Add Faux Look-Ahead To Your Compressor

A NOVEL APPROACH

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1 Preface

Recently I recorded a friend´s guitar playing and singing. The tracks were pretty unbalanced in volume, so I reached out for a compressor. Due to lack of practice, I keep forgetting the ins and outs of those units. It comes in handy that I have made an extensive write-up for just those cases. Actually, the write-up was originally done solely for my own needs, but it would have been a shame not to share it [Gragger2022].

I do by the way increasingly stand by my opinion that one should rather harness a compressor without bells and whistles than get carried away by the alleged *mojo* of iconic units, whose intricacies and imponderabilities invite confusion rather than problem solving.

I have mentioned that I was using Reaper´s **Reacomp** due to the sheer versatility of it. It was and is still unparalleled in the possibilities it offers. However, they seem to treat the public version step-motherly, which is comprehensible. So for the reasons mentioned in the above document it sadly seems increasingly technically outdated.

So I was looking for a replacement. I just recently stumbled over **Melda´s MCompressor** (the free version), although it had been in front of my nose for quite a while. This has practically all features **Reacomp** has, except for *look-ahead*, plus it does not suffer from the flaws described and and it is well maintained. I also looked at their **MModernCompressor**, that *does* have look-ahead besides an incredible amount of powerful MIDI features (which I will never need). Unfortunately, they dropped the now standard compressor visualization that shows the knee in favor of a *level distribution* view - whatever this may be – and the very powerful *custom shape transfer curve editor*. This is not helpful for my purposes and I dislike the view of it. Unfortunately this spoils the game for me and keeps me from obtaining one, since the price is reasonable.

They also have a *dry/wet mix* control, which is of questionable value since most parallel compression solutions will use a bus. They also incorporate a *parametric EQ* with 6 nodes into the side-chain (rather than a basic hi/low-pass), but this can be realized externally for the same reason.

This compressor however does not have the option to derive the side-chain from the output, in other words, to chose between *feed-back* and *feed-forward* mode. That said, I am not aware of any *versatile* unit besides **Reacomp** that does. On the other hand, it is questionable anyway how well **Reacomp** performs in this respect [Gragger2022, chpt. 6.5]. So this can be safely ignored.

But back to look-ahead. There are some cases where you genuinely *do* want look-ahead, such as for limiting (although that is not what I would try to do with a stock compressor at all cost), for applications that are supposed to *duck fast transits* and for certain *parallel compression* applications.

Interestingly, during the course of that, I also discovered **TB F│X4** (spelled TB Flex and optically resembling TB FIX) that comes with **Mixcraft** from version 9 on and can be downloaded for free from the **Toneboosters** site. This can be a conventional *static EQ* (albeit much more sophisticated than many others), but linked to a compressor it can be a very powerful *dynamic EQ* for performing surgical sound tasks. It is thus in function not unequal to **TDR´s Nova**, but appears even more powerful considered the unconventional possibilities its compressor and EQ sections offer. And – it´s completely free.

It does not have a conventional rate control, but you can instead drag the nodes and shape the transfer curve to any shape you like. This allows for *negative compression rates*, and there are few compressors that can do this.

This way you can achieve very heavy attenuation not easily possible on conventional compressors, like ducking a voice reverb for a bone-dry into-your-face voice and lush reverb tails in between.

Again, this device too, does not have look ahead, which can (and will) spoil the game.
So the creative mind goes looking and finds.

The findings appeared to be so useful that it would be a pity not to share it.
It was no question that I should make a written, printable document instead of opening a thread in the forum, since readability is of paramount importance. The preceding publication has proven this a hundred times.

There are a several approaches to adding a faux *look-ahead functionality* to a random compressor, and I will shortly address those, however the one depicted in the following has not yet be seen before and is considered most elegant.

This text is dedicated to those people at **Mixcraft** Forum, who are always willing to help and to all those somewhere out in the vast fields of the internet who share their knowledge freely.

If anybody wants to collaborate or detects any errors, or anything is perceived missing, or if something is deemed in conflict with law by any means, please contact me under **aquataur9999(at)gmail.com** and I will do the best to rectify this.

Have fun,

Helmut Gragger, The Tyrol, Austria, 2023

2 Methods To Add Look-ahead To Your Compressor

B efore we dive deeper into the matter, I invite you to fire up your DAW with a quick project to evaluate the merit of the compressors mentioned and of the quality of ducking you get with them. Join me on this journey.

2.1 A DAW setup to evaluate look-ahead for ducking a reverb

Set up a **Mixcraft** project this way:

This is a setup of a conventional *reverb ducking* compressor utilizing its *side-chain* as it has been described endless times. The compressor will "listen" to the snare directly and duck the reverb somewhat. We will build upon that and improve it.

- Create a new project.
- Create two VI tracks and place a few MIDI events in it. Assign one to **Acoustica drums** > Snare and the other to Kick.
- Loop over it. You should hear a bone-dry snare and the kick.
- duplicate the Snare track. Name it *Snare-ahead*
- Create a send track. Name it *Snare-reverb*
- Send the Snare into *Snare-reverb.*

Up to now this has been a totally conventional *reverb bus* setup.

- Insert a reverb with a very long tail into the FX stack of *Snare-reverb.*
- Insert a compressor of choice following it and side-chain it to *Snare*

This setup works to an extent. However, it reaches its limits when you want deep attenuation (due to a limited *rate*) and when you have very steep and powerful transits in your audio material (since the compressor is too late without look-ahead). Unfortunately neither of the two targeted compressor units mentioned above offers this possibility. But there is several solutions to that.

Let´s first explain what we are talking about.

2.2 But what *is* look-ahead?

> „This function magically looks into the future, analyses the upcoming signal, and triggers the compressor to start compression earlier than the occurring transient. Well actually…this isn't completely true. This function can't really "see into the future". Instead, it allows a compressor to react to a signal earlier, by means of a side chain."
> - Danny Anthony [Anthony2017]

This "earlier reaction" is achieved by either advancing the compressor´s reference (the side-chain signal) by several milliseconds, or by delaying the incoming signal(s) by the same amount.

2.3 Approach #1: delay by manually shifting the reference signal earlier

> „The look-ahead function duplicates the incoming signal, which is then delayed (by the amount that you set the look-ahead value). The non-delayed signal is fed to a side-chain that drives the compression of the delayed signal. That signal is then outputted with the rest of the tracks."
> - Danny Anthony [Anthony2017]

This is in accordance to the basic idea of a look-ahead function (see also **Izhaki** [Izhaki2012, p. 287]). Note that **Anthony** does not quite adhere to his own scheme in so far as he does not delay the main signal, but nudge the duplicated track *earlier*, which yields the same result relatively: the signal "seen" by the side-chain comes earlier, while all other tracks remain (time-wise) where they were before. An equivalent method has been described by [Cooper2015] and shown applied in [Cooper2016].

It is very simple and works great, unfortunately precise *nudging* (moving by small defined amounts) of a track along the timeline is not easily and predictably accomplished on **Mixcraft** (at least with the current version). Agreed, this is probably not needed very often. But this method phases out for that reason. Note also that this method does not disturb any other tracks for matters of playing in synchronicity, like the subsequent method does.

2.4 Approach #2: delay by using a delay-plugin

Well-known **Craig Anderton**[1] uses a different approach by creating the necessary time-delay through a conventional sound-delay-plugin. For distinction, this means *a sound-forming device* akin to *reverb* or *echo* and not a specialty tool that just inserts time-shifts without interfering with the signal per se.

> *„Create a bus, and insert the Analog Delay. Edit the parameters for 2 ms of delay,*
> *delayed sound only, and no modulation (...)”*
> - Craig Anderton [Anderton2021]

Note that **Anderton** uses a bus (a *send track* in **Mixcraft** lingo) for the signal destined for the side-chain. This does not work in **Mixcraft**, it does not provide send tracks on the list of candidates for the side-chain. We would have to use a duplicate of the to-be-treated signal as the earlier method does.

As different to the previous method, and in total accordance to the **Izhaki** method, he delays the main audio signal by an amount. This leads us to the problem that *all* of the tracks in the given project would need to be delayed to remain in synchronicity:

> *„However, there's a catch. Studio One plug-ins with a look-ahead function delay the*
> *signal by 1.5 ms, but apply plug-in delay compensation so that all the other tracks are*
> *delayed by 1.5 ms. This keeps the tracks in sync, and you don't really notice a delay this*
> *short. However, our 'faux look-ahead' doesn't have plug-in delay compensation. Then,*
> *move the track forward on the timeline by 2 ms to align it with the other tracks.”*
> - Craig Anderton [Anderton2021]

He then nudges the resulting track again to keep it synchronous? The tutorial is somewhat confusing and ragged.

Anyway, with this approach you are at the mercy of a suitable delay plugin that you trust not to mangle your signal otherwise.

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1 Author/musician Craig Anderton is an internationally recognized authority on musical technology. He is particularly well known to electronically inclined musicians by his early D.I.Y. music electronic books.

2.5 Approach #3: Use the DAW´s *insertion delay compensation*

Sidestep: What is insertion delay compensation (a.k.a latency compensation)?

I must explain what this does, a short side step is unavoidable.

Imagine you have three tracks without any FX. All play in synchronicity.
Now you install a plug-in into the FX stack of the third one, which inevitably consumes some processing time. By the time the audio played appears on its output, it will be delayed in relation to the other two tracks. Or to put it differently, the other two ones are ahead of it. The term for this is *latency*.

Let´s for the moment assume the plug-in in question consumed 10 ms (to just quote a handy number), so the other two tracks would already play for 10 ms until the plug-in could output its audio, *if the DAW did not compensate for this*. They were thus playing earlier by this amount.

A "behaved" plug-in of course reports its time consumption to the DAW, which automatically issues equal delays to all other tracks, so that they are in synchronicity again. You don´t even know this happens.

But obviously some plug-ins are misbehaving in so far that they do not report the (correct) latency, so **Voxengo** invented their (free!) **Latency Delay** plugin, which does nothing fancy to the audio, but corrects the plug-in delay. They call this an *auxiliary plugin* for that reason.

> „*Latency Delay introduces 10.000 samples latency itself and delays the audio signal by 10.000 minus the specified amount of samples or milliseconds, thus eliminating the unreported latency.*"
> - Voxengo Latency Delay User Guide [Voxengo]

Note that this has the potential to be misleading. It is not phrased very clever. The way this is written may make you assume that additional delay is applied to the track that hosts the faulty plug-in as the cure. This would not make any sense, since we are trying to undo exactly this damage. It rather reports a latency value to the DAW that not only cancels out its own latency, but also the latency of the faulty plug-in by issuing an appropriate delay *to all other tracks* playing. The reported latency value is then *the sum of its own latency plus the dialed-in value* and thus *higher* than its own latency.

Conversely, if the plug-in had a way to manipulate its own latency, they would report 10.000 but actually consume less by the specified amount.

In both cases, when you view this backward, the reported latency for the track hosting the faulty plug-in is by the dialed-in amount smaller than the compensation delay issued to all other tracks. In all cases, they *report* a latency bigger by the specified amount than they consume. So the way they describe it in their manual is a pretty gnarly way of putting it.

Finally, for our purposes (when all plug-ins behave OK): if we install **Latency Delay** into a slot and select 10ms, then *all other tracks* are exactly those 10ms late, because the DAW compensates for this. The now relatively *earlier* coming track is destined to be our compressor reference and does not contribute to audio directly, so we have no problem with phase shifts. Bingo, this is our look-ahead time window.

2.6 Visualizing the faux look-ahead and making it audible

Let´s visualize what we have achieved until now on **MCompressor.**

- Plug **MCompressor** into the FX-slot of *Snare-ahead* instead with fast settings and *custom shape* (thr and ratio do nothing in this mode)
- Detach the *display window* and make it bigger.
- Enable (right-click on the window) traces:
  ◦ gain reduction (gray)
  ◦ level detector (green)
  ◦ input waveform (blue)
  ◦ side-chain waveform (red)
  ◦ output waveform (dark blue)
- Insert **Voxengo´s Latency Delay** into the FX stack of *Snare-ahead*

- Play with the millisecond control on **Latency Delay** and behold how the compressor clamps early before the transit (red, green and Grey curve). (Note that the release is too short to be practical). You have gained some time do dial in a more musical attack now.
- Using something like 60 ms[2], turn *Snare-ahead* ´s replay volume up just a wee bit and actually *hear* the doubling of transits and how the side-chain´s transit comes earlier.
- Alternatively, turn *Snare-ahead*´s replay volume up fully and *Snare*´s replay volume to zero to hear a loud click for the early signal coming

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2 Those settings are no real life scenario, they are chosen to expose and exaggerate the effect for our exercise. For a practical look-ahead you would choose much less.

from *Snare-ahead* and the "regular" signal coming from *Snare-reverb* at a lower level (due to the compressor). You get the swing. Or Rock. Or Jazz.

2.7 Deep, deep ducking

The **TB F│X's** *negative rate* yields really deep, deep ducking.

- Dial in 10 ms on the **Voxengo** to expose the effect.
- Set the track volume to zero.
- Install any old gnarly reverb with a long tail that extends into the next snare hit on *Snare-reverb*. Mix= 100% wet.
- Remove **Mcompressor** and plug in **TB F│X** instead. Turn on one EQ section and set it to **low pass** extending up towards the upper frequency limit.
- Turn on the compressor, min attack, min release, hard knee
- Direct its side-chain to *Snare-ahead* (pre-control)
- Create a downwards slope on the curve for a negative rate (see picture)[3]
- Set the center node correctly for a suitable threshold.

When you turn on and loop audio, the EQ should pump downwards in a broad-band manner.

- Listen to the reverb with headphones. You can clearly hear the reverb ducked massively by the snare hits.
- Turn the compressor off and behold how the reverb tail extends into the next snare hit.
- Turn it on and behold how it is "carved out".
- Play with the latency. Turn it up to 60ms. You can clearly hear how it "carves out" around the snare hits, and how the ducking comes "early". Turn the delay off, and you can clearly hear that the compressor is not fast enough to catch the peaks without the look-ahead[4], despite fast attack, while the release side works well.

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3 Note: ultra conservative settings have been chosen for the picture's sake. You can choose much more extreme settings on the nodes.
4 Neither will it be fast enough for explosive vocals. Practical values therefore are probably in the millisecond range.

Alternatively, turn off *Snare* volume to hear the ducked reverb exclusively.

With the very low threshold in custom mode, **MCompressor** can achieve respectful ducking too, but **TB F│X** clearly wins out.

Note: keep in mind that Mixcraft evaluates the insertion delays upon *replay start*. It can compensate for a plug-in that is activated during replay, but *not* when it is taken out during replay. This can lead to funny synchronization problems. **Stop replay and restart** every time you take out a plug-in.

3 Final words

Look-ahead is not something you need everyday, so few compressors are equipped with it, or at least have the control *user accessible*. The approach described in here is a very powerful one in enabling you to upgrade your otherwise excellent compressor with that functionality into the bargain. It is precisely adjustable, painless, consumes low CPU, does no audio mangling, and it´s for free.

TB F│X has performed incredibly well, but the overall winner *for generic purposes* is **MCompressor.** Its sibling, **MModernCompressor**, phased out due to the unusual (and for me unusable) display. A pity they dropped the classic display capabilities, because having this option select-able and (if necessary) dropping some MIDI function instead, which (to this extent) is of questionable value in a compressor anyway, would have eliminated the need for a faux look-ahead function, and indeed, the need for writing this article.

And time and time again, when I read specialty literature about compressors, I feel humbled...

> *„Perhaps, after reading this chapter, those who used compressors in the past will feel that they have been flying a spaceship when they thought they were driving a car"*
> - Roey Izhaki [Izhaki2012, p. 267]

4 Disclaimer

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