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Filter Characteristics of Pultec-Style Equalizers: Softube's Plugin Emulations of Tube-Tech's PE 1C and ME 1B

Robert Toft

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FILTER CHARACTERISTICS OF PULTEC-STYLE EQUALIZERS

Softube's Plugin Emulations of Tube-Tech's PE 1C and ME 1B

Robert Toft

The user manuals for Softube's digital emulations of Tube-Tech's PE 1C and ME 1B units root both the hardware and software in the Pultec tradition:

“*Tube-Tech is Pultec.*” This is a quote from when the very first Tube-Tech product, the PE 1A, was promoted back in 1985. The vintage US made Pultec EQ 1P (designed and sold during the fifties) was the inspiration for Tube-Tech designer and founder John Petersen, who was determined to produce a modern unit that could capture the magic of the original Pultec. The final testing, before shipping the PE 1A, was the EQ 1P and the PE 1A on different channels on a stereo track, making sure that each and every setting behaved exactly the same.”

[Softube User Manual, Tube-Tech PE 1C, “Pultec” Equalizer]

“The original Pultecs were built in the fifties, and Tube-Tech has been making their Pultec clones since the mid eighties.”

[Softube User Manual, Tube-Tech ME 1B, Midrange Equalizer]

The Pultec “sound,” as replicated by Tube-Tech, is based on a number of filter characteristics:

“The Tube-Tech PE 1C is a passive, tube-based equalizer ... [that] ... features a Low Frequency section made up of two low shelf filters, which can be combined to attenuate and boost at the same time. These filters are actually a bit apart in frequency, even if they are controlled by the same frequency selector. The High Frequency section has a peak and shelving filter working in parallel, which provides a smooth top end, while not getting too bright.

The ability to combine the different filters and sections is what gives the PE 1C its characteristic sound and is something which plays a crucial part in explaining the classic Pultec sound.”

[Softube User Manual, Tube-Tech PE 1C, “Pultec” Equalizer]

“... the Tube-Tech ME 1B is a passive, tube-based equalizer. It was designed to accompany the PE 1C equalizer and provide control over the frequencies that the PE 1C doesn't adjust. On its own, it's a great tool to shape the mid-range of any audio material, and together with the PE 1C, it becomes a versatile and full featured equalizer.

The focus of the PE 1C, ‘program equalizer,’ is the shelving filters and the mid-range boost. It cannot attenuate the mids, and you don't have the ability to get bell shaped filter curves in the lows and highs. The ME 1B solves all these drawbacks by offering the user three bands of equalization: low frequency boost (200 – 1000 Hz), an almost full range sweepable cut (200 – 7000 Hz) and a high frequency boost (1.5 – 5 kHz).”

[Softube User Manual, Tube-Tech ME 1B, Midrange Equalizer]

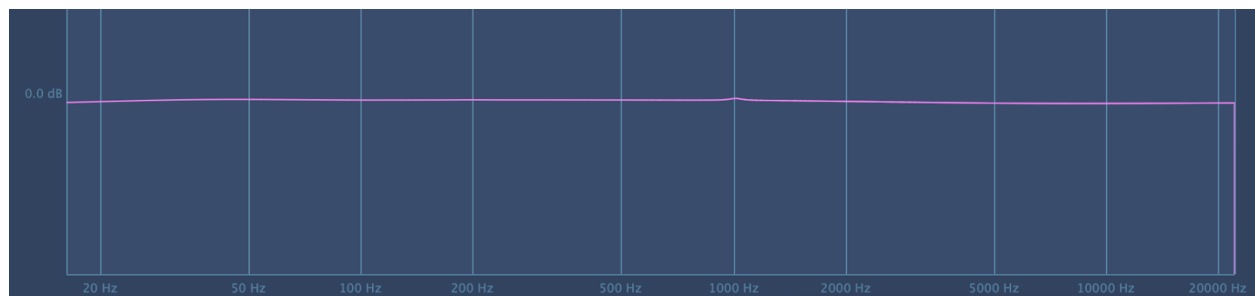
Filter Characteristics of Softube's PE 1C and ME 1B

The graphs of the filter curves have been taken from DDMF's PluginDoctor (Hammerstein Analysis, Order 2, 44.1 kHz)

PE 1C & ME 1B



The filter curve when the boost, attenuation, and output controls are set to zero (as shown above)



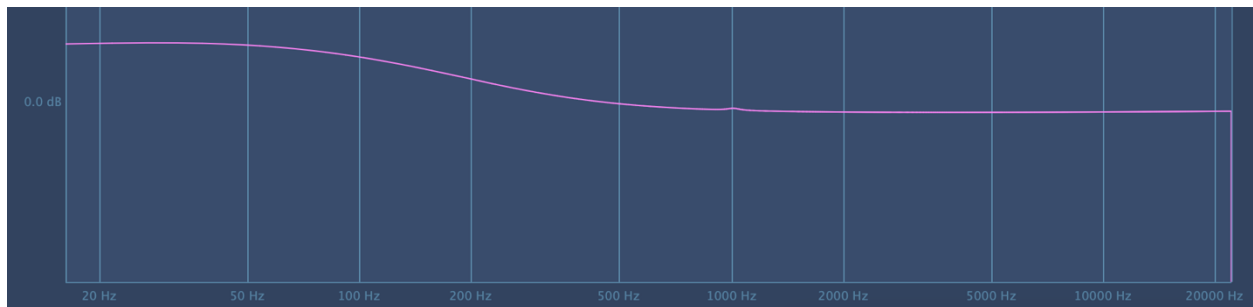
PE 1C



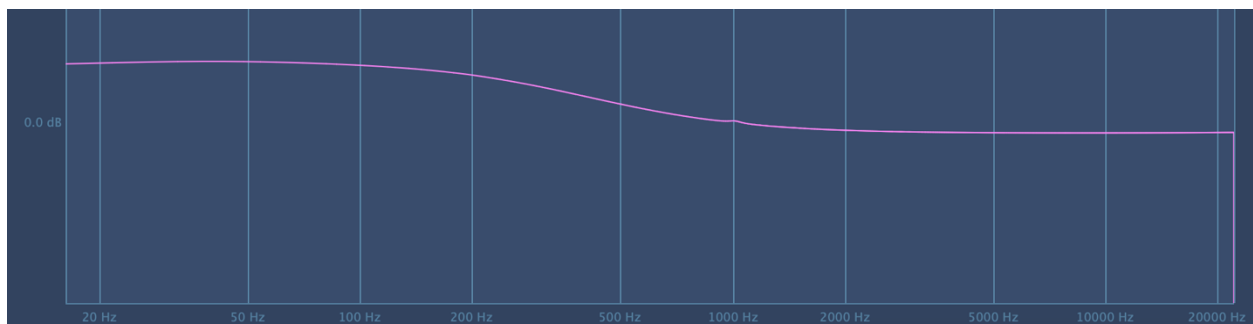
Low Frequency Section

The triangle of three controls on the left (Boost, Atten, CPS)
– boost and/or attenuation through shelf filters.

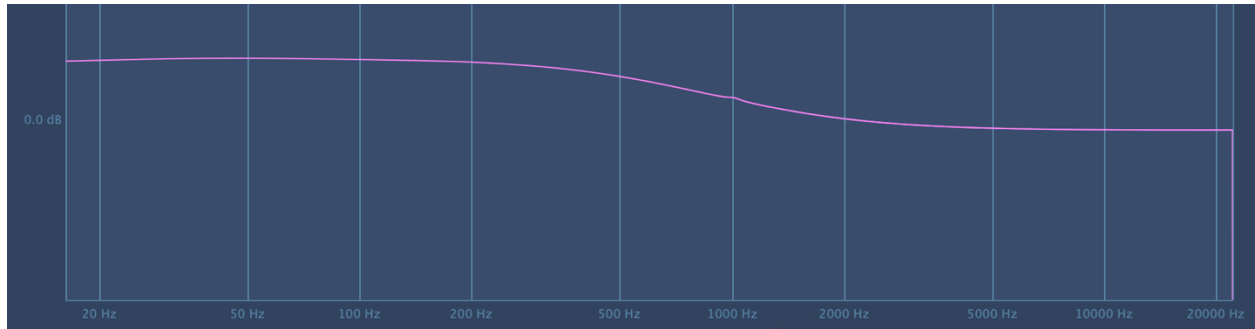
Boost setting of 4.0 at 20 Hz



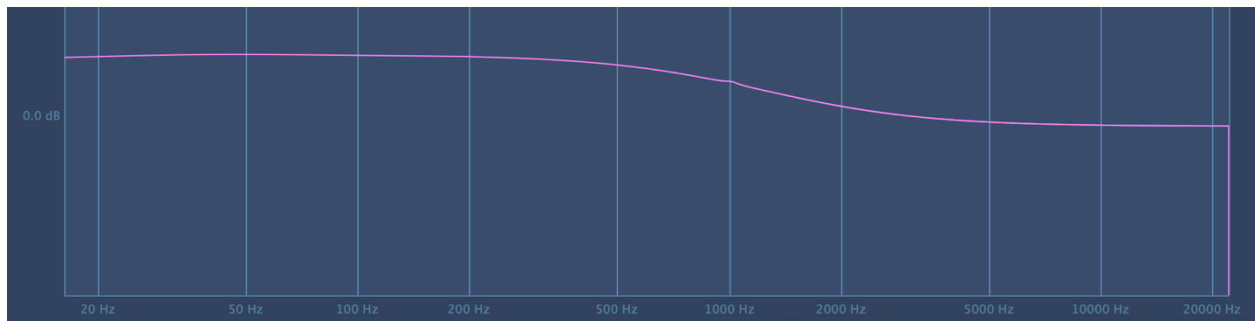
Boost setting of 4.0 at 30 Hz



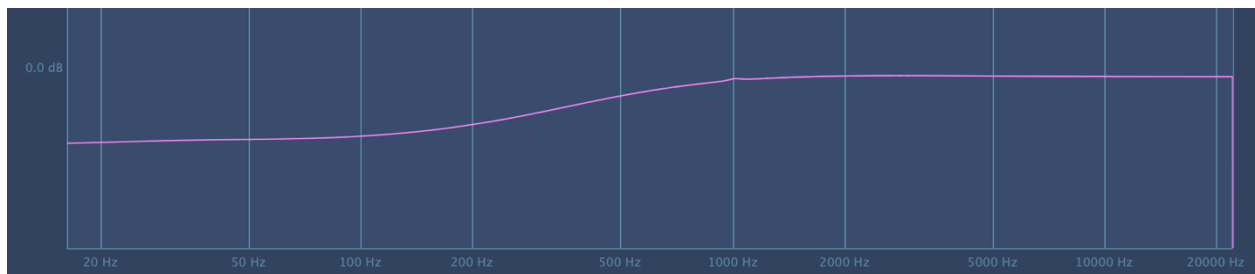
Boost setting of 4.0 at 60 Hz



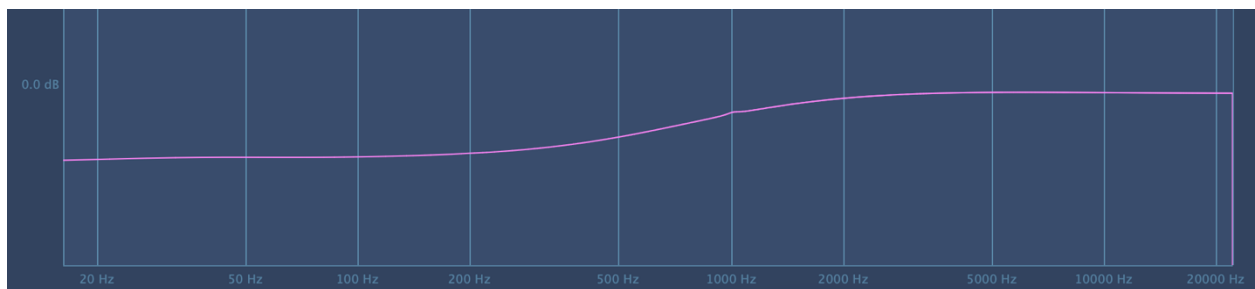
Boost setting of 4.0 at 100 Hz



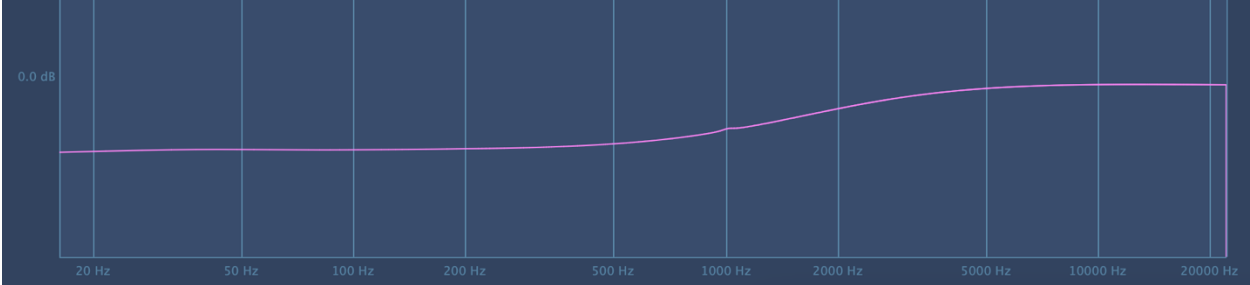
Attenuation setting of 4.0 at 20 Hz



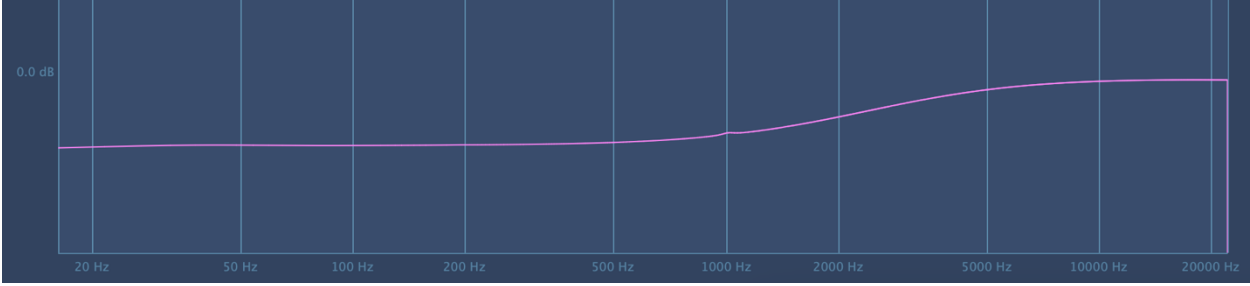
Attenuation setting of 4.0 at 30 Hz



Attenuation setting of 4.0 at 60 Hz

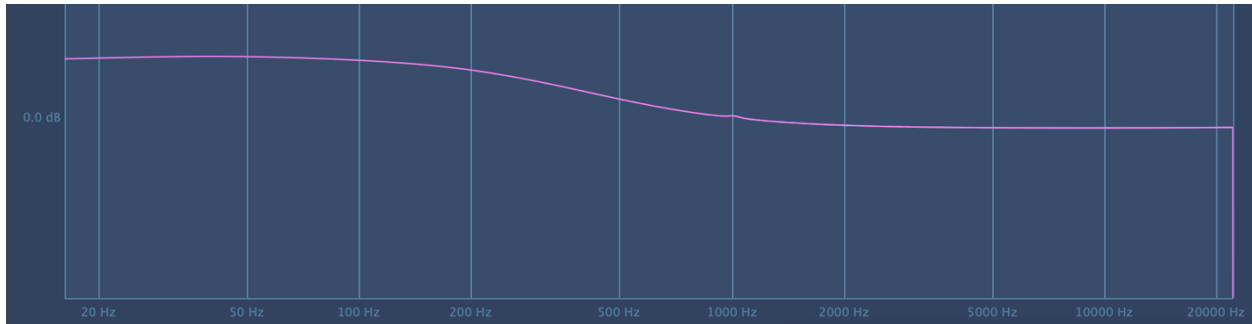


Attenuation setting of 4.0 at 100 Hz

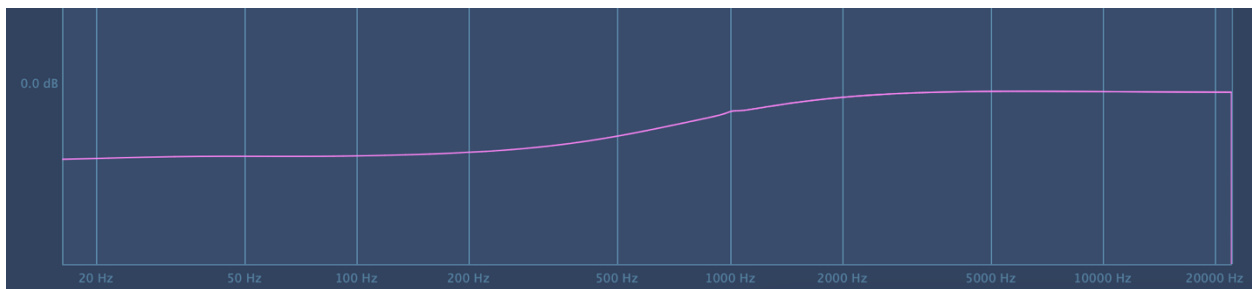


Simultaneous Boost and Attenuation Settings (Low Frequency Section)

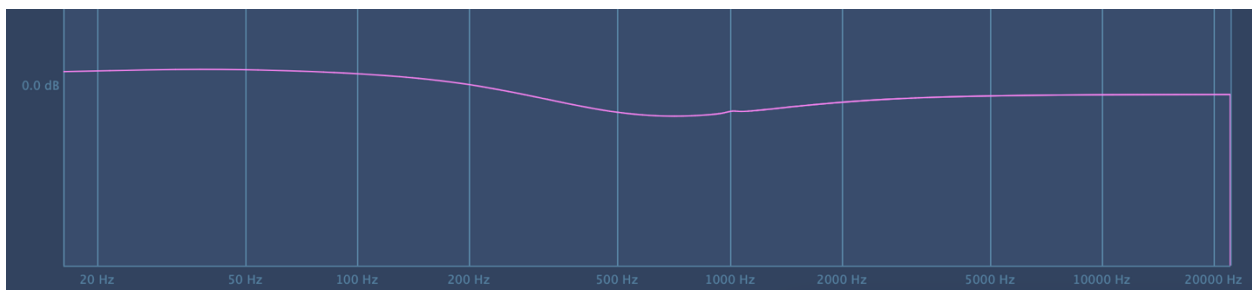
Boost setting of 4.0 at 30 Hz on its own



Attenuation setting of 4.0 at 30 Hz on its own



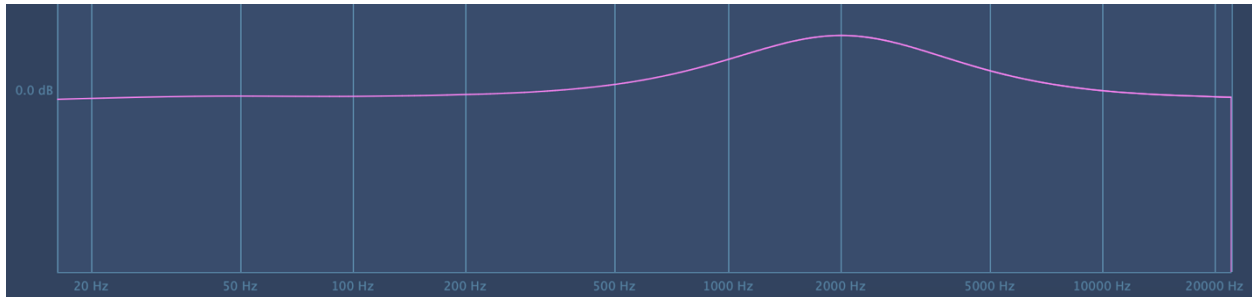
Combined boost and attenuation settings of 4.0 at 30 Hz



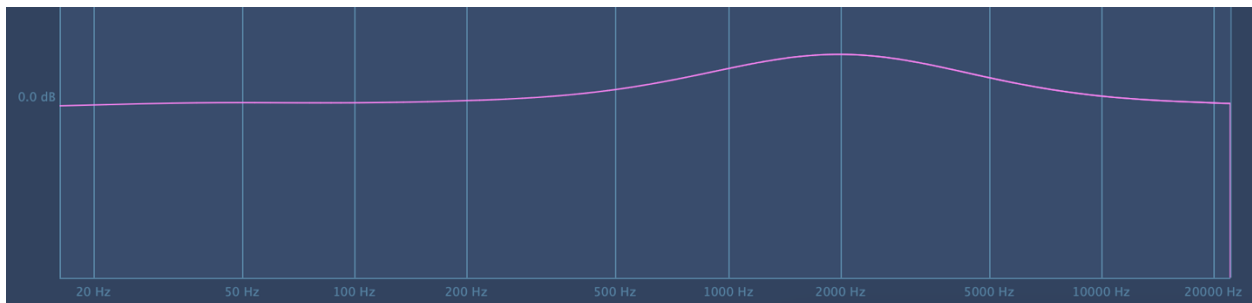
High Frequency Section – 1

The triangle of three controls in the middle (Boost, Bandwidth, KCS)
– boost through bell filters with variable bandwidth.

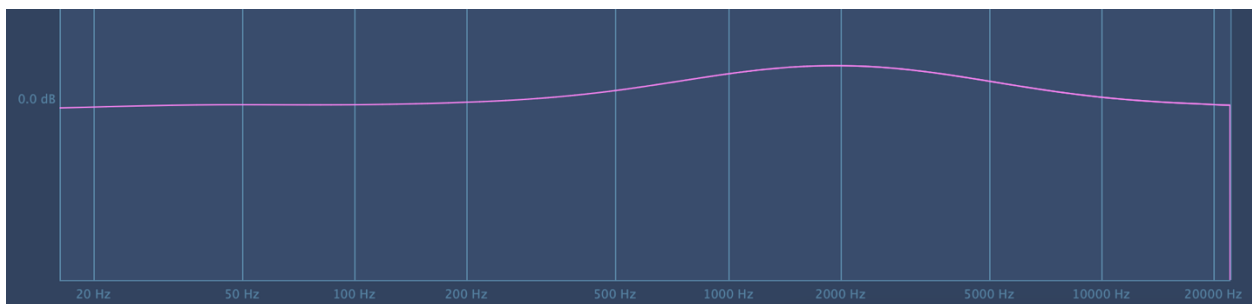
Boost setting of 4.0 at 2 kHz, bandwidth 3.0



Boost setting of 4.0 at 2 kHz, bandwidth 6.5



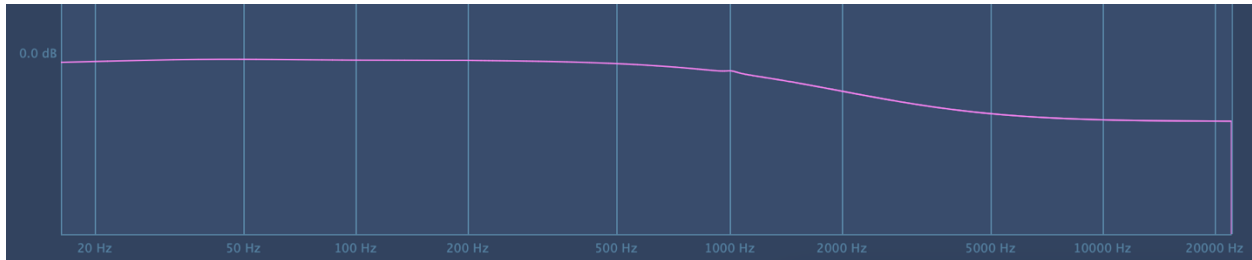
Boost setting of 4.0 at 2 kHz, bandwidth 10.0



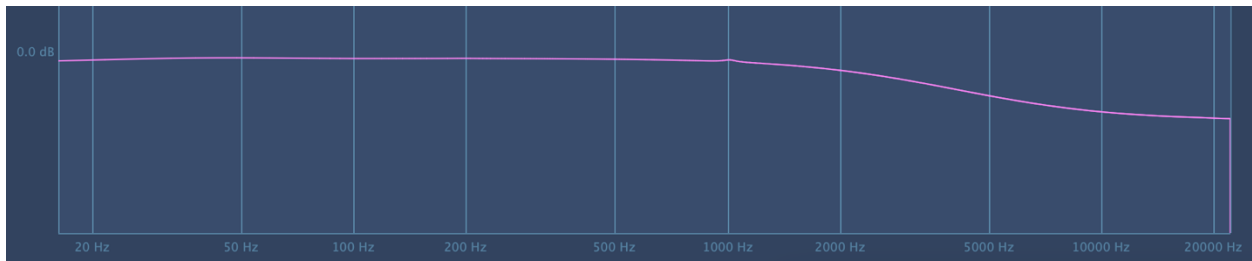
High Frequency Section – 2

The two upper controls on the right (Atten, Atten Sel)
– attenuation through shelf filters.

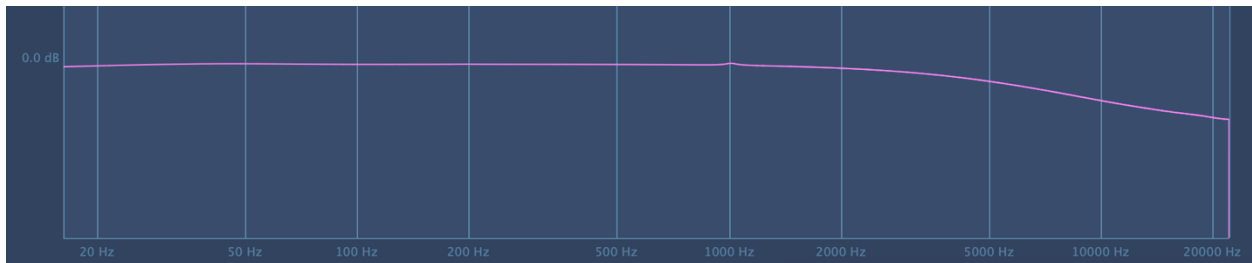
Attenuation setting of 4.0 at 5 kHz



Attenuation setting of 4.0 at 10 kHz



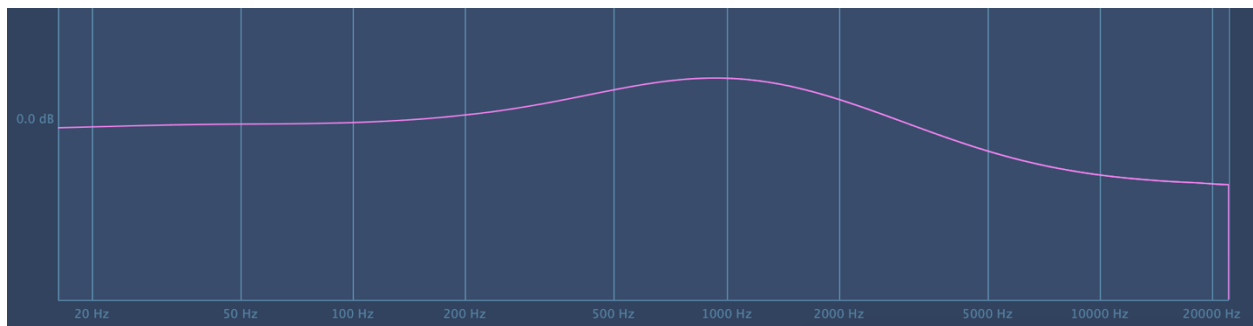
Attenuation setting of 4.0 at 20 kHz



Simultaneous Boost and Attenuation Settings (High Frequency Section)



Boost setting of 4.0 at 1 kHz, with bandwidth of 6.5; attenuation setting of 4.0 at 10 kHz
(as shown above)



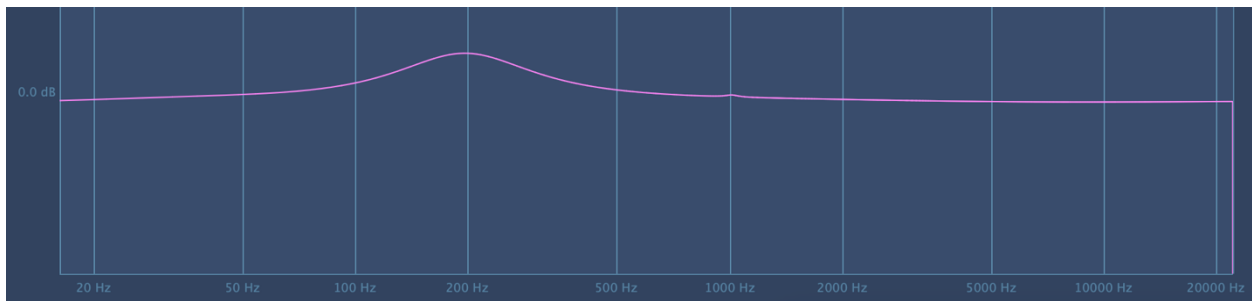
ME 1B



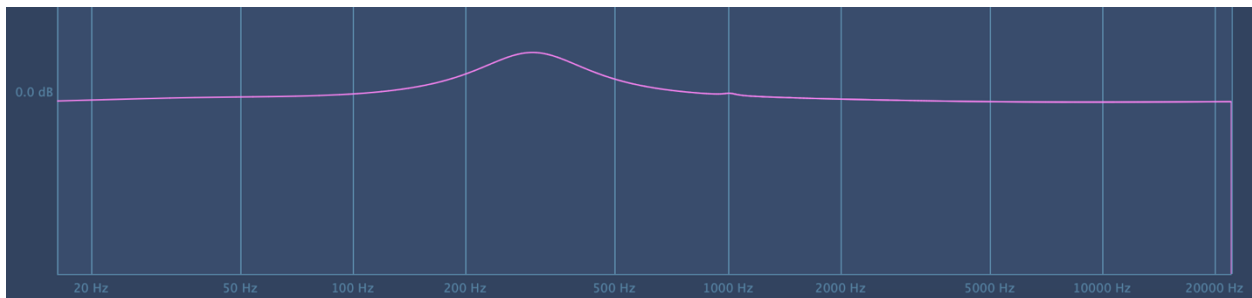
Low Frequency Section

The two controls on the left – boost through bell filters.

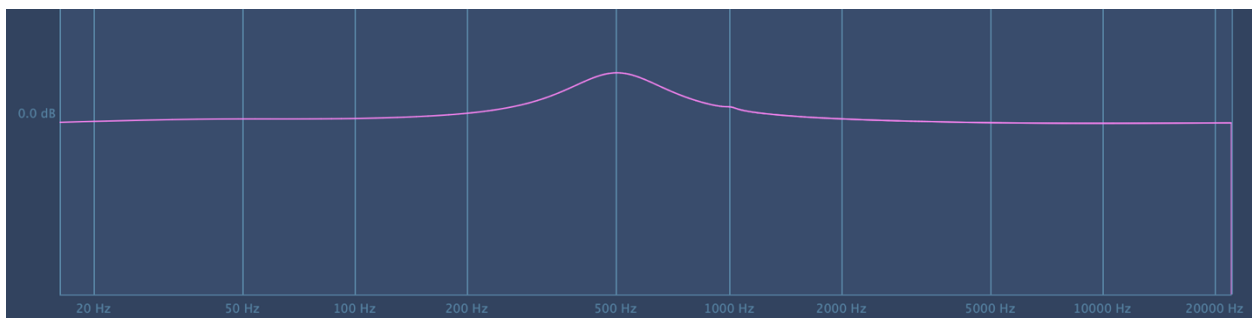
Boost setting of 4.0 at 0.2 kHz



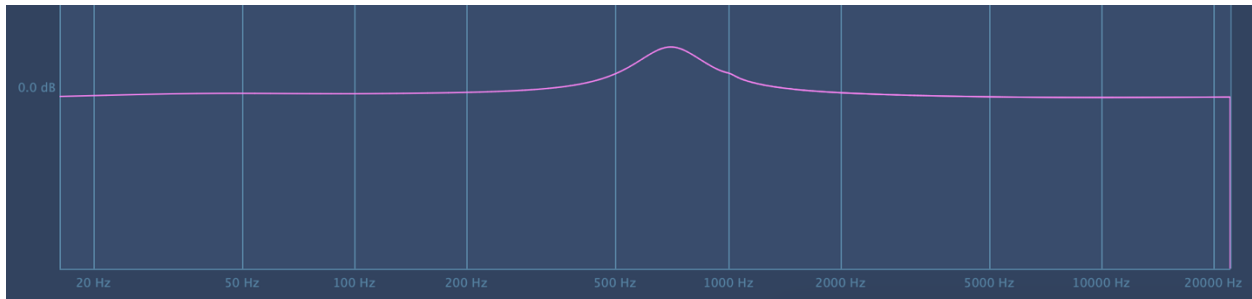
Boost setting of 4.0 at 0.3 kHz



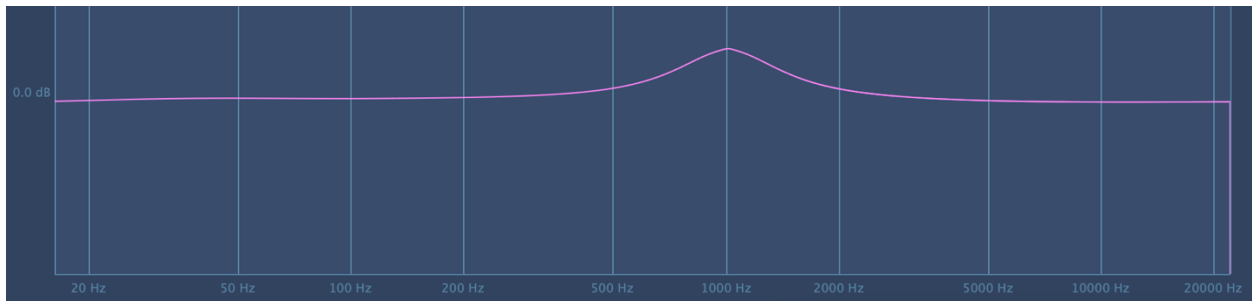
Boost setting of 4.0 at 0.5 kHz



Boost setting of 4.0 at 0.7 kHz



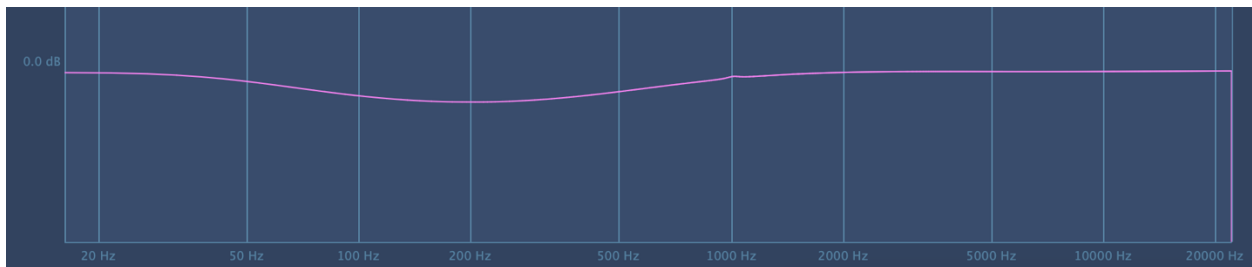
Boost setting of 4.0 at 1 kHz



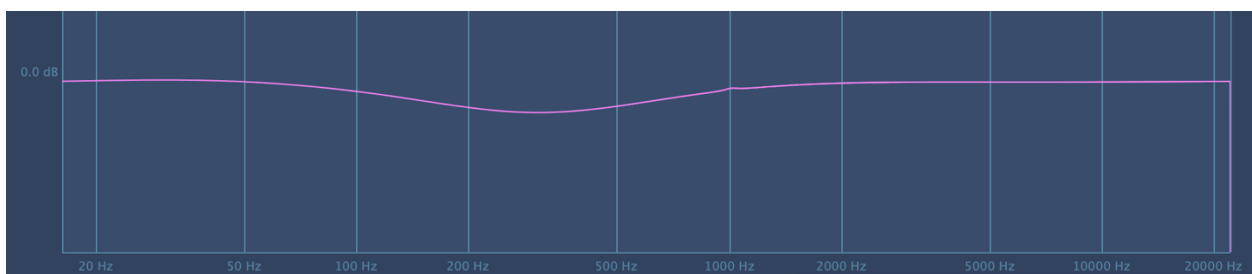
Mid Frequency Section

The two controls in the middle – attenuation through bell filters.

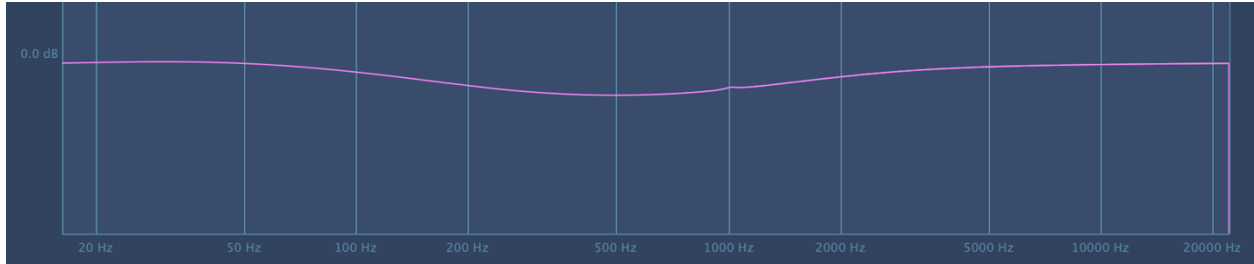
Attenuation setting of 5.0 at 0.2 kHz



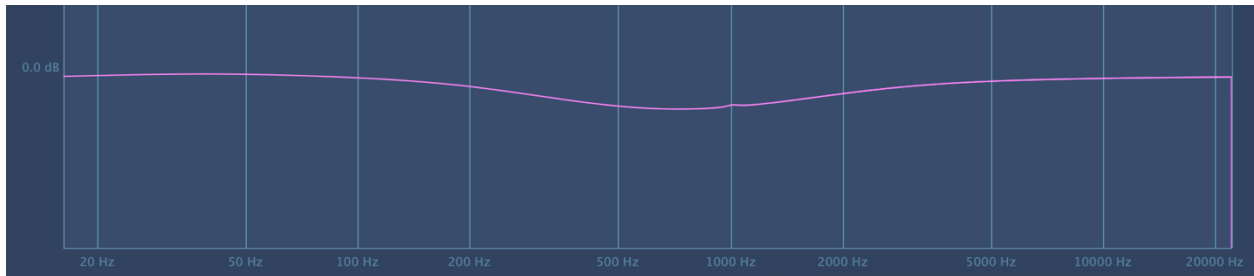
Attenuation setting of 5.0 at 0.3 kHz



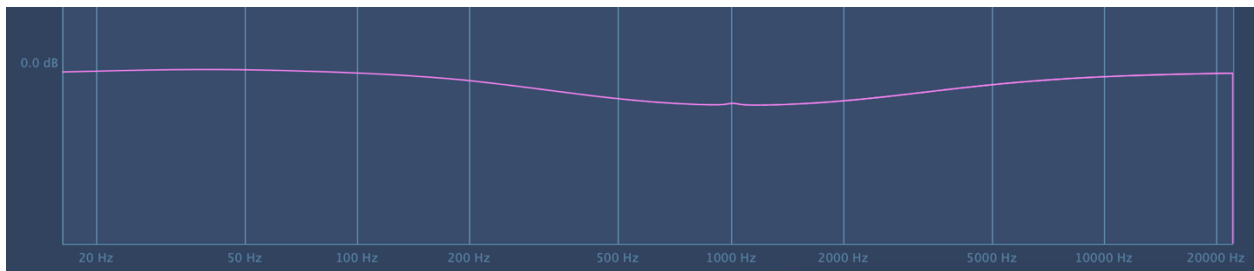
Attenuation setting of 5.0 at 0.5 kHz



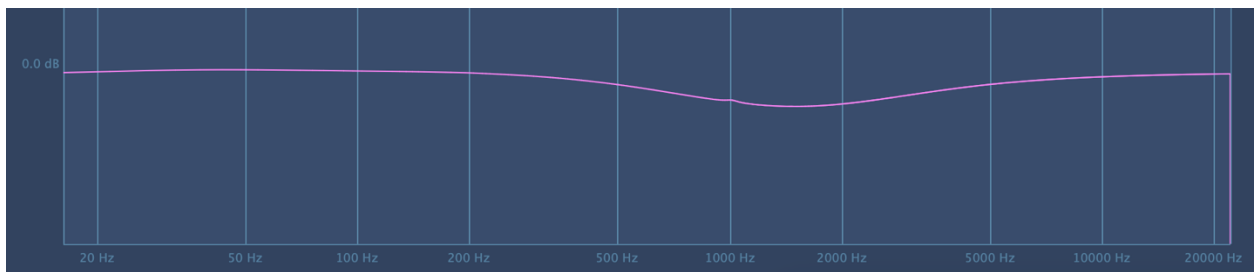
Attenuation setting of 5.0 at 0.7 kHz



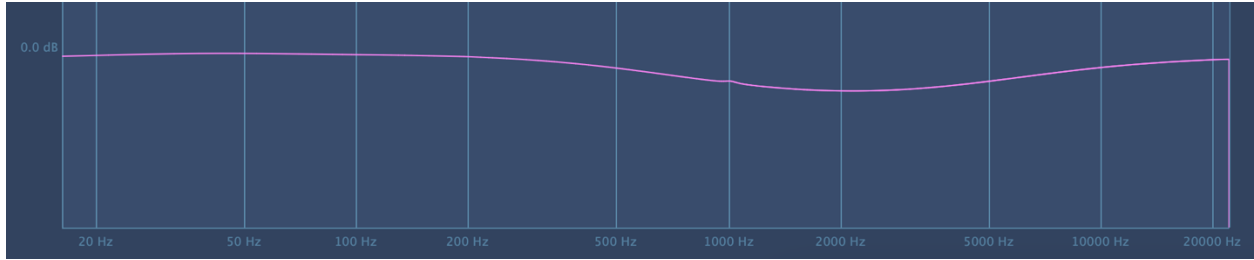
Attenuation setting of 5.0 at 1 kHz



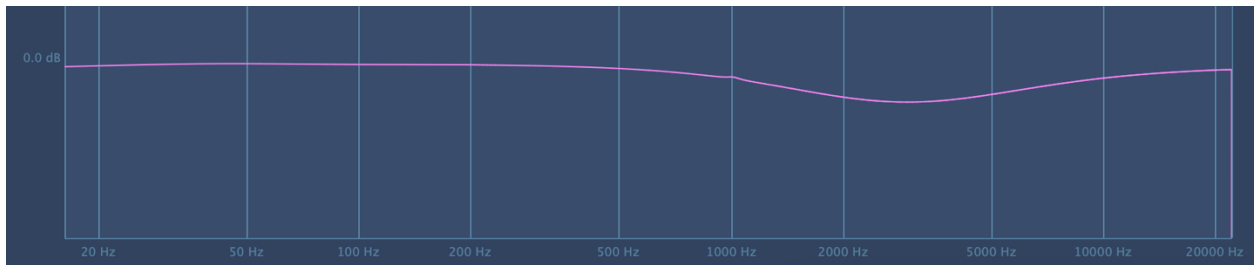
Attenuation setting of 5.0 at 1.5 kHz



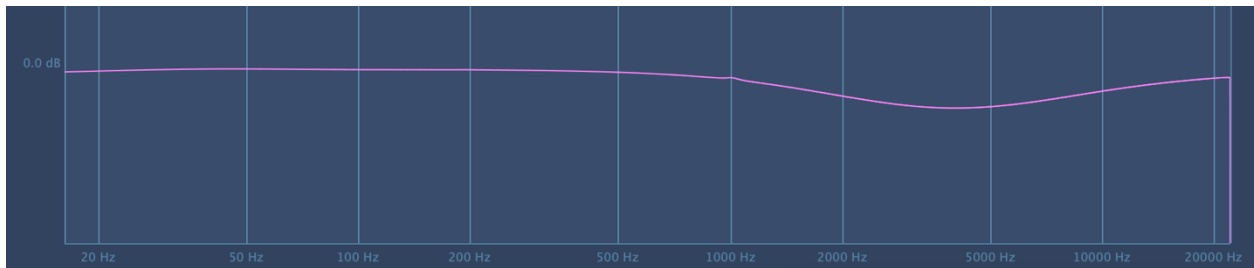
Attenuation setting of 5.0 at 2 kHz



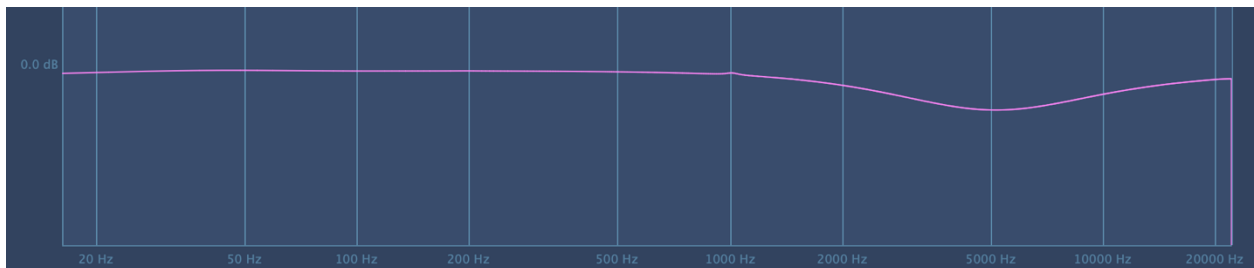
Attenuation setting of 5.0 at 3 kHz



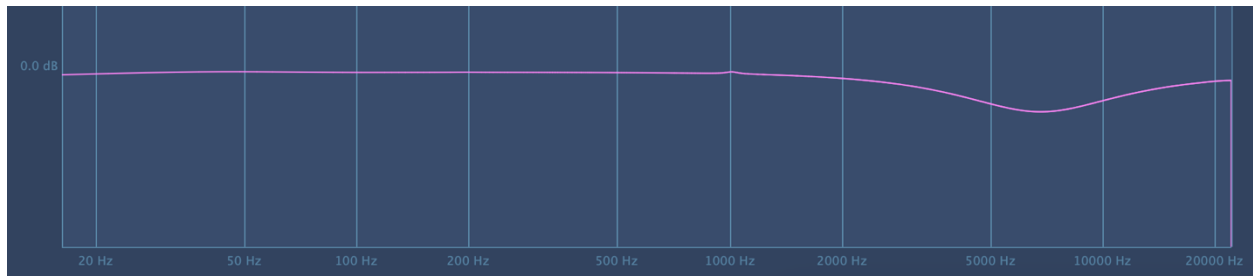
Attenuation setting of 5.0 at 4 kHz



Attenuation setting of 5.0 at 5 kHz



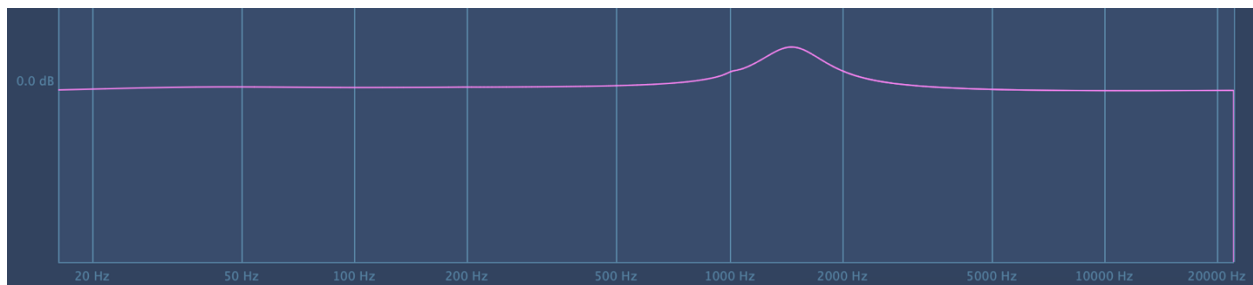
Attenuation setting of 5.0 at 7 kHz



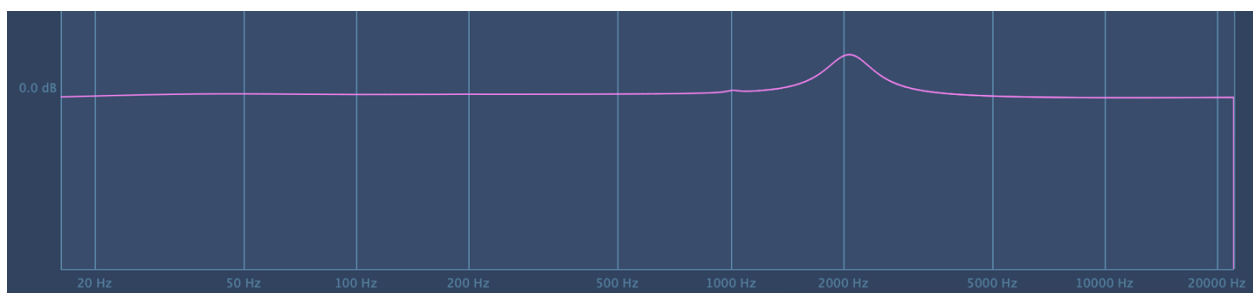
High Frequency Section

The two controls on the right – boost through bell filters.

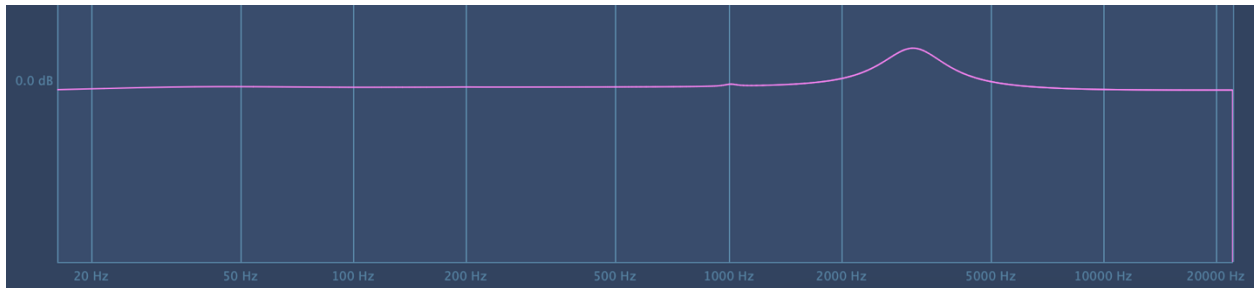
Boost setting of 4.0 at 1.5 kHz



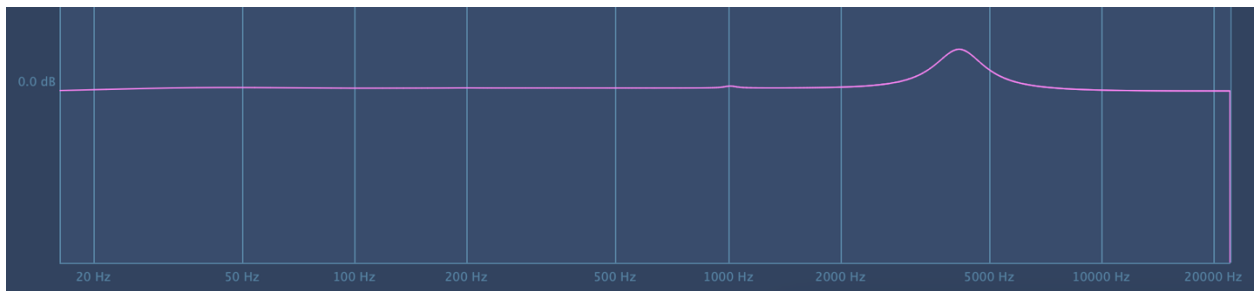
Boost setting of 4.0 at 2 kHz



Boost setting of 4.0 at 3 kHz



Boost setting of 4.0 at 4 kHz



Boost setting of 4.0 at 5 kHz

