Rephase

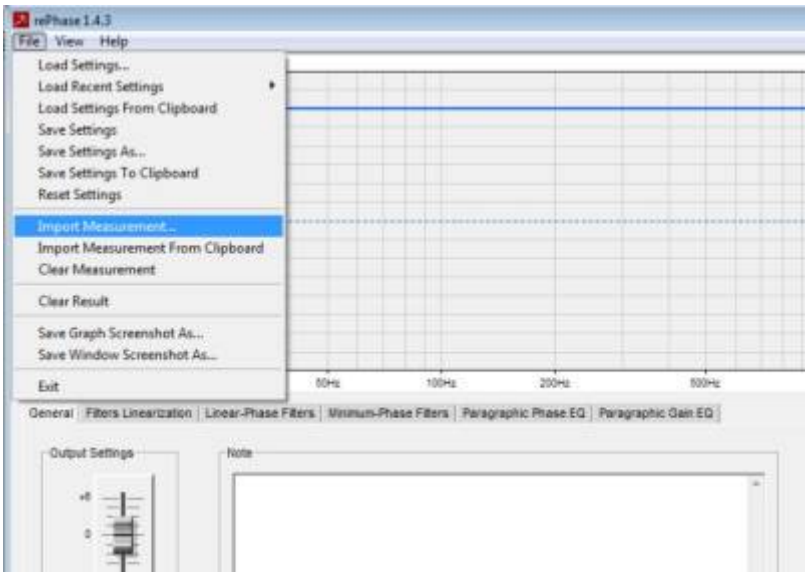
Rephase will be used to do the following:

1. tweak the EQ filter settings generated by REW and;
2. create the FIR filters for the BruteFIR software convolution engine that runs on Volumio

For each individual stereo channel do the following steps:

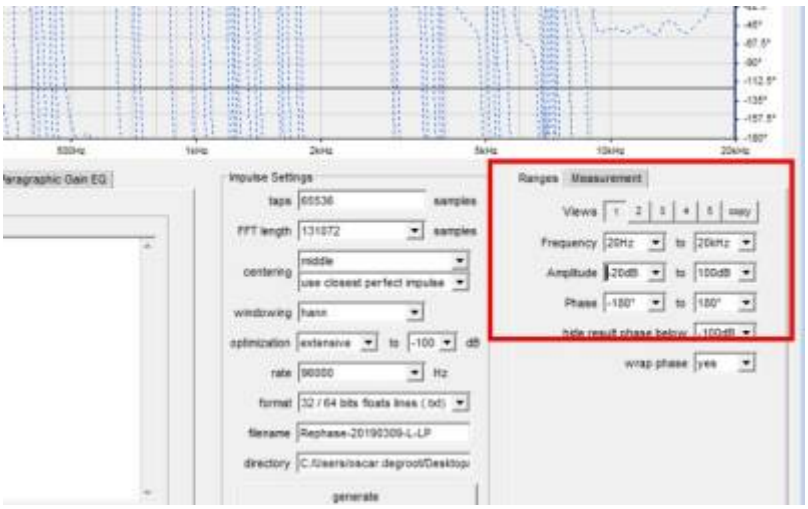
Load Measurement

From the file menu choose “Import Measurement…” to import the REW measurement.



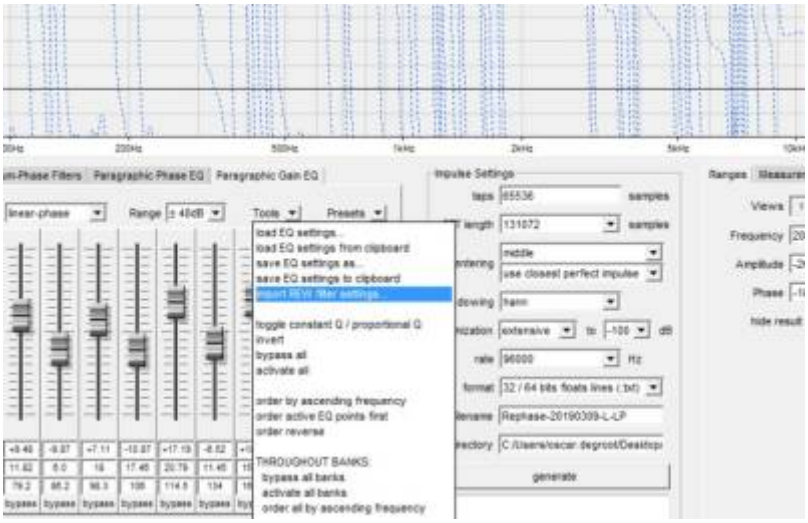
Adjust the visual ranges

Sometimes the measurement graph from REW is not directly visible, because it falls outside the default visual range of Rephase window. Choose Ranges and adjust Frequency (20Hz - 20kHz) and Amplitude (-20 dB to 100 dB).



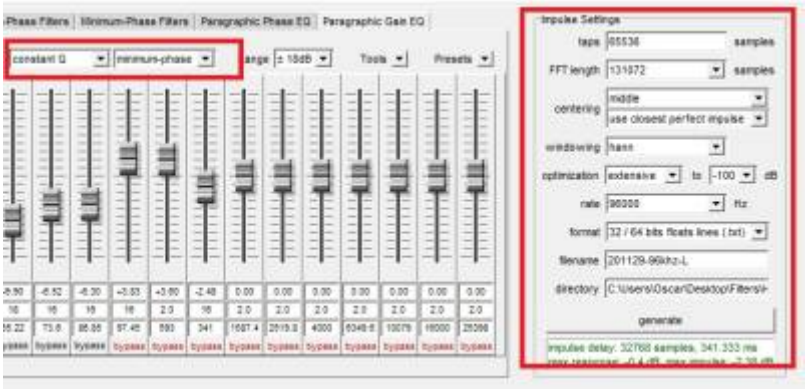
Import the REW filter settings

The EQ filter settings generated by REW can be loaded into Rephase by: Under the “Paragraphic Gain EQ” tab choose “import REW filter settings … ” in the “tools” list. After loading, Rephase displays the effects on the EQ settings on the frequenty displayed curve. The parametric EQ filters can be changed and optimized manually.



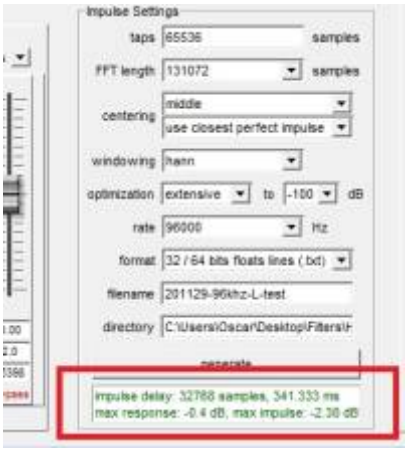
Configure parameters and generate filter

Configure following rePhase parameters: set taps to 65536, rate to 96000, filename to the name of of the filter and choose directory in which rephase will create filter. For simple EQ amplitude corrections use “**Minimum Phase**”. Hit generate to generate and save FIR filter Save your work under File/Save settings

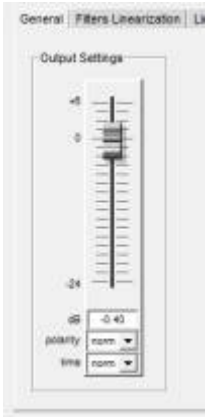


Maximum Response Peak Output

Make sure that the target curve is completely below 0 dB. After clicking on the generate button the maximum gain value is shown. See the “max response: -0.4 dB” in the example below. This value we be above 0dB if there is an EQ settings with positive gain in one of the banks. If this value is greater than 0 dB, you will risk distortion.A good setting is between -0.5 dB and -1.0 dB.



This can be corrected by adjusting the potentiometer located under the first Rephase tab. Why is it absolutely necessary to mitigate? Imagine a power surge at both 100, 1000 and 10000 Hz, exactly at the same time when recording. With the absence of phasing, the three power peaks arrive shifted in time: We can easily have 300° of phase rotation between 100 and 10,000 Hz. With phasing, power peaks are added. The digital part will be more in demand, hence the absolute need to attenuate. The dynamics will be greater since the strong signal will be stronger, the weak signal will be weaker.



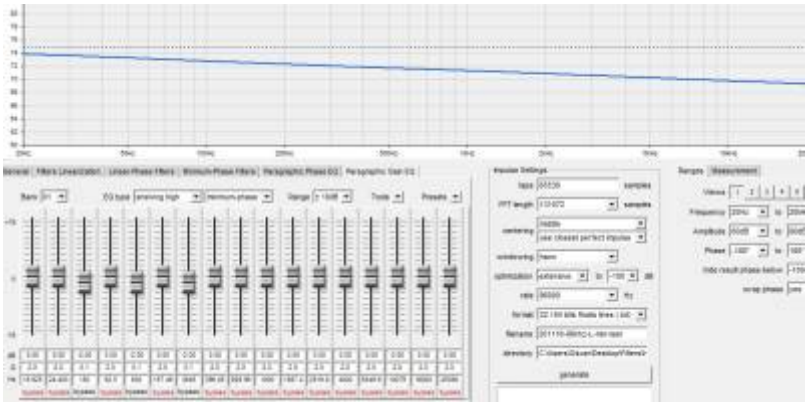
Adding Room Curve

The best solution is acoustic treatment. But sometimes you can onlu do limited acoustic correction at home (e.g. due to buget, the WAF). Even if you do an acoustic treatment that improves listening, this treatment is not necessarily perfect, and a target curve can further improve the defects that remain.

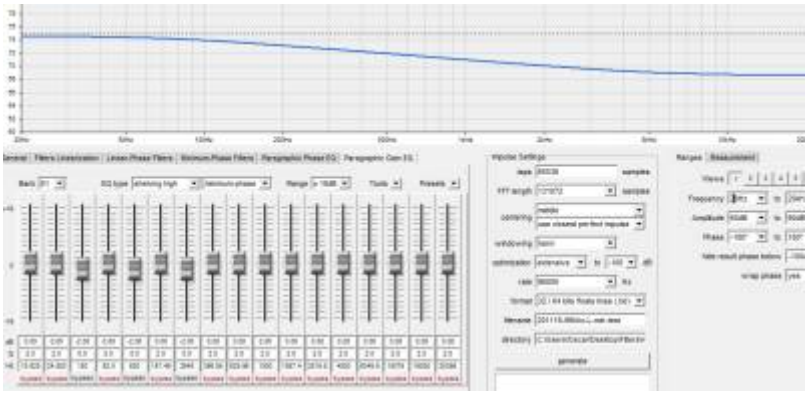
With only 3 corrections you can easily obtain a rather linear target curve. The intervention frequencies are 150, 630 and 2645 Hz. 630/150 = 4.20, 2645/630 = 4.20, constant difference in octave between the 3 frequencies. 630 Hz is the midpoint in octave between 20 and 20,000 Hz: root (20 * 20,000) = 632.5 Hz.

I use bank 1 for linearizing the frequency response with EQ correction and bank 2 for setting the target curve. In bank 2 set the EQ type to “**Shelving High**”, minimum phase, Q = 0.1 for the 3 corrections. The target curve is presented in a 1/2 octave bank. You can do it in 1/3 octave with the Presets: “flat 1/3 oct mid freq”. There are no other changes.

Linear curve: 3 corrections at 150, 630 and 2645 Hz, Q = 0.10, gain = -2.0 dB. The target curve is the blue curve below.



S-curve with Bass preference, high reduction 3 corrections at 150, 630 and 2645 Hz, Q = 0.50, gain = -2.0 dB. The target curve is the blue curve below.



S-curve with less bass preference, high reduction 1 correction at 630 Hz, Q = 0.50, gain = -2.0 dB. The target curve is the blue curve below.