



**UNIVERSITY OF  
LIMERICK  
OLLSCOIL LUIMNIGH**

**CS4052**

**Final Assessment**

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## Introduction:

In this assignment I imported audio files such as Bass, drums, vocals, Rhodes piano etc into Reaper and applied some basic mixing techniques. I will also show my ability to execute signal chain configuration and my understanding of the DAW reaper. I will show my understanding of MIDI, use of compression, reverb, delay, EQ and other VSTs. I will talk about the effect and benefits these FX tools have on audio which make it pleasing for the listeners on all devices. Finally, I will talk about mastering my finished mixed stereo bounce which gives the track a loud widened finished track ready to stream.

## Methodology:

I firstly imported a drum loop, bass loop and vocal loop into Reaper from my lab audio files. These audio files are said to be a 'Digital Audio' files. Meaning the sound is recorded in using a microphone and converted to digital form.

I began applying my main plugins to these audio files which included, ReaEQ, ReaVerbate, ReaComp. Staring with my Drum sample I applied ReaEQ. I started by cutting out the unwanted frequencies between 350 Hz to 450 Hz by about 4 dB. I wanted to get rid of some of the muddy low mid end to allow for the kick drum to come through more clearly. I also wanted to get click and slapping sound to come through in the higher end such as the hi hat and snare. I done so by boosting the region around 2.5k. I also applied a boost around 8k as I felt it made some of the instruments snappier.

FX: Track 4 "CS 4025 Lab Week 2 Loop (1)"

FX Edit Options

- VST: ReaEQ (Cockos)
- VST: ReaComp (Cockos)
- JS: Soft Clipper/Limiter

stock - Basic 11 band Kick

ReaEQ

Gain: 0.0

1 2 3 4 5 6 7 8 9 10 11

Enabled Type: Band (alt 2)  Log-scale automated frequencies

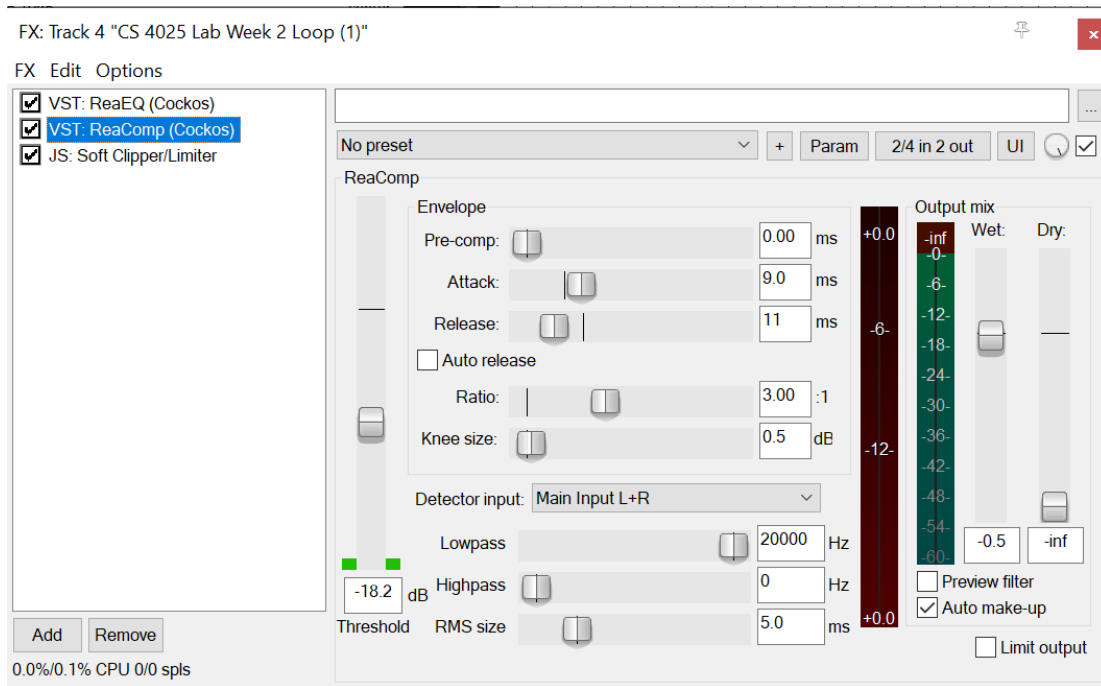
Frequency (Hz): 377.9 F#4

Gain (dB): -3.7

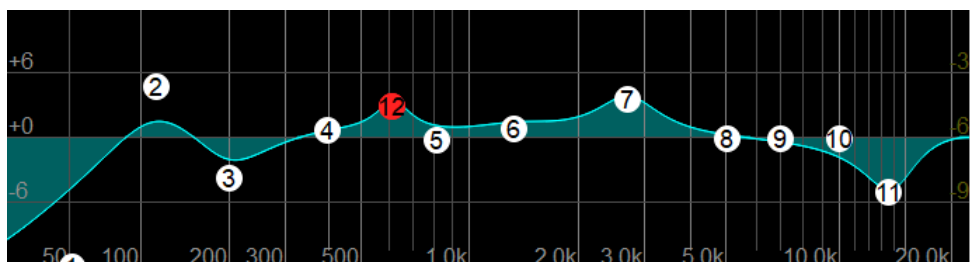
Bandwidth (oct): 1.01

0.0%/0.1% CPU 0/0 spls

Sticking to the drum sample, I then went onto the compression. I started with a fairly quick attack time at 9ms, quick enough to compress the transients but not so quick it loses its punch. I set the release to fast at around 11ms, this allows the kick to come through rounded just after the initial transient, just slightly slower than the attack. I thought 3:1 ratio of compression would be appropriate. I set the threshold to around -18dB as I felt that it was an appropriate level of compression in my mix.

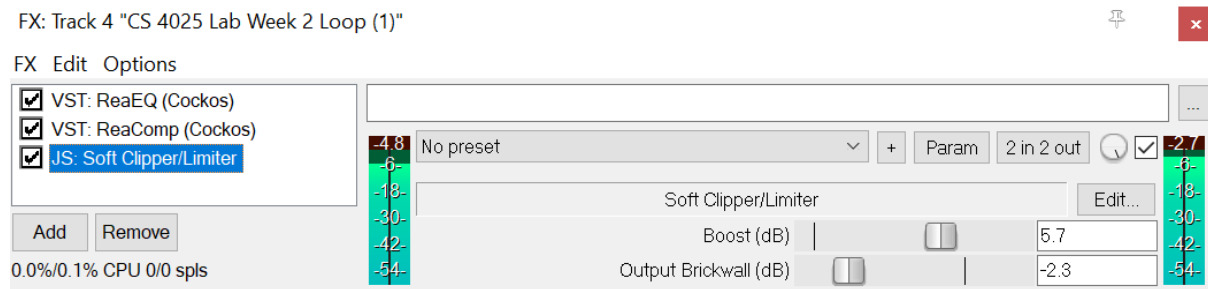


Moving on to my bass sample. I began with ReaEQ to shape the audio file. Firstly, cutting below 50Hz to cut out any unwanted muddiness. This is the extreme low end and is more of a rumble than anything which would be unwanted on loud systems. I boosted around 100hz slightly to add some depth to the bass. Cutting some frequencies around the 200Hz to remove some muddiness. I boosted around 600-650Hz to add some punch to the bass. I also boosted around 2.7k to add some bite in the higher end of the mix and give the bass some brightness.

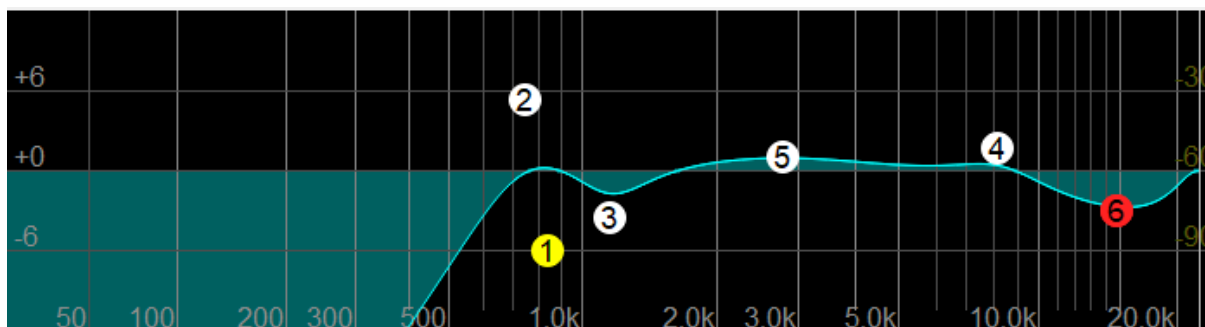


Moving onto the compression I added to the bass. I applied ReaComp and began the process of compressing my bass. I found setting my ratio to 4:1, my attack to 26ms and my release to fast (740ms) gave a nice amount of compression in my mix I set my threshold to -18dB also.

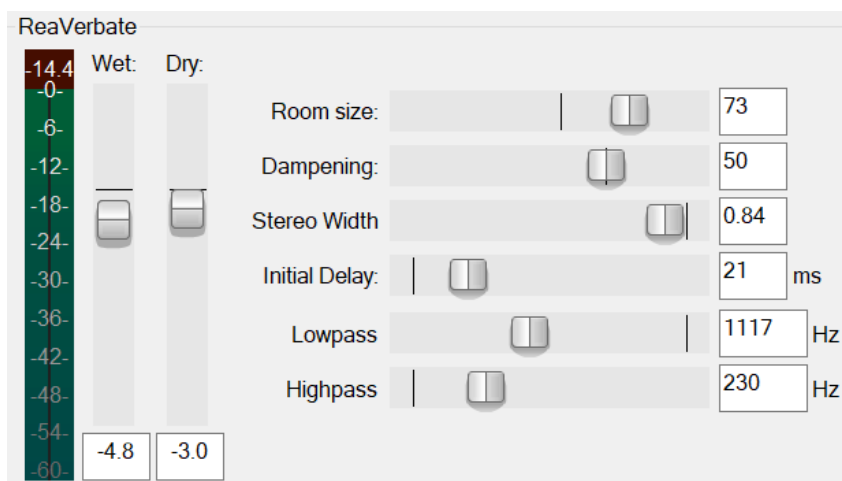
I also added a soft clipper to the drum sample giving it more presence and allowing it to stand out more in the mix.



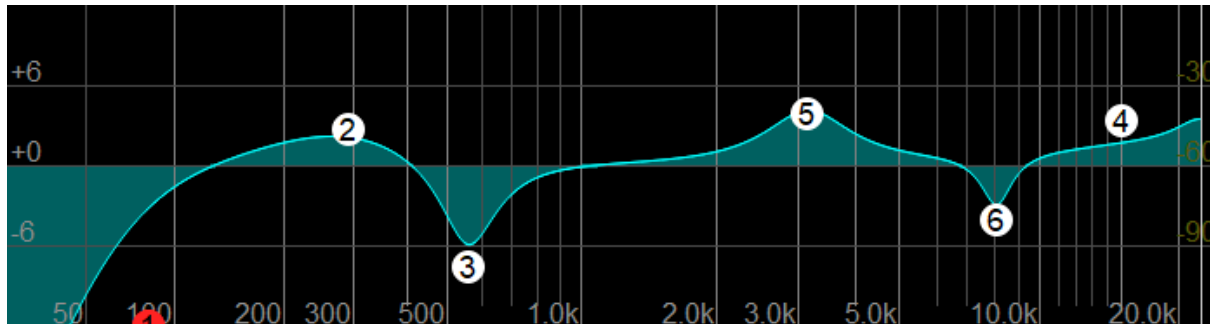
I then moved onto my other audio files such as the choir and began a similar process of Eqing and compressing. Starting with the Eq I cut below 800Hz giving it a high pass filter. This gives room for the lead vocalist and makes it seem like the choir is in the background not competing with one another. I also cut around 15k to prevent any clashing with the lead vocals syllable pronunciation. I also made a slight boost around 2.7k to add some presence in the mix



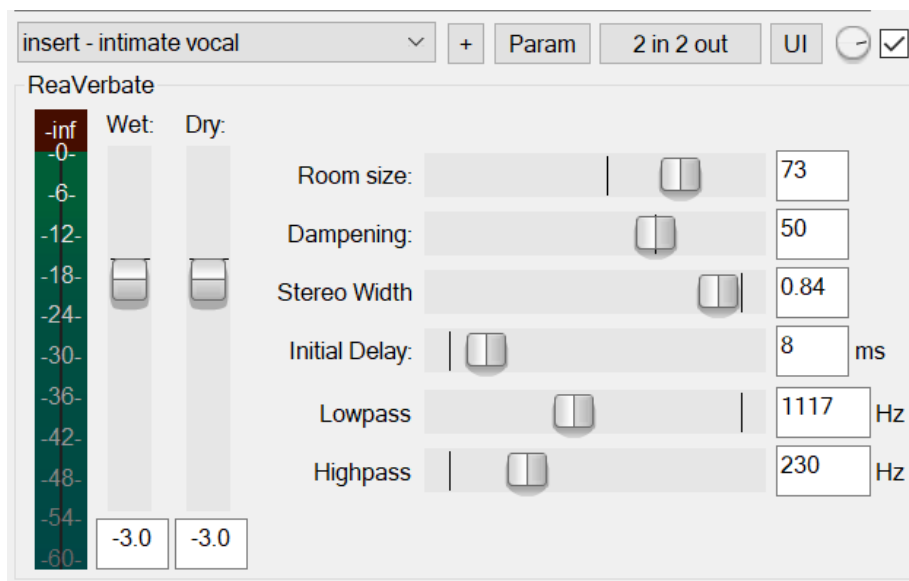
I also applied a basic compressor to the choir and some ReaVerbate for some intimacy



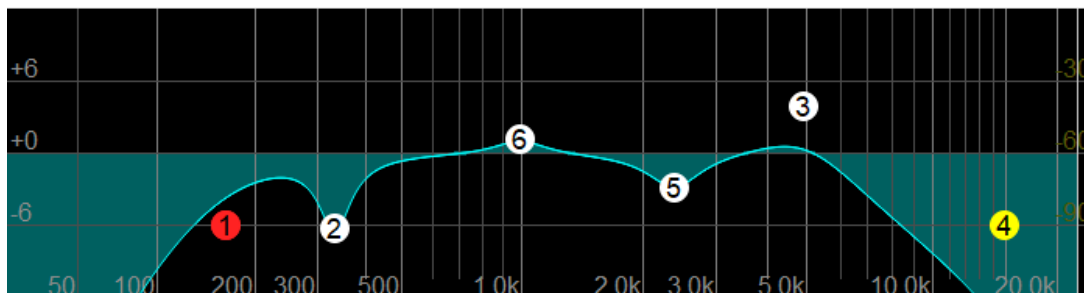
I went on to Eq my lead vocal and add compression. Boosting regions around 10-20k to allow the vocals syllable pronunciation to come through. I boosted around 3.5k to allow the vocals voice to come through more clearly and be more present in the mix. Cutting between 500 – 1000hz took some muddiness out of the vocal. I felt with a slight cut at 10k it took some unwanted sibilance away.



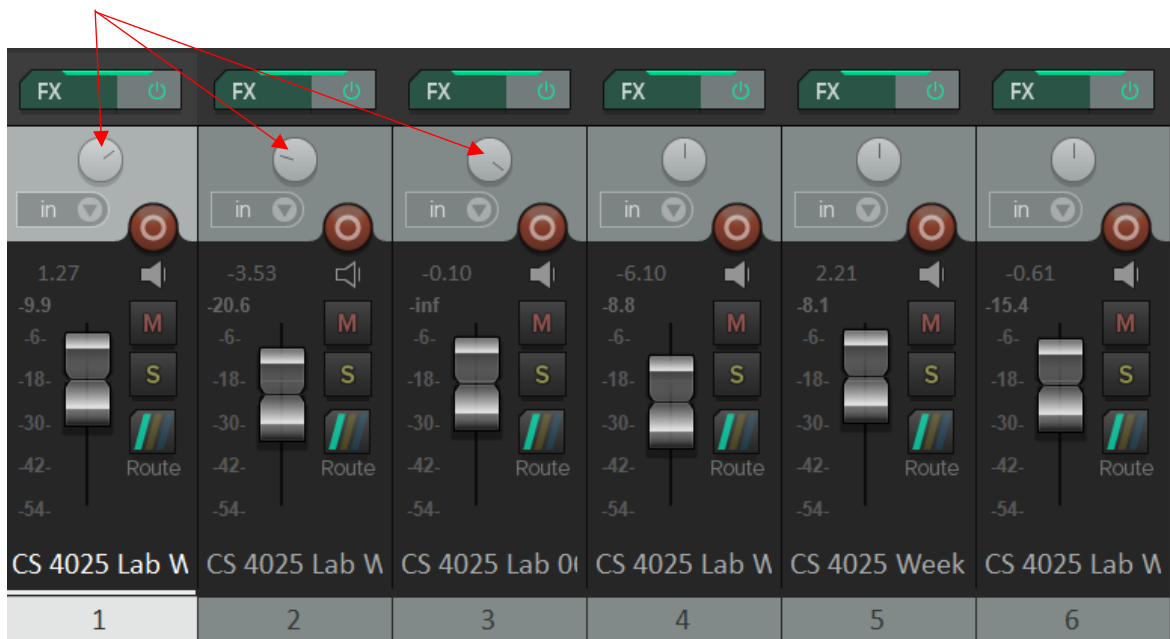
I also added ReaVerbate to the vocal applying the pre-set intimate vocal, making some tweaks to the initial delay, room size and turning the dry/wet knob to 75% added some nice intimacy to the vocal.



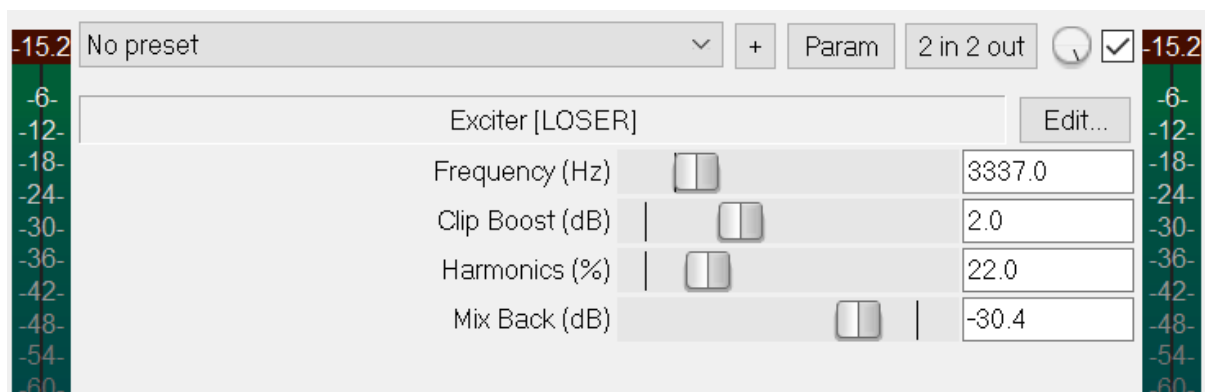
I then moved onto my Rhoades audio file and repeated the process with Eq and compression.



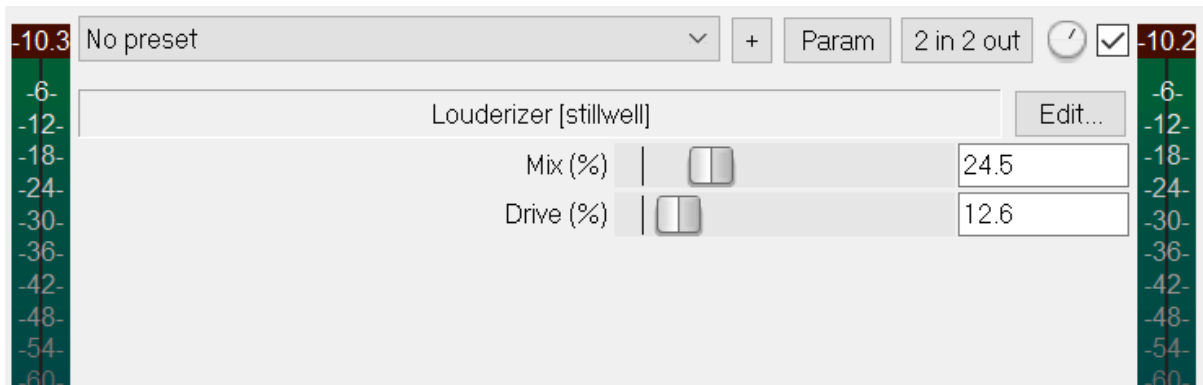
Now that my mixing was complete, I wanted to create a widened perception of the sound within my track. I done this using panning. Keeping the main parts of the track in the centre of the mix such as the main vocal, drums and bass samples. I panned some of the other instruments to the left and right. The choir 33% to the right, the keyboard 80% to the right and the Rhodes 45% to the left. I adjusted these percentages until I could hear each instrument clearly. Sound comes at us from all sides, including the left, right, front, and back, as well as from above and below. More crucially, the audio impulses from each ear are processed separately by our brain, by adjusting the panning it allows the human ear to process the sounds easier and hear them more clearly in the mix.



When I was happy with the mix I bounced the stereo file into a new reaper session. I firstly dropped the master fader by  $-0.7\text{db}$  to allow for some headroom in the mastering process. I firstly added JS Exciter to my master fx tab. I chose 3340 hZ to 'Excite' using these settings as I thought it had a nice warm sound in this region which stood out.



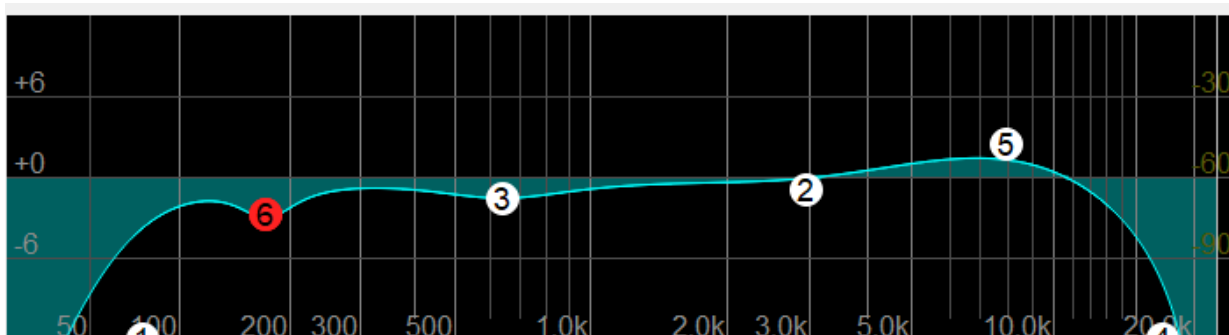
I then went on to add JS Louderizer which is essentially a limiter allowing the drive to be monitored using percentages. I used these settings till it sounded well.



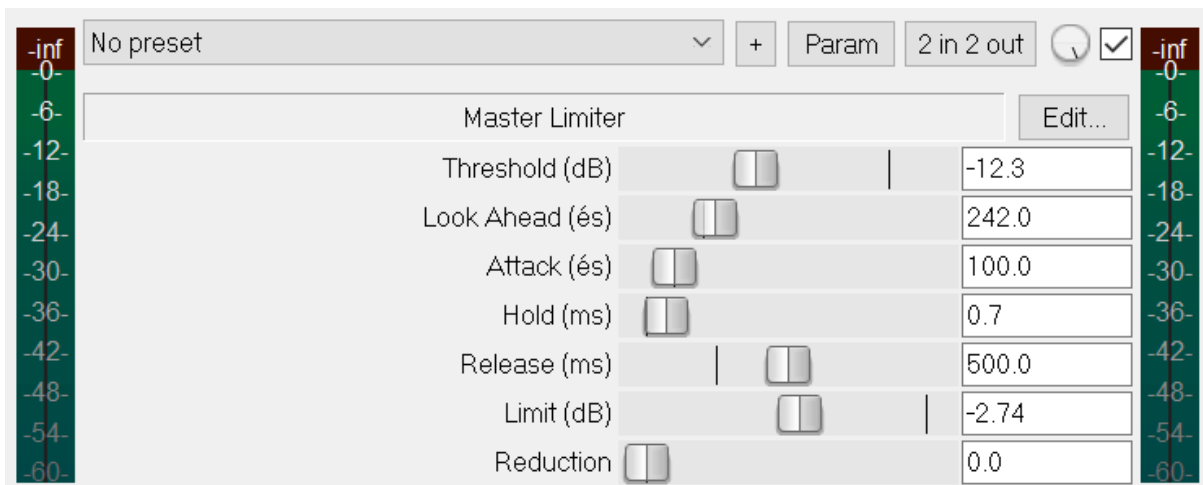
I then went on to add JS stereo width which essentially increases the perceived width of a mix or individual instruments. Generally, drum samples and bass should be kept in mono so I just increased the width and didn't touch the centre boost.



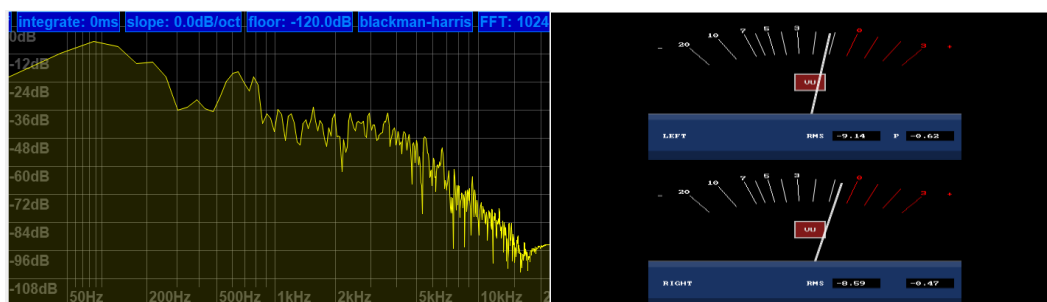
Before moving onto my master limiter, I applied a master Eq and placed it at the top of my effect chain. Cutting some low and high unwanted frequencies. I added a touch of high shelving at 9 kHz or higher to widen the stereo image. To reduce muddiness and tighten up the overall sound I added some low shelving at 200 Hz or lower. To add some definition to the vocal I made a slight cut around 750hz



For the final step of my master, I applied a master limiter to my track. The purpose of this is to make my track as loud as possible without clipping or distortion. This arguably the most important step of mastering.



I used frequency spectral analyser and VU meter, to analyse the overall look of the frequencies and to see where I needed to cut or boost frequencies on my master Eq. While the VU meter allowed me to analyse what dB my track was outputting.



### Discussion & Findings:

Overall, the mixing process made the track come to life and allowed each instrument to come through as much as it could. Each instrument unmixed has frequencies naturally that will not sound well when played with another instrument. Mixing these instruments using compressing and Eq allows the sounds to come together and sound good together in harmony.

### Conclusion:

Overall, I acquired the basic skills required to mix and master a track. Including skills such as use of plugins, volume control, panning, rendering different file formats, and mastering. I really enjoyed this module and found it very interesting.



## References:

*"Mixing Tips: The Importance of Panning" 16 Feb. 2014, ask.audio/articles/mixing-tips-the-importance-of-panning.*

*Klaassen, Reinier. "The Vocal EQ Chart (Vocal Frequency Ranges + EQ Tips)" Producer Hive, 21 May 2020, producerhive.com/music-production-recording-tips/how-to-use-a-vocal-eq-chart/.*

*H, Jared. "Mixing with EQ: 23 EQ Tips to Sculpt the Perfect Sounding Song" LedgerNote, 11 Dec. 2016, ledgernote.com/columns/mixing-mastering/mixing-eq-tips/.*