the subtractive EQ in a vocal processing chain. The compressor will probably bring up some of the cuts done in the EQ, so it's up to you to keep tweaking these settings to get the desired balance or compress beforehand.

Neither approach is wrong, you will have to experiment and see which yields the best results depending on your vocalist and track.

Vocal
EQ
Cheat Sheet

EQ Boosting

A decent rule of thumb for additive vocal EQing is to boost some of the highs, mainly above 5 kHz. This accentuates the consonant sounds in the vocal and gives it some "air", making the vocal clearer and the lyrics easier to understand just as we previously mentioned.

There are other ways to brighten up a vocal including saturation, distortion, and harmonic excitement. All of these options can be considered in a real life scenario, but since EQing is the main focus of this book, this will be our approach.

Once again, referencing a professional track that is similar to what you're trying to achieve stylistically is the best idea.

If it's needed, you can also add a little boost around 1-2 kHz. As we previously mentioned, this is the frequency range that evokes emotion and that the human ear has most affinity for.

If the vocal is still missing some presence while the highs are boosted, a bit of a boost here can help improve the intelligibility.

Pro Tip: *Keep in mind that over-boosting here can cause the vocal to have the nasal sound that we're generally avoiding. Sometimes the best way to improve the clarity of the vocal is to just EQ these frequencies out of other elements.*

Vocal EQ Cheat Sheet

De-essing

Sibilant sounds are generally made by pressing air through the lips or tongue, so having the vocalist sing close to the mic can also accentuate this problem—besides plosives.

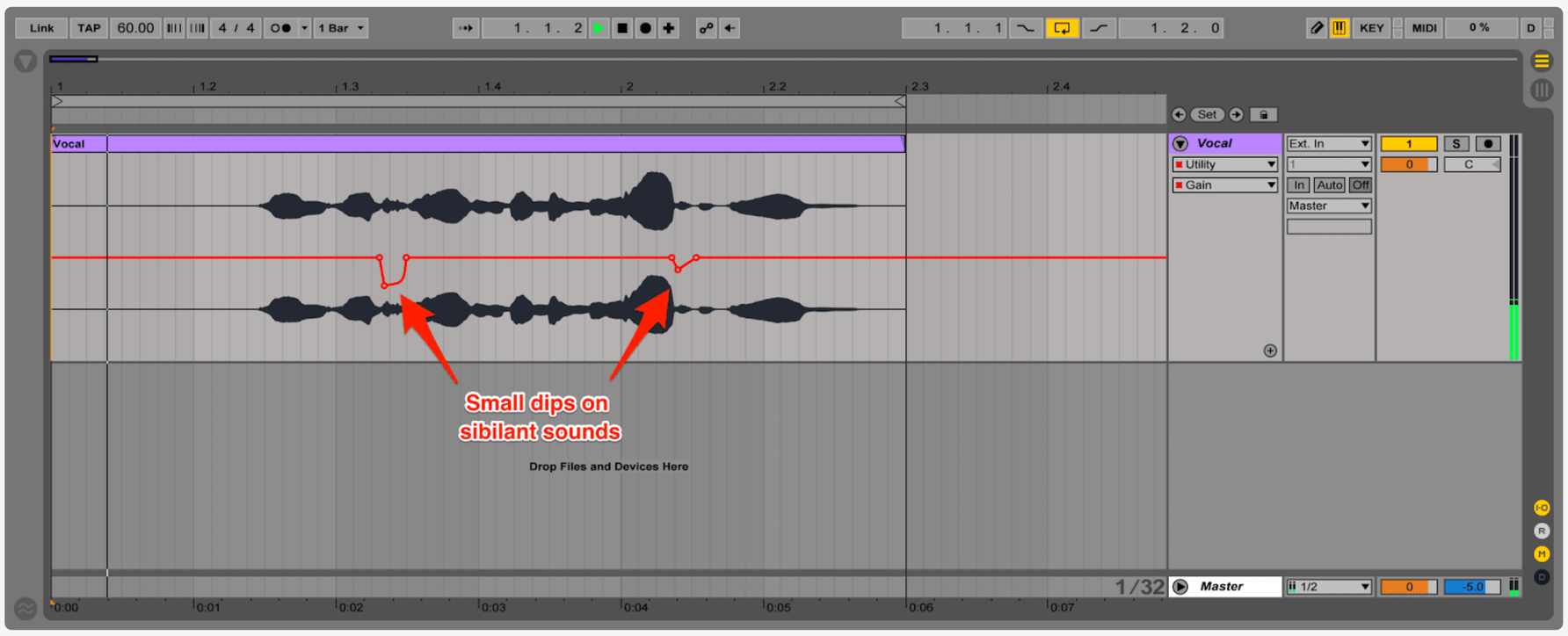
To reiterate, aiming the microphone a bit lower toward the vocalists' throat can decrease the sharpness of these sounds, and it should be your first line of defense.

We've also already mentioned another way to deal with sibilance using an EQ. Simply use the bell filter technique to find the right frequency (usually between 3-10 kHz) and attenuate it with a fairly narrow bell filter.

A better, but more tedious solution is using gain automation. Slowly go through the vocal performance from beginning to end, decreasing the vocal's level during sibilant sounds.

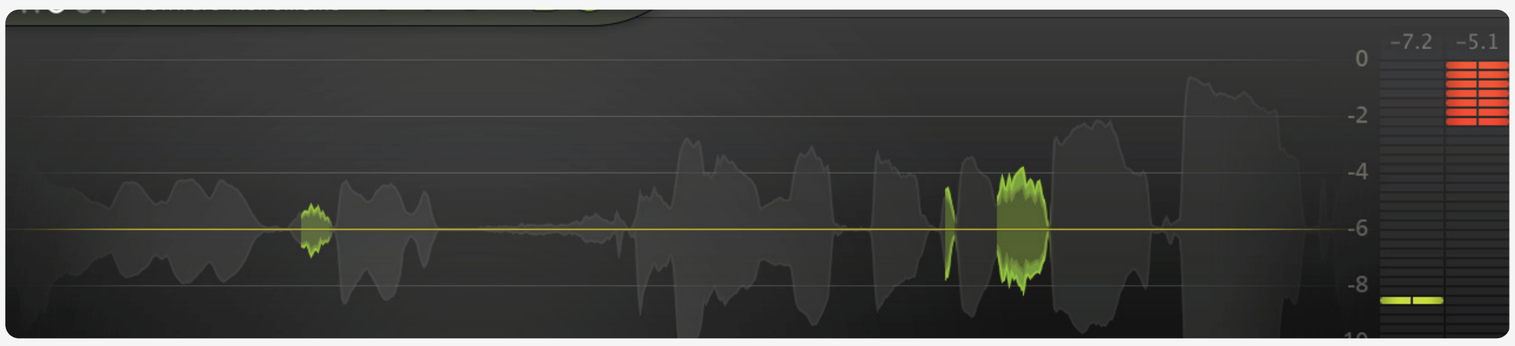
Gain automation is technically the clearest and most consistent form of de-essing. But tons of tiny volume automations can be a pain to set up...

Thankfully, we have access to plugins called de-essers.



De-essers are basically multi-band compressors that focus on taming sibilant sounds, which are generally split-band or wideband. A split-band de-esser will just compress the high band when it's activated, while a wideband de-esser will compress the whole audio signal when it's activated.

FabFilter's Pro-DS has both split-band and wideband modes and it's extremely transparent, so it makes a great option as a de-essing plugin.



De-essers should generally be applied after compression in the processing chain. Placing one before a compressor will require much harder de-essing, as the compressor will bring these sibilant parts back up.

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Vocal
EQ
Cheat Sheet

Final Thoughts

EQ is one of the most important tools producers have for mixing, especially when dealing with vocals. The control that EQ's offer allows you to work like a surgeon, boosting and cutting to fit the vocal perfectly into the mix.

The key to increase your chances of crafting a professional sounding vocal every time is to always keep in mind what you're trying to achieve stylistically.

Even though some terms stay the same to describe vocals across multiple genres, no vocal will ever be processed in the exact same way.

For example, nasal frequencies may live in a certain frequency range, but they will vary for every single vocalist you work with, especially between male and female singers.

Finally, we mentioned in this guide that mixing a vocal should be like fitting a piece in a puzzle (your mix). These fundamental EQing techniques are just one piece in the even larger puzzle that is crafting professional sounding vocals.

You still need to deal with compression, time based effects such as reverb, delay, choruses, flangers, backing vocals and harmonies.

However, we hope this guide has given you some insight on how to start EQing your vocals and spark some new inspiration.

Happy vocal processing!

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