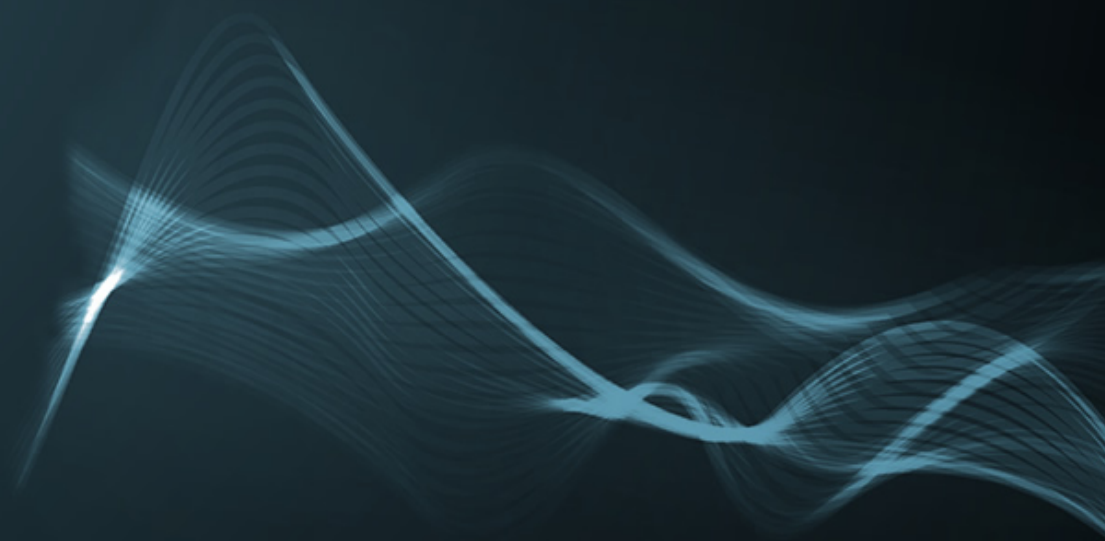


SAMPLECRAZE



THE LOW END

THE DEFINITIVE GUIDE FOR PRODUCERS

WRITTEN BY EDDIE BAZIL

The Low End: Demo Chapter

This is an excerpt taken from Eddie Bazil's book, '**The Low End**'.
To download the complete book with all audio examples, please go
to:

<http://www.mpc-samples.com/product.php/221/the-low-end/>

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Foreword

I have always been fascinated by low frequencies. Like a beautiful 'washing' pad sound I find low frequencies moving and vibrant. Some people will say that because a pad sound encompasses a wider frequency range, it hits the 'sweet' spot in terms of emotion and impact. I think that low frequencies can evoke the same feelings if handled correctly. I remember when I was younger and our car sound systems were limited in terms of features, but almost all of them had a 'bass boost' button. I don't ever remember not pushing that button.

Low End is a term that is used to describe the low energy of a track. Although many think it is simply the relationship between the kick and the bass, it is actually more than that. A frequency range is literally a range, so when other instruments reach into that range then they too have to be considered as part of the range. This is especially true in the low end. For example, sub harmonics (undertones) are frequencies that reside below a fundamental frequency. When we consider a harmonic series referenced against a fundamental, we must also consider the sub harmonics of the same fundamental in the same way.

However, for the purposes of this book I am going to focus on the relationship and management of shared frequencies between the kick and bass elements, simply because this area of audio production seems to be the hardest to overcome for writers and producers. I will touch on some related examples using sound design and engineering techniques for managing relevant low end range. Pads are a prime example because they invariably cause more low end problems than kicks and basses. By covering as many examples/exercises as possible, I will show that the core techniques used are the same for any sound.

For some archaic reason that I simply do not understand, people seem to think that low end management is a mystical and sacred art kept secret amongst those that have 'the gift'. It has become so overhyped that some producers call themselves 'low end doctors' or 'low end specialists'. For me, it is simply a matter of understanding and using certain principles and processes, nothing more. Of course, 'having an ear' helps, but that can be said of just about every area of sound design and audio production.

I decided, as with all my other books, to expose the myths that have been created in our industry, and to explain and guide you through a subject that has far more to do with sensible signal paths than any magical process.

I must say, I am blessed to have worked with so many talented individuals in my career, both as a sound designer and as a producer, and have learnt so much from them. The techniques and principles covered in this book stem from my own experiences and those I have shared with others. I hope they will help you as much as they have helped me.

Eddie Bazil

How to Use this Book

This book assumes that the reader has a basic knowledge of sound technology. The fundamental principles of sound are referred to, but not explained in detail, because they are already covered in the series of books I have written on audio technology.

There is no strict chronology in the way the chapters are structured, although one chapter will invariably flow into another. I decided to write the book in this format so that more advanced readers can skip to the chapter they want without missing too much preliminary information.

This book is not aimed at any specific genre, because the techniques and processes can be adopted for any style. However, emphasis and focus are directed at mainstream Dance and Urban genres, because they encompass most of the techniques covered in this book.

Screenshots & Diagrams

Wherever possible, I have provided both simple explanations and diagrams, and also more detailed and complex versions for readers who are more advanced. Each image used in the book is also provided at full size in the associated 'Images' folder for each chapter.

I am a firm believer in using images and diagrams to convey principles and processes. With this in mind, I have included as many images as possible to make the reading process compact and more enjoyable. An example of this would be a screenshot of the settings for a specific dynamic effect, with an explanation of the settings used, why those settings are used and how those settings were arrived at.

To write this in pure text format would result in page after page of data. A picture speaks a thousand words, and this is especially true in audio technology.

Each and every process is supplied with before and after audio files for you to use in the examples and exercises: this is the best way to demonstrate a process and far more useful to readers because they can see and hear the results themselves, and not rely on a promise of a result.

Audio Files

Each time I refer to an audio file, you'll see the  icon followed by the file name – the audio file itself can be found in the 'Audio' folder for the relevant chapter.

Please **don't click the icon** in the book and expect audio to play back! Although it would be ideal to embed all the audio examples in the PDF itself, this feature has

limited support and would have required heavy file compression. Because audio fidelity is of the utmost importance, this didn't seem like a viable option.

Technical Requirements

As far as possible, I have used the tools inherent in most digital audio workstations (DAWs) and audio editors. I am also a strong believer in using the right tool for the right job, as opposed to multifunction tools. Additionally, I have tried to use freeware or affordable plugins so that the reader can attain the same results as me without having to spend a small fortune on high-end products. All the products I have used in the writing of this book are made by developers whom I endorse wholeheartedly. Please support these developers, so they can continue to create such wonderful products for us to use.

Before continuing with this book, I recommend that when working with low end frequencies you either use a quality subwoofer speaker with your monitors in a treated room, or good closed-back headphones, otherwise you will not hear the sub frequencies. Domestic speaker systems do not have the bass extension required for you to reference really low frequencies accurately, if at all. At best, they reproduce only a compromised version of the low end by using the EQ section of a hi-fi system.

If you are using mid-range studio monitors without a subwoofer, then you will have problems hearing sub frequencies even in a treated room, because the response of the monitors will roll off at around 30 Hz – 40 Hz. You either need a good set of monitors with accurate bass extension *and* a treated room or, preferably, a good set of headphones. I use the AKG 712 headphones for low end work and they are just fine for my needs, even though my room is treated and I use a sub. The AKG 701/702s and the Sennheiser HD 650s are others worth trying, but the 712s are built specifically for low end referencing. I cannot overstress how good they are.

If you have no choice but to use your existing studio monitors that do not have good bass extension and are housed in a non-treated room, then try to work on frequencies just above the sub range (60 Hz plus).

I am using the Novation 61SL Mark 2 keyboard controller and Steinberg's Cubase 7 for the main DAW. The audio editor I always use is Sony's Sound Forge.

3. Filtering and EQ

I decided to dedicate a chapter to filtering, even though it is also part of the Energy and Referencing chapter, because it is one of the most common processes for managing low end tasks, and because it will come into play in the more advanced chapters.

The types of filters/EQ that are most common when it comes to treating shared frequencies are: low pass, high pass, band pass, and notch (corrective).

In the previous chapter we saw how to use side-chain compression to duck the bass using the kick as the side-chain trigger. This is a tried and trusted technique that has developed over the years into a fine art, and software developers have become aware of the importance of providing side-chaining for other processes and not just for compression. But the old school method of trying to marry a kick with a bass is to use filtering.

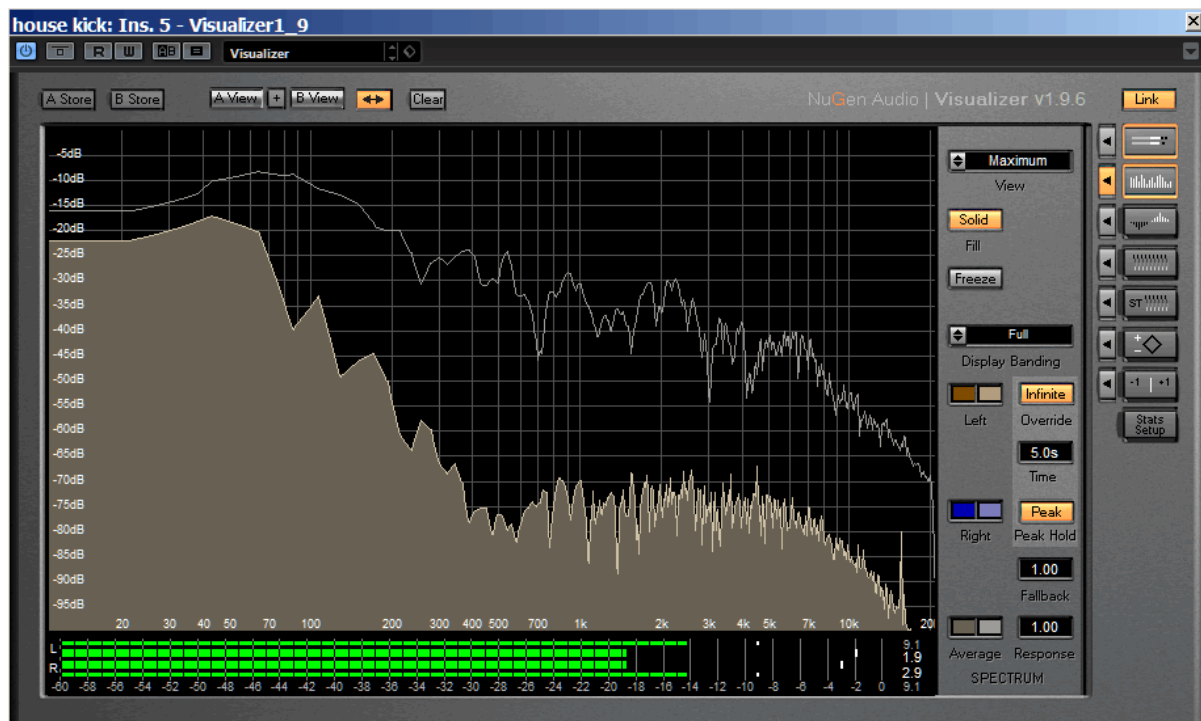
However, there are problems with this technique arising from the difficulty of deciding exactly which frequencies need filtering. This happens when the dominant frequencies of the entire low end are shared by the bass and the kick, and you are left with a hard decision: which element has to sacrifice its foothold on the dominant frequencies? An example of this would be when a tonal kick is vibrant and strong at 80 Hz but the main energy of the bass also lies between 60 – 100 Hz. What do you do? Do you filter the kick to allow the bass frequencies to shine through, or vice versa? Do you try to find a happy compromise and share parts of that particular frequency range between both sounds? Sure, we can use side-chain compression, but even here we have to decide which attack frequency transients have to be attenuated.

These types of situations call for different solutions, most of which entail the signal path. In the next chapter I will cover the signal path in detail because that is the engine for all your low end chores and is where the most important decisions take place. However, for now, let's run through some examples that can, on their own, be sufficient to get the low end working.

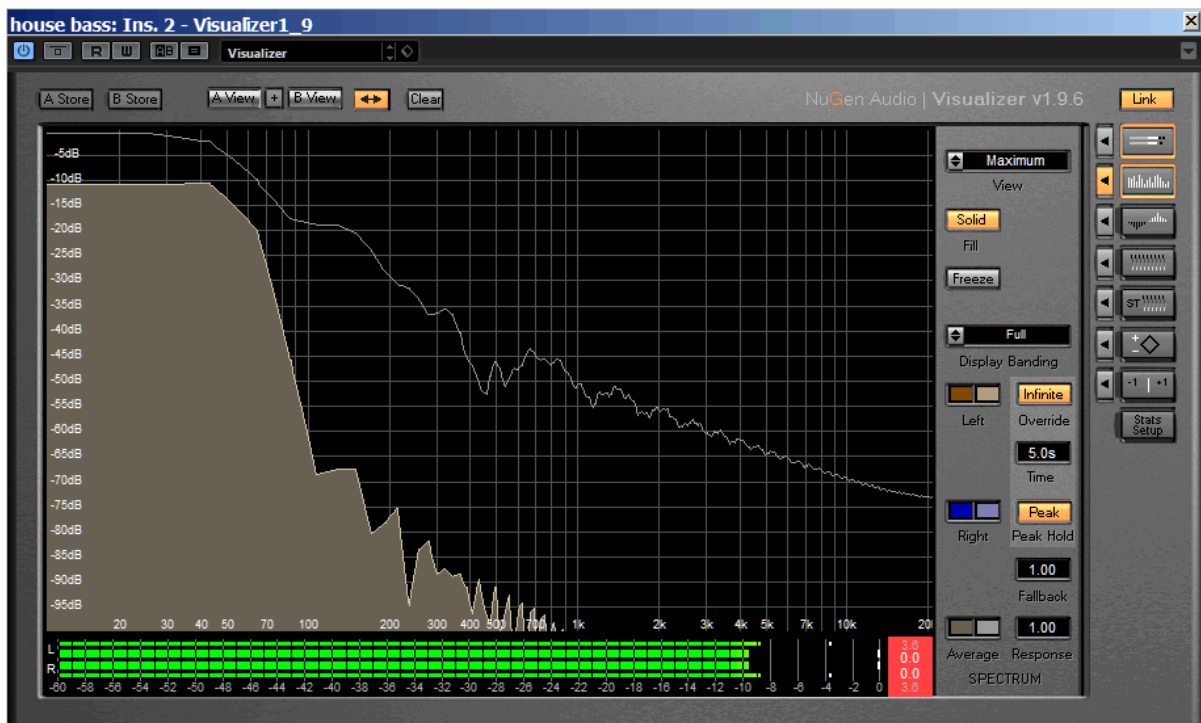
We'll start off with a simple separation example using an EQ to cut the dominant frequencies in the following audio files:



house kick mid boom

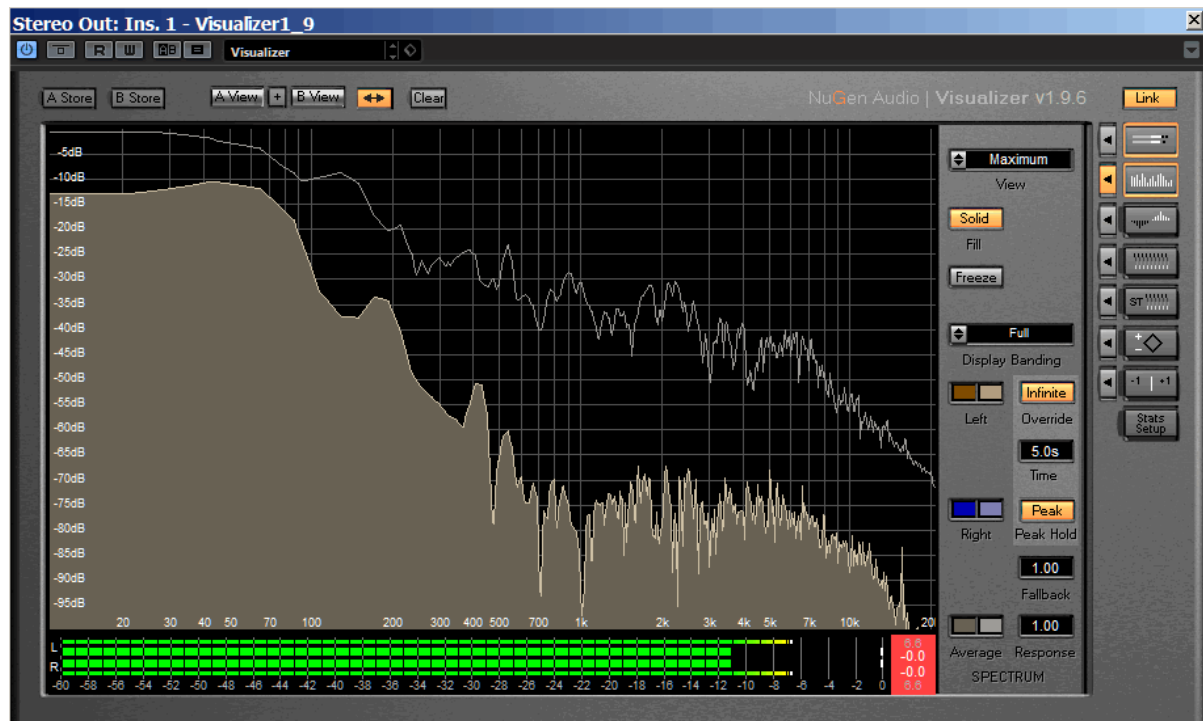


 **house bass**



The two together untreated:

 **house kick and bass dry**



The energy reference above shows the summing and masking taking place between the two sounds when played together. Our job is to allow the bass to breathe through without compromising the energy, or perceived energy (what we think we are hearing), of the kick.

I will now use the Softube Summit Audio EQF-100 and filter out everything on the output at 82 Hz, but gently shaping at 100 Hz with a boost. This allows the 100 Hz band to be boosted while cutting below 82 Hz. We leave ourselves a nice and tight frequency range with which to play. The removal of everything below 82 Hz removes some of the low end boom that was muddying the two together.



 house kick and bass filter 82

This time I am going to disable the output filter and cut at 100 Hz:



🔊 house kick and bass cut 100

Although the changes are pretty distinctive, the audible difference between the two versions is quite subtle.

Negative/Inverse EQ

Negative, or inverse, EQ is a much better way to work than positive EQ, and can yield more accurate results. So long as we are not working on a very narrow bandwidth, using cuts is preferred. The object is to do the exact opposite to what we have done above. Instead of boosting the kick at around the 100 Hz mark we *cut* the bass at the 100 Hz mark. This will allow the 100 Hz of the kick to come through:

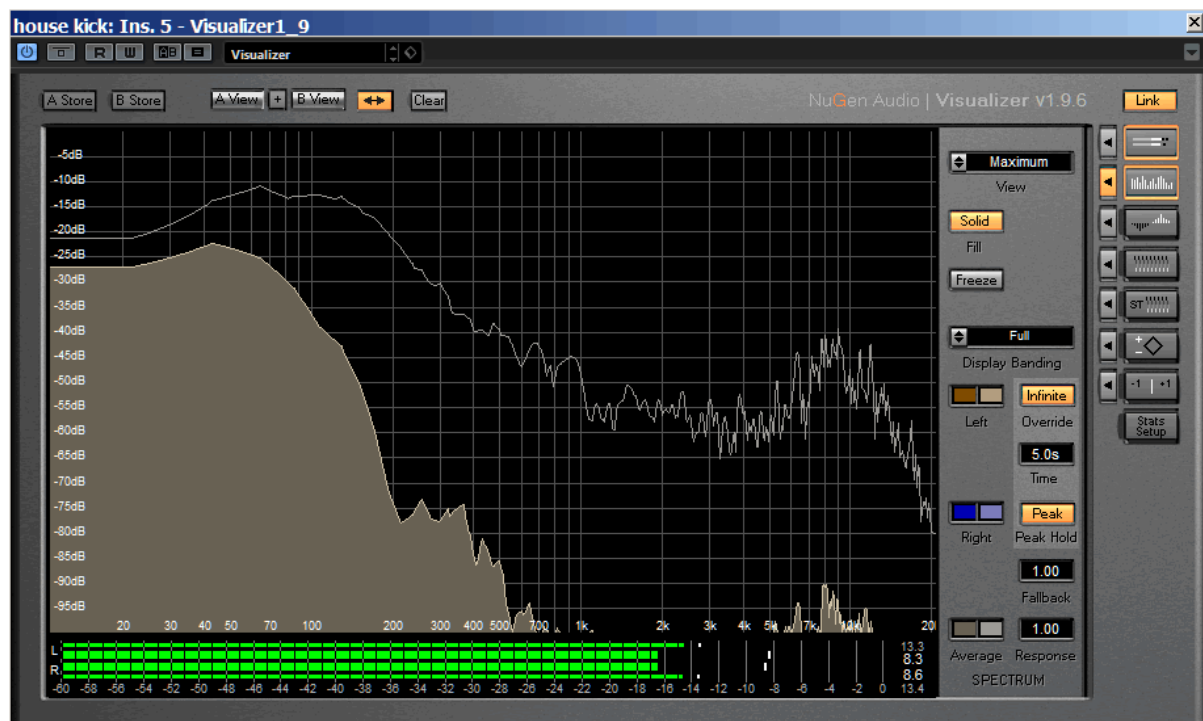


🔊 house bass cut 100

This version sounds cleaner and more controlled. Even though the sonic differences between all three (above examples) are subtle, the processes are different. This reveals something important: there isn't one specific way of achieving the same result.

This time I am going to use a kick sound that is dark, muffled and lacking definition – one of the worst types of sounds to layer with a heavy bass tone. The process to get the two to sit together involves cleaning the kick and then filtering the bass:

house kick 2



I will use Softube's Focusing EQ for the cleaning task:



house kick 2 cleaned

I have cut everything below 80 Hz and boosted the mid and high frequencies. The kick is now ready to be used with the bass.



house kick 2 bass filtered

A simple cut at the output removes any underlying rumble and cleans up the bass. Now the two together sound far better.

Up until now I have kept all examples nice and simple, and have had only two or three sounds to process in each example. So, what happens when managing low end in a mix context?

Let's run through an example that uses a lot of low end elements. I will show you some simple filtering techniques that will be the first port of call for any low end management. It really comes down to understanding the order of importance for various frequencies and how to process them in view of what follows.

I'll cover this topic extensively in the chapter on signal paths, but for now, we will have a little taster of what's to come.

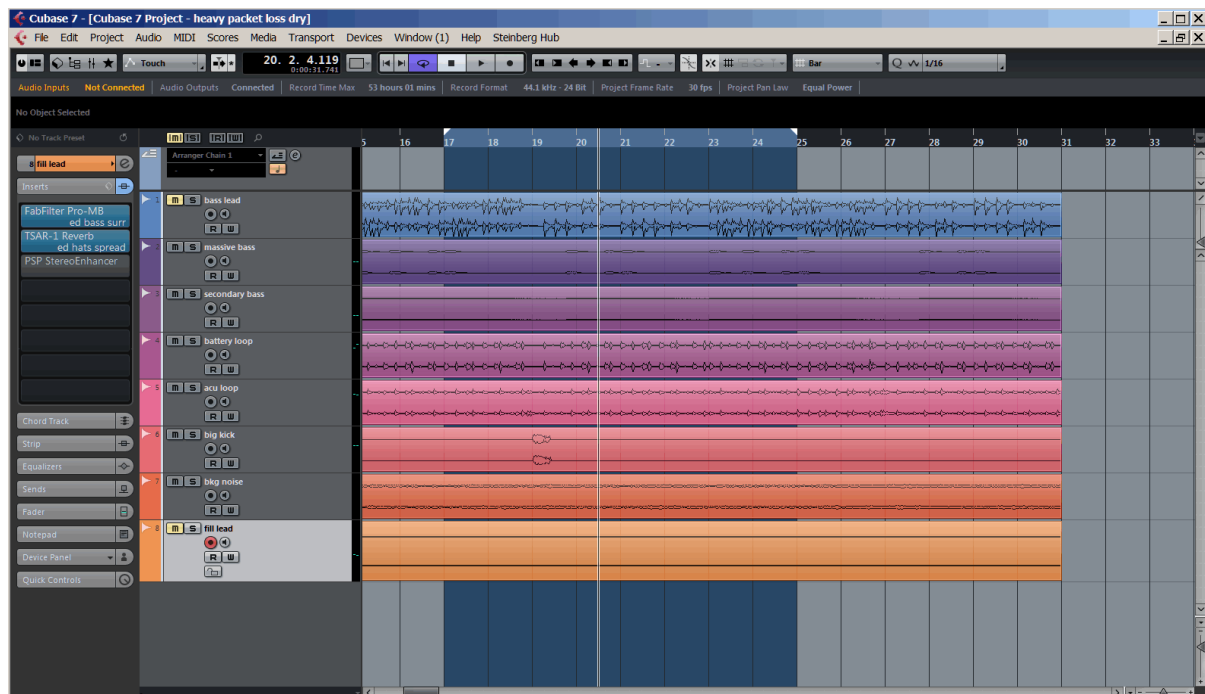
Mix Version

The following example will incorporate a segment from a track by my good friend and very talented musician, Matthew Oglesby. Check out Matthew's websites at:

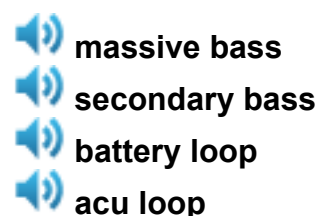
Soundcloud: <https://soundcloud.com/gdir>

Romantically Apocalyptic: <http://rom.ac>

The track is called 'Heavy Packet Loss' and here is the section I am going to mix:



The following are the individual stems for the mix:



big kick
bkg noise

As you can see, there are a lot of low end elements in the beat, and we will have to mix these in stages, rather than all at once as some do. We need to select a sound as the foundation and reference all other sounds to this. Because this is a Dance track I am going to start with the basses, then complement the basses with the drums. However, I will constantly be referencing at every stage and at some point might decide that the primary focus should change to be the drums.

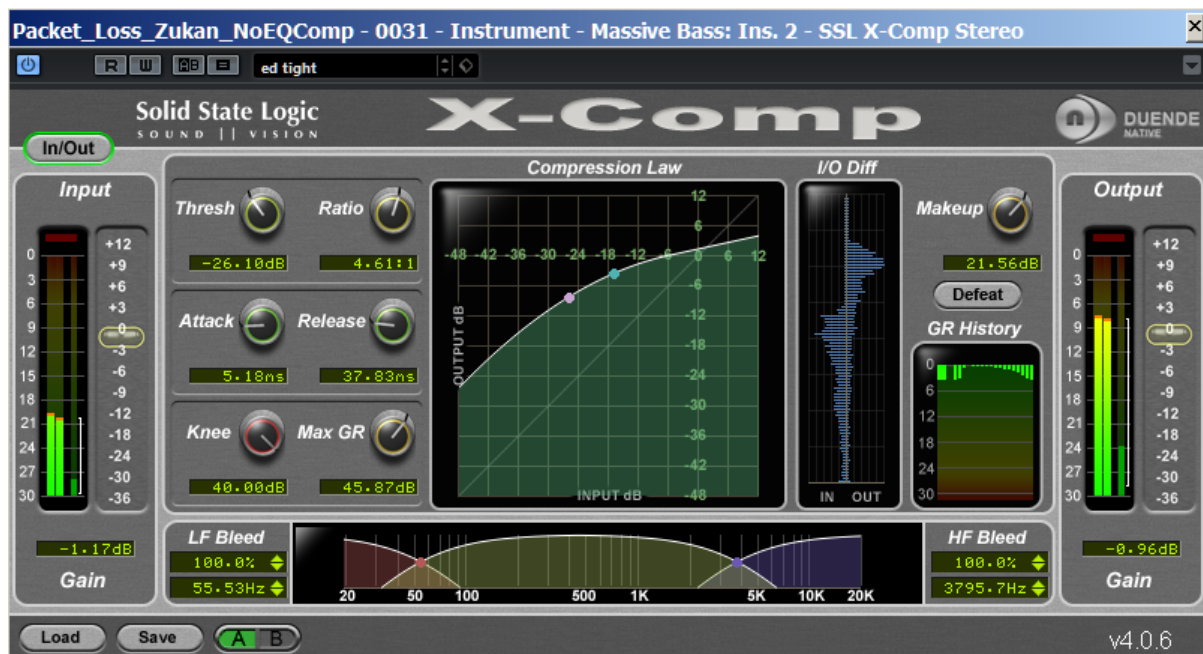
I am going to mix this beat in two different ways:

1. I will mix with emphasis on the kicks and bass
2. I will mix with emphasis on space and a tighter low end.

1. Kick and Bass emphasis

kick and bass emphasis

Massive Bass



hpl bass ssl comp

I must say, I really love the SSL X-Comp. The bleed section is such a potent feature that it makes for an endless array of textures. Using the LF and HF bleeds I can shape the range while referencing other low end sounds.

However, this bass is too dark and broody as a single hit bass, so I am layering it with another sharper and raspier bass.

Secondary Bass





hpl sec bass wet

As introduced earlier, the Tsar-1 Reverb by Softube has a lovely sheen to it and is one of the only reverb plugins available that has true stereo reverb. This allows for richer and more interesting textures.

I normally never use reverbs for bass sounds. This time I have made an exception because I have selected enough pre-delay to separate the initial reflection so that it comes after the sound's attack transients have passed. The longer pre-delay prevents the bass from ending up in mush land. The subtle tail of the reverb shines through when the bass is played in isolation but this tail starts to disappear when layered with the massive bass. However, this result lends itself to a nice and airy low end.

Next, the FabFilter Pro-L limiter comes into play, not only to strengthen the sound but also to add some more dynamic movement. I haven't applied any lookahead because I want no thickening of the sound. The late attack allows the attack transients to pass through and the short release allows the bass to swell. The 'punchy' style algorithm sounds lovely, but feel free to try different styles as they each have a pretty dramatic impact on the way the limiter behaves.

Battery Loop



The battery drum loop is already quite degraded and the kick part of the break sounds thin and hard. So, we have to get into some frequency management just to make the sound a little more presentable and useful. In particular, the kick needs some low end boosting and thickening.

To start the signal path I have selected my favourite multiband compressor, FabFilter's Pro-MB. I have split the battery sound into three distinct bands, each one directed to a very specific frequency range. However, to hear what is happening at the output we need to reference against the other two processors in the path – a compressor followed by a saturator. I always work in a linear and logical fashion, starting with a process that provides 'management'; in other words, I like to get my sounds clean, well-balanced and with acres of headroom before I get into any sound mangling. The first step is to select and highlight the frequencies that I want to process. For this, the Pro-MB is perfect.

I will cover the Pro-MB in later chapters, but apart from the extensive control this beast offers, it is the quality of the algorithms that make the Pro-MB sound musical and expressive. The fact that you can select compression or expansion for any band is a massive benefit.

I have configured the three bands to behave differently to one another. The low and mid bands are used in expansion mode while the high end band uses compression.

From the manual:

Dynamics Mode

'FabFilter Pro-MB can apply any kind of dynamics processing per band, using the Dynamics Mode buttons in combination with the Range knob. When the Dynamics Mode is set to Compress, use either a negative or positive range to apply downward (normal) or upward compression. The same applies to Expand mode.'

Downward compression

'Using Compress mode in combination with a negative Range will result in normal, downward compression. The dynamic range of the signal is reduced by attenuating peaks that exceed the specified threshold level.'

Upward compression

'Using Compress mode in combination with a positive gain does the opposite of normal compression: instead of reducing peaks above the threshold, it adds gain as soon as the level drops below the threshold. So this reduces the dynamic range from the noise floor up instead of from the peaks down. Upward compression can be very useful to add loudness and body, while leaving the transients untouched. Also, when used with extreme range, ratio and release values, you can achieve creative pumping effects.'

Downward Expansion

'When using Expand mode in combination with a negative range, the signal will be attenuated as soon as it drops below the threshold, increasing the perceived dynamics of the signal around the threshold. This is the most common type of expansion and with higher ratio and range values, it's often called gating.'

Upward Expansion

'Expand mode in combination with a positive range will again do the opposite of normal expansion: instead of attenuating the signal when it drops below the threshold, it will add gain as soon as the signal exceeds the threshold, emphasizing the peaks in the audio. So this increases the dynamic range from the threshold up instead of from the threshold down. Upward expansion is a great way to enhance transients. For example, you can easily increase the impact of a snare in a drum loop using upward expansion.'

I have boosted the high end significantly, and fed the whole lot into FabFilter's Pro-C compressor, which follows in the signal path. I can now shape the sound.



The settings above are pretty standard for tightening a sound and emphasising the attack transients with a late attack that has been matched to the threshold. The idea is to bring out the loop's attack transients while eradicating any pumping that took place when the loop was mixed originally. However, the real power of the Pro-C lies in its side-chain section. If you select the appropriate bandwidth using the audition feature, you can achieve some potent internal side-chain filtering.

Next up, we need some nice saturation. I find heavily processed pre-existing sampled loops to be so over processed that reverse engineering the signal path becomes too convoluted. So, I prefer to strip the sound down, rebuild it and then apply my own coloured processing. Saturation is a lovely process to use for any low end sound because it has an uncanny way of introducing harmonics into the sound simply from the smearing side effects. PSP's MixSat 2 plugin provides a number of different saturation shape options, from valve to tape to digital...you are never short of a medium to use.

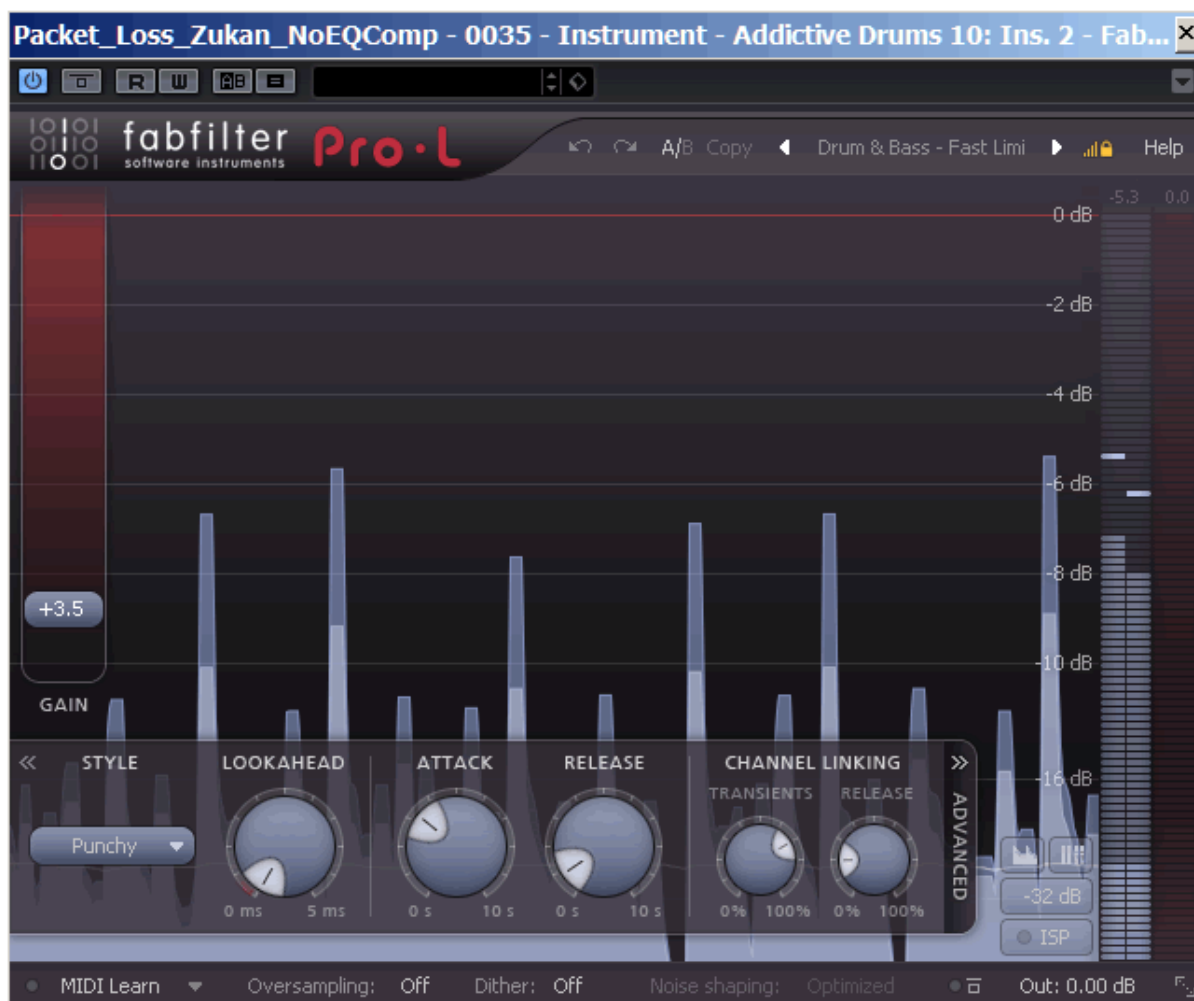
The low and high sections of MixSat 2 are very useful and I have added some frequencies around 200 Hz. I want that region to be very prominent because the original battery drum loop suffered from a metallic attack that would go wayward when trying to use simple EQ. With some gentle saturation and focused low frequency control I have been able to tame the metallic attack and add some weight, fixing the limp kick sound in the loop. The battery loop now sounds more dynamic, fuller and more expressive than before.



 hpl battery loop wet

Acu Loop

Due to the fact that the acoustic drum loop is a sample, we are confronted with a fully produced and mastered end result that we must, somehow, break down into a usable raw and dry form.



hpl acu loop wet

The acu loop is another sample lift and is laden with a lot of existing processing. However, I have attempted to give it a little more focus and definition using the Pro-L limiter. The extremely short release lets the whole loop pump and move. With 'punchy' selected for style, attack transients bite through.

The acu loop now sounds more controlled and has more dynamic movement. Sadly, using sample lifts in your music means more work getting things to fit and gel. Stripping the sound down into a basic dry form will help you so much more than simply trying to make it fit when it doesn't want to.

Big Kick

This is an appalling sample to work with! Not only has it been over-processed with no sensible regard for topping and tailing, but the channel delay used on one side to create 'width' has been done pretty badly. The release of the sample is also poor (as is the whole thing, if I had to be honest). Normally, and please take this as a nugget of advice, I dump any sound that is not fit for use in a mix. However, I do not have that luxury here and my job is to manage the low end and nothing else.



FabFilter's Simplon is a very nice and potent processor. Sporting two lovely multimode filters the scope for creating some interesting textures is endless. Simplon is so easy to use that there is no excuse for getting instant results on the fly. I find that once I have the two filters set up, it is then easy to link and move them as a range. This is very useful and saves a great deal of time in having to move the bands one by one and relative to each other.

The filter slopes are very important in determining how one band behaves relative to another. In this example I have used only one band and have chosen a 12 dB slope. I did not want anything too steep because I am dealing with a sound that I can't manipulate too much without leading to compromises.

hpl big kick wet

I have set up the X-Comp to tighten the big kick so that it cuts through the mix, because it sounds so lame and bloated by default. The LF and HF bleeds have really helped in getting the right frequency range with which to work, and because we are dealing with a short static sound the gentle knee settings have made sure to keep the compressed signal fluid and rounded.



Background Noise



 hpl bkg noise wet

FabFilter's Pro-Q is another wonderful plugin and does what is says on the tin with no airs and graces. I have set the plugin to display both pre- and post-EQ on the built-in spectrum analyser so we can see what happens before and after a process.

This sound is simply what we call a soundscape in the sound design world – a combination of industry backdrops that form so many of the backbone fillers you hear in big Dance tracks. This particular sound is a sample and therefore processed and mastered, so we have little room for mauling. However, when one wants to maul one must simply maul. The spectrum analyser shows how much energy lies between 50 – 100 Hz and this range is seriously affecting the low end. In view of this, the most sensible and potent process is a broadband cut using a gentle shelf.

Space and Tight Low End



space and tight low end

For this mix, apart from adjusting levels, the only changes that have taken place in terms of processor settings are the following:

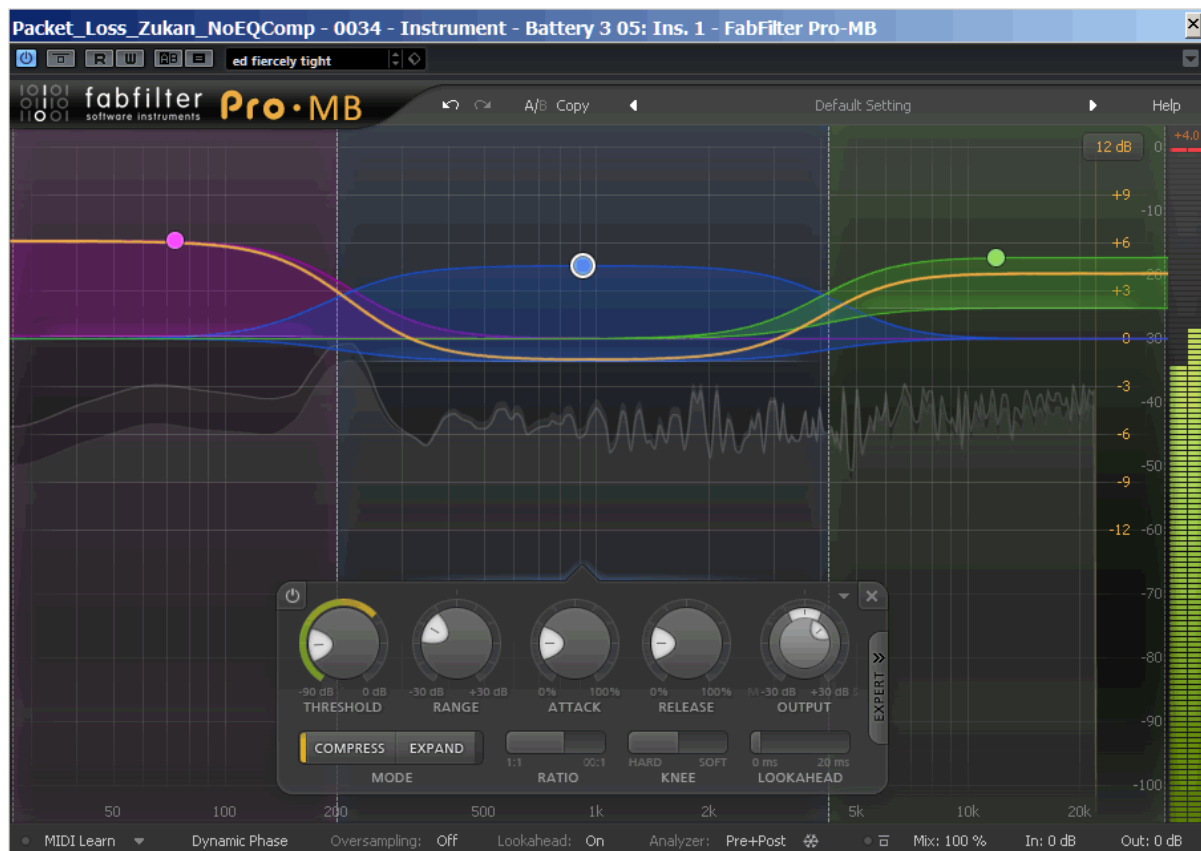
Secondary Bass



stl sec bass wet 2

A longer pre-delay with a darker texture and short reverb time allow for a tighter and smoother colour. This will be more pronounced when layered with the massive bass.

Battery Loop



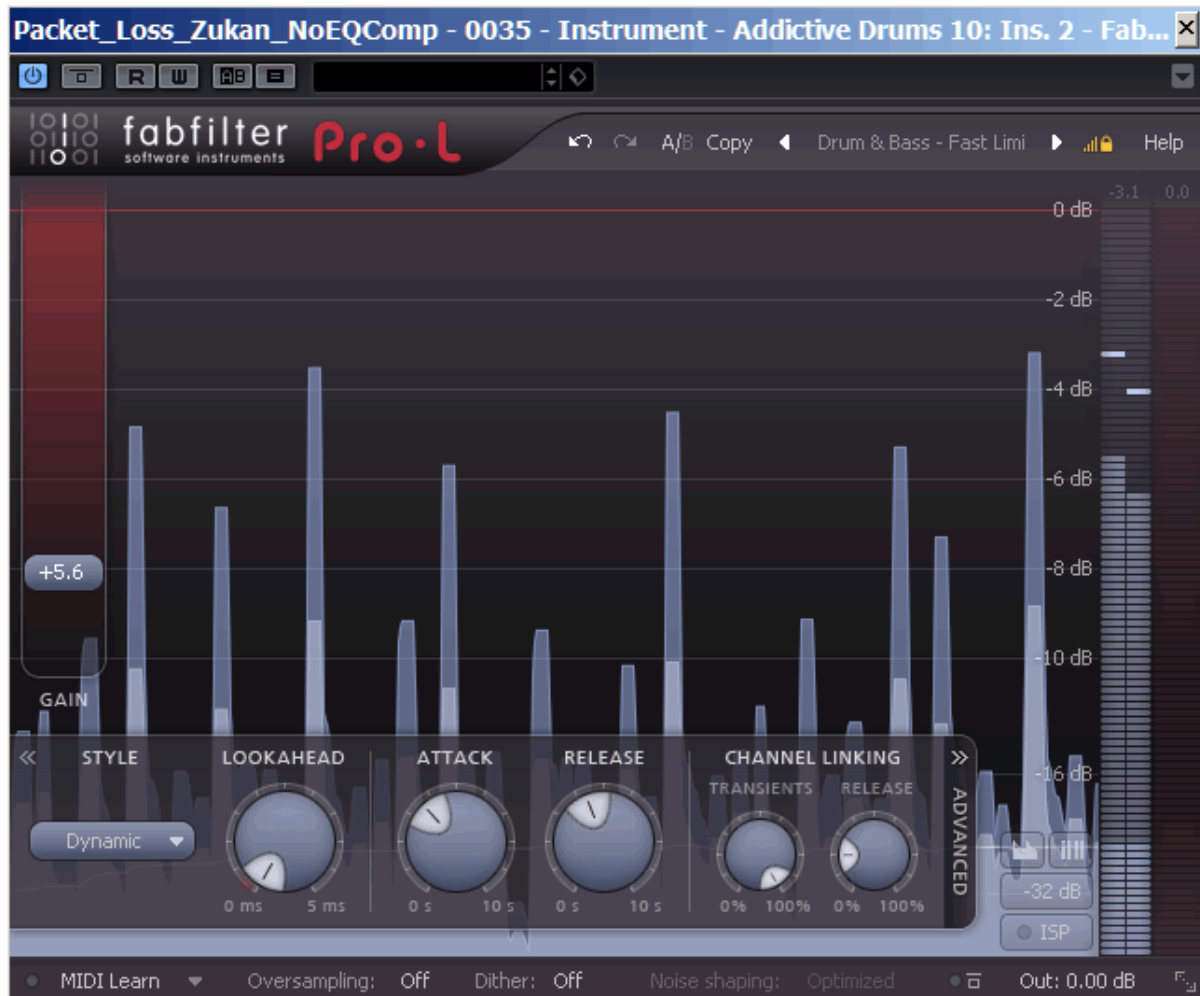
I have kept all three bands spread equally, and have placed the crossovers at important points in the spectrum to achieve the best separation. I have made sure to pronounce the whole low end range up to 200 Hz. This gives the loop a nice low oomph that thickens the kick nicely. The other two bands have been kept dynamic.



stl battery wet 2

The only parameter I have changed on the MixSat 2 is the low section, which I have disengaged. However, I am still applying saturation, and the low end band 1 boost from the Pro-MB replaces the low boost of the MixSat 2.

Acu Loop



stl acu loop wet 2

The Pro-L has kept the acu loop in check by adding some nice dynamic movement without any pumping. The late attack makes sure the attack transient shines through, before the midway release drops it back down.

Hopefully, this chapter has shed some light on the subject of filtering. We will, of course, encounter more examples of filtering in the later chapters.

The Low End: Demo Chapter

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To download the complete book with all audio examples, please go
to:

<http://www.mpc-samples.com/product.php/221/the-low-end/>