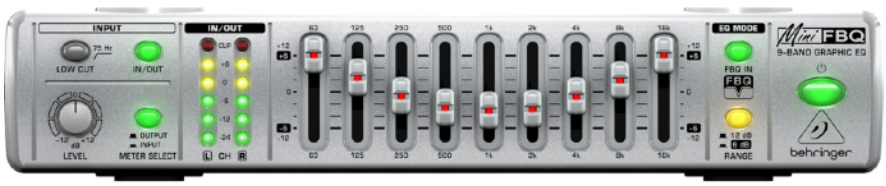
Headphone Essentials 6:

EQ’ing headphones on a Mac computer



Note: this document is part of a instructional series. If you would like to start with more foundational background information, see *Basics of Musical Sound, Basics of Headphone Sound*, *The Skinny on Headphone Frequency Response Graphs* and *Wrapping your head around the whole flat/neutral/Harman headphone thing* at Headphone Essentials.

Also note: This tutorial can be adapted for use on Windows computers by using EqualizerAPO with the Peace GUI add-on, then working with the 31-band template provided in graphical mode.

EQ, or *equalization*, in audio means modifying the frequency response of an audio device’s output. There was a time when any respectable stereo system had a bass and a treble control dial to raise or lower the loudness of the low and high ends of the output sound. This is a very simple form of EQ. Then ever more sophisticated dedicated hardware EQ boxes were developed to fit into an audio system between the turntable or CD player and the amplifier. Now that we use computers for audio we have software applications to perform the same EQ function.

If you want a very simple, rough-and-ready yet system-wide solution, simply install EQMac2 or Boom, then play with the 10-band interface until you have something you like. If you’re ready for a deeper dive, read on.

There are many approaches to doing software EQ and many tutorials based on them. There are even other measurements-focused tutorials out there that might be adapted to the Mac. I haven’t had much luck with any of them, nor with any of several other approaches I’ve tried on my own. The following is what’s worked for me. And while parts of it may *look* a bit technical at first blush, I think you’ll find it easy to pick up and use. It’s actually very simple — we start with readily available measurements, then season to taste.

Getting started

The first thing to do is evaluate the frequency response of your headphones in a relatively objective manner. Listening at the loudness level of normal conversational speech, use the Online Tone Generator in your web browser to gradually move through the entire audio range from 20 Hz to somewhere between 10 and 20 kHz, wherever your hearing stops. The only changes in loudness you “should” hear is a potential gradual decrease as you go to the left of 50 or 60 Hz down to 20 Hz. This is due to limitations of a common driver technology in this range. Plus, you may possibly also hear a gradual increase followed by a gradual decrease, starting anywhere from roughly 200 to 1500 Hz, peaking around 2500 to 3000, then tapering off to 6000 or 7000 Hz. This is due to a natural amplification thanks to the shape of human ears. We see these scenarios illustrated in Fig. 1a:

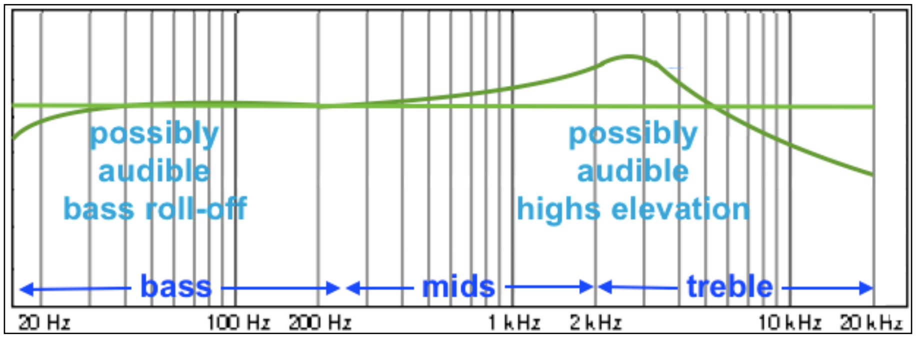


Fig. 1a: Perceived rise and fall of loudness for a problem-free headphone

In contrast, many headphones have a bass boost for consumer enjoyment. This is fine. The problem is that too often it extends well past the bass range (20 to 250 Hz) into the midrange, often reaching as high as 1000 Hz. You'll hear this as a gradual, steady drop-off in loudness beginning somewhere *higher* than 250 Hz. This distorts the sound of the human voice and many musical instruments.

Another potential problem is that many headphones have dips and rises in loudness at various places throughout the audible range. In particular sharp rises in the high frequencies can be highly irritating. Dips don't call as much attention to themselves, but they can seriously diminish enjoyment.

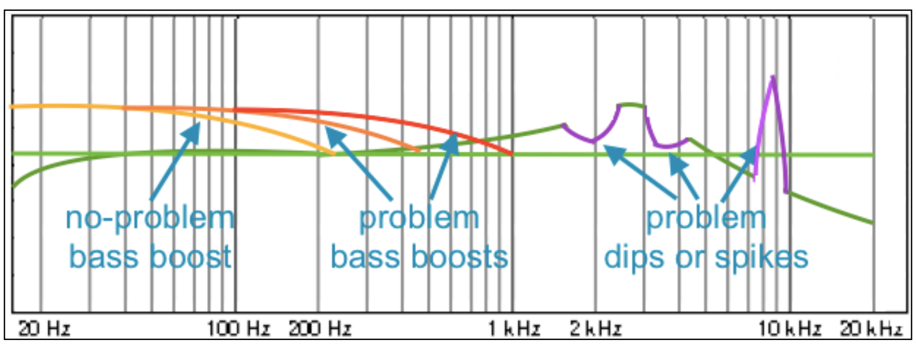


Fig. 1b: potential problems

Working with the Online Tone Generator, make notes of any problem areas you hear (even if you're not really certain if you're hearing something real) by noting the approximate start and stop frequencies, whether the sound goes louder or quieter, and whether the change is subtle or prominent.

For example, let’s say your headphone is a Beats Solo3 Wireless. Your notes might read: rise starting from 20 Hz, max loudness at 200 Hz, gradually falling off to max quietness at 700 Hz, rising to max loudness at 3700 Hz, falling to 5800, rising slightly to 7300, then steadily tapering off after that. All the better if you sketch your results like so:

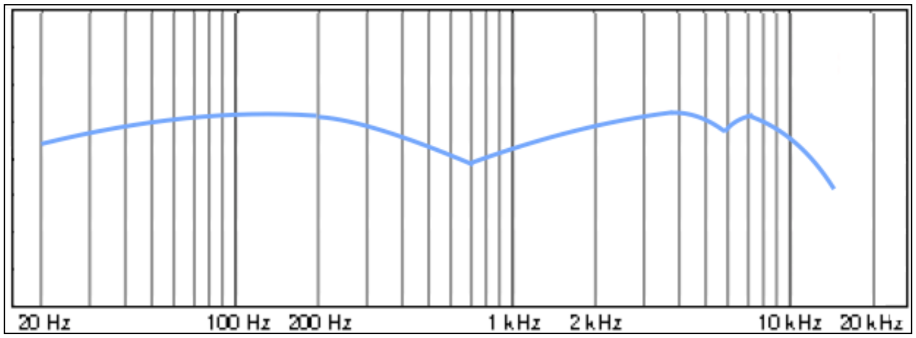


Fig. 2a: Perceived rise and fall of loudness for Solo3 Wireless

This tells us that the frequencies between 250 and 700 Hz are falling as in Fig. 1b rather than rising or holding steady. We may also want to experiment with raising the area around 5800 and/or dropping the area around 7300 Hz. Additionally, we may want to experiment raising everything above 7300 Hz to see if that is desirable.

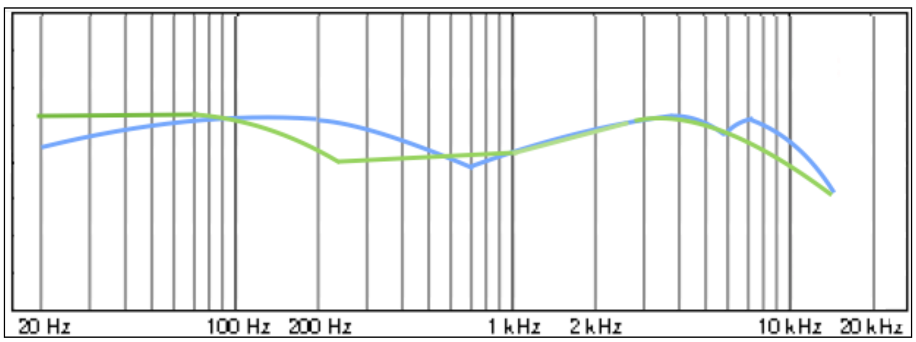


Fig. 2b: Perceived loudness curve for Solo3W (blue) with possible correction (green)

So what we want to do is use software EQ to modify the Solo3’s sound output from the blue line to the green line in Fig. 2b. Keep the same bass elevation. Just confine it to the bass region.

Currently, the only decent system-level EQ app for MacOS is called eqMac2, which does 31 bands of graphical EQ (a new version promising multi-channel parametric EQ is under development but not ready for prime time). We’ll use eqMac2 throughout this tutorial.

Introducing eqMac2

Download and install the open-source, thus malware-safe, eqMac2 (https://sourceforge.net/projects/eqmac2/). Since you’re not getting it through the App Store, you’ll probably have to do the permissions dance in the Security & Privacy dialogue. This should put the eqMac icon in your (upper right) menu bar. Click the eqMac2 icon to open its interface.

The default 10-band input screen is too crude for our needs. So click on the *31 Bands* button to switch to this input screen:

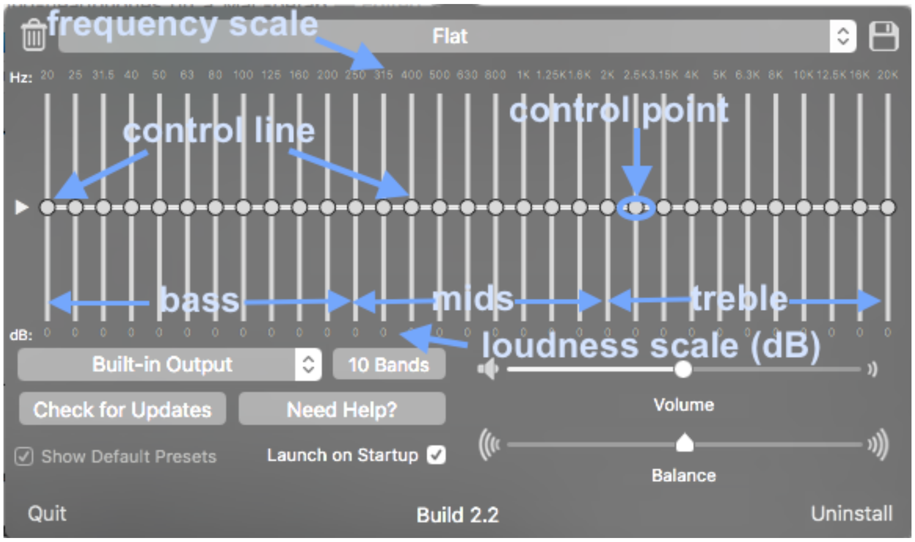


Fig. 3: eqMac2 31-band input screen with added frequency range labels

The thick horizontal light grey line with 31 dots at each intersection point is the default EQ control line, fittingly named Flat. The 31 vertical lines divide the audible spectrum into third-octave bands as specified by an ISO standard (I’ve added labels in blue to indicate the bass-mids-treble frequency ranges the various dots cover). Listening to music with a flat EQ in the middle, or 0 dB, level, means eqMac2 has nothing to do. You’ll hear what you normally hear with eqMac2 not loaded.

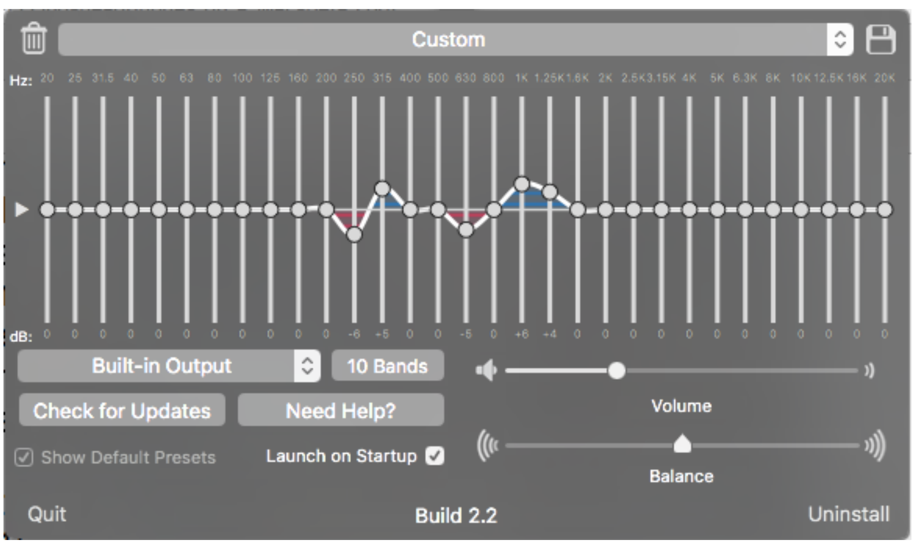


Fig. 4: randomly moving some control points on the graph

But notice the convenient volume and balance sliders that allow easy and fine-grained adjustment to both those sound properties. To the left of the volume slider is a dropdown for choosing among multiple output devices if you happen have more than the standard internal speaker and headphone connections installed. Definitely select Launch on Startup to save yourself from some tricky issues that can occur if eqMac2 doesn’t get to initialize during the boot sequence.

The next thing to do is move a few of the white dots around the centre of the long horizontal line up or down until the number below that point changes to something around plus or minus 5 or 6 dB, as in Fig. 4. Play a piece of music while you do this to hear the sound change that results.

Once you’ve got a feel for using the control points we’ll return to fixing the hypothetical issues with our imaginary Beats Solo3 Wireless headphone.

Caveat: I recommend moving the control points up or down by 6 dB or less, since that much is easily audible, while a +10 or +20 dB boost is something to use with extreme caution. There is an evil called *clipping* that can happen when we drive a headphone (or loudspeaker) too loud. In theory this can damage your device, although I strongly suspect Apple has built in a safeguard to its audio output to prevent this from happening.

Another concern regarding large boosts is distortion, see **EQ sound degradation?** below, page 16). But beyond all the above it’s really a combination of your overall volume/loudness setting *plus* your EQ frequency boosts that can add up to trouble. So stick with a +6 dB limit if you listen at loud volumes.

Creating an EQ compensation curve using eqMac2

Looking at Fig. 2b, the first thing we want to do is raise the 20 Hz control point by a moderate amount, raise the 25 Hz control point by a smaller amount, and raise the 31.5, 40, 50, 63, and 80 control points by every diminishing amounts. Let’s start with +4 dB for the 20 Hz control point, about ½ way between 4 and 3 dB for the 25 Hz control point, 3 dB for the 31.5 point, etc. The result looks like Fig. 5:

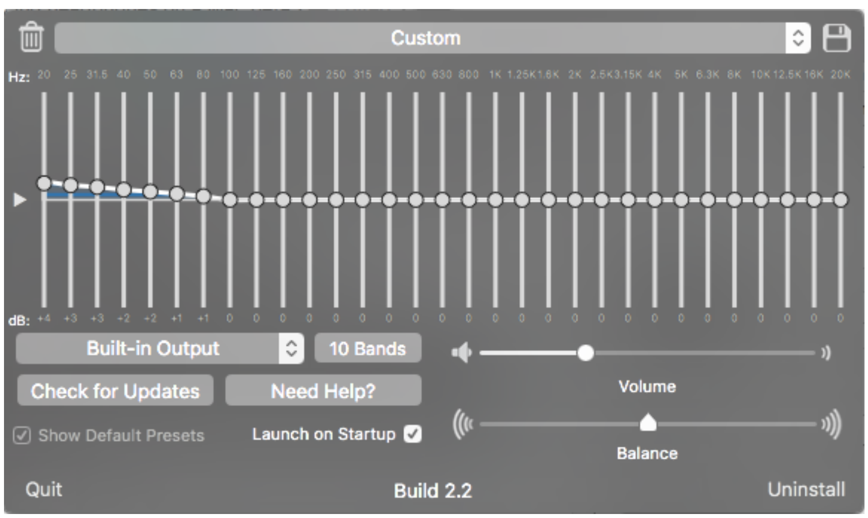


Fig. 5: Initial sub-bass correction for Solo3W

Listening to the Online Tone Generator in the 20 Hz to 100 Hz region, perhaps we now hear loudness holding steady rather than rising. If we instead hear the loudness falling instead of rising, we’d know we’d used too much correction and would dial it back as needed until it holds steady.

Again referring to Fig. 2b, we now need to correct the region between 100 and 250 Hz. The change looks pretty dramatic at 250 Hz, so let’s go for a large -6 dB as our initial guess, and use decreasingly smaller corrections until we get back to 100 Hz. The result looks like this:

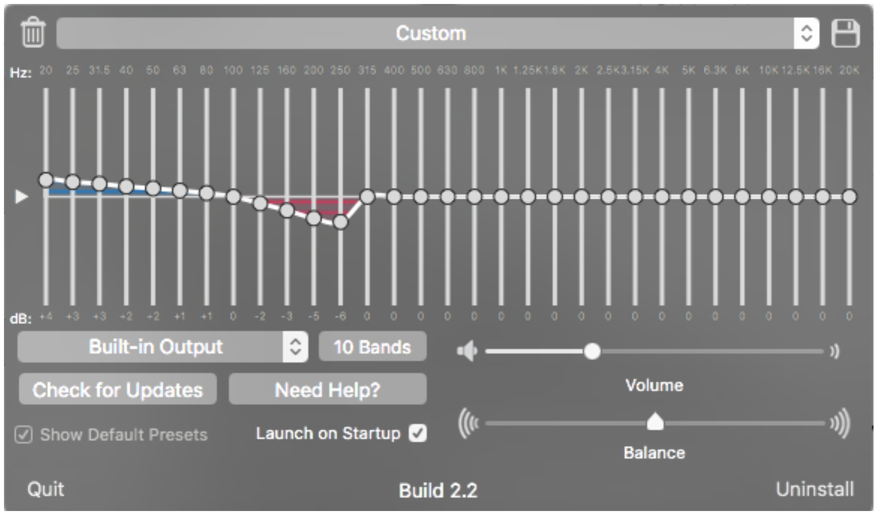


Fig. 6: Added mid and high bass correction for Solo3W

We now need to taper off our reduction until we get back to 0 at 700 Hz. We don’t have a 700 Hz control point so we’ll target 600 Hz as being 0. The result looks like this:

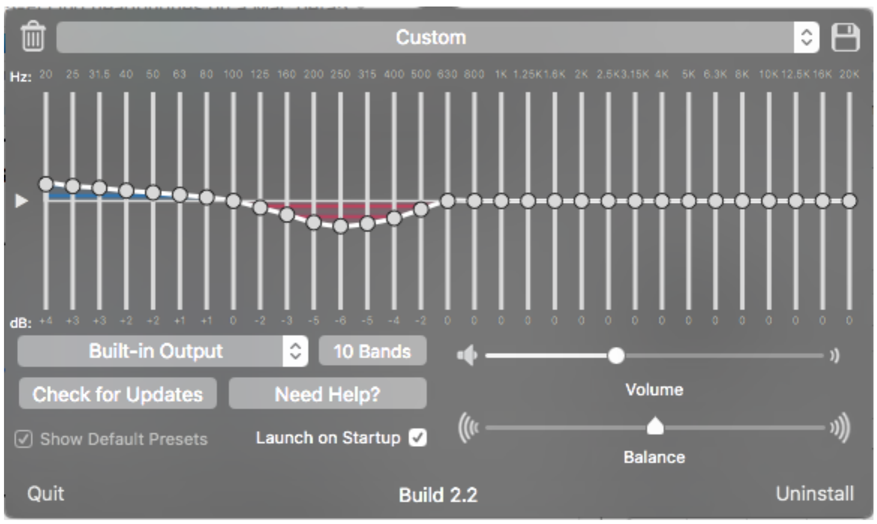


Fig. 7: Added low mids correction

Caveats: Clicking anywhere in the graph area relocates the nearest control point. clicking on the arrowhead to the left of the centre line switches to the Flat profile (but does not throw away your work, which is still retained as Custom).

Now we need to test again. Using the Online Tone Generator we need to do something a bit tricky. We need to compare the loudness of the tone at 250 Hz with EQ on to the loudness of 700 Hz with EQ off. In general, to turn EQ off in eqMac2 we simply switch to the Flat “curve” or profile. But in this case all the control points to the right of 500 Hz are still at 0, so we can just leave our custom profile in place. Going back and forth between the two by toggling sound on and off with the space bar in the Online Tone Generator and moving the slider left and right, perhaps we hear 250 Hz being slightly louder than 600 Hz. So we drop the 250 Hz control point by 2 dB, move the others surrounding it accordingly, then re-test. Now we hear steady loudness from 20 Hz to 600. Continuing the process we end up with:

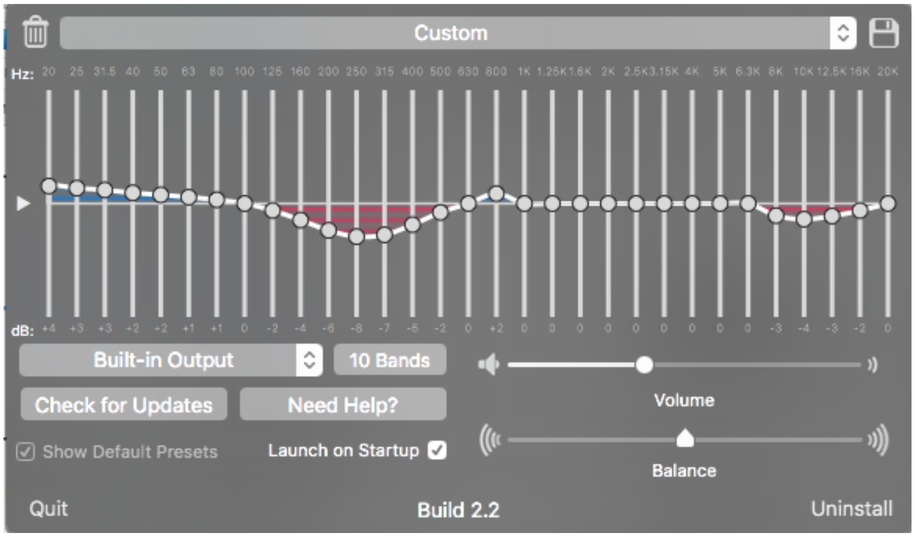


Fig. 8: Final flatness correction

Testing this with the Online Tone Generator we hear thumping loud bass from 20 to 100 Hz. This smoothly tapers down to a low point at 250 Hz then rises steadily to 3700 Hz and tapers smoothly off from there. That's what we were aiming for. But what does that do to music and spoken word listening? After repeated use over a few days we decide it's a definite improvement overall. Even for EDM we retain plenty of bass kick — but also gain a new clarity in the vocals. This is fine but it seems to come at the cost of the loss of a little sparkle in the highs. Taking out the final dip on the far right of the graph from 8 kHz on restores the sparkle, and now we're good all around.

This is the free-form approach to EQ. Listen for problem areas, such as an over-extended bass boost, dips and spikes. Correct by ear. But sometimes we run into trouble. The only thing that keeps me from turning raw food ingredients into an unpalatable mess when I have to cook from scratch is a competent recipe. So the next step is to learn the headphone equivalent of following a recipe.

Creating an EQ compensation by matching a target curve

First, you'll need to grab a screen shot or save an image file of a raw measurement graph of the headphone you want to EQ. I explain these graphs and where to get them in Headphone Essentials 4, so review that material now if you're hazy on it. Then we need what's called a target curve. This is a visual representation of what the headphone *should* sound like but currently doesn't. (And I explain this in Headphone Essentials 5.)

The workhorse Audio-Technica ATH-M50x is probably still one of the most-owned headphones among “serious” listeners. So there’s at least a small chance you’ll actually have this model. If not, no worry. Again, we’re just using it as an example or place-holder for your own headphone. Substitute your own headphone model as you follow along.

First step: I screen-grab the raw FR graph for the M50x from Oratory1990:

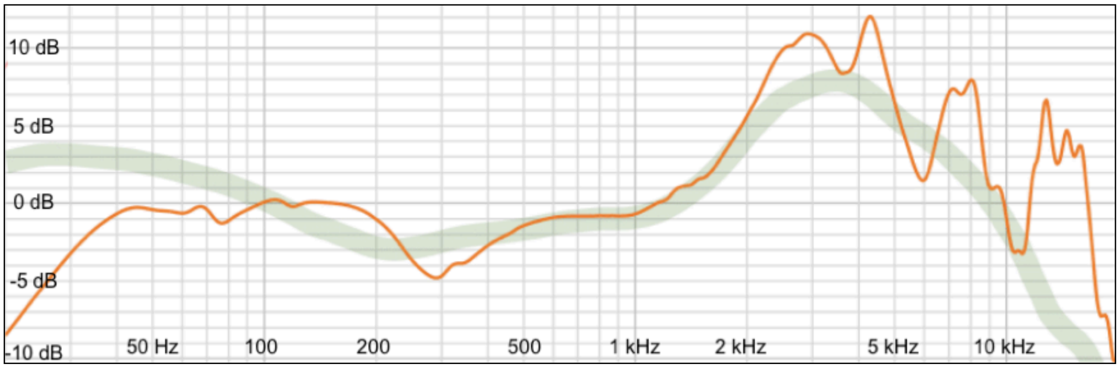


Fig. 9: M50x raw measurement graph screen grab (source: Oratory1990)

The orange line are the actual frequency measurements, showing how loudly or quietly the M50x reproduces sounds from bass through treble, 20 Hz to 20 kHz. The broad green line is the 2018 Harman frequency response target for reference (which we’ll ignore). The horizontal grey lines divide the vertical loudness axis into 1 decibel (dB) units, while the vertical grey lines mark frequency (pitch change from bass to treble) in Herz (Hz). I’ve added scale numbers in black.

Next, I used the crude mark-up tools in the Mac's Preview app to draw the loudness curve in blue that I want to change the frequency response of the M50x to match. Alternately, you could use some other, more sophisticated, image editing program. But the simplest thing is to print the graph, then pencil in your own compensation curve. I explain choosing/creating your own target/ compensation curve in the section **Finding your own compensation curve** below on page 14**.** For now, simply copy the blue line curve:

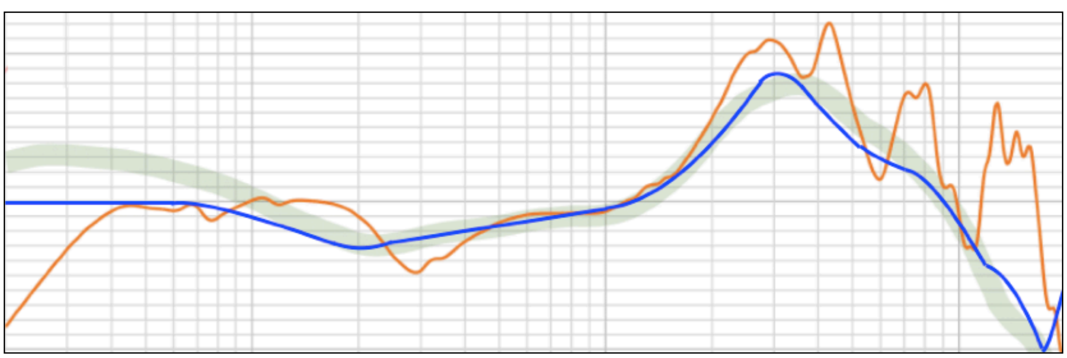


Fig. 10: Target compensation curve added in blue

The particular blue line I added is called the 2013 Harman target response curve (but slightly customized with the bass elevation on the left reduced from 4 dB to 3 dB). The goal is to use EQ to change the frequency response of a pair of M50x headphones to match this Harman target. Thus, any place in Fig. 10 where the blue line rises above the orange line we want to *lower* the frequency response via EQ. And anywhere the blue dips below the orange line we want to *raise* the frequency response.

To make this clearer, here's an inverted version of Fig. 10:

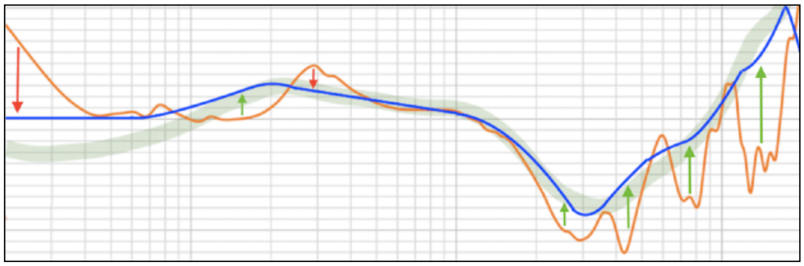


Fig. 11: Figure 2 turned upside-down

Inversion literally shows where the orange line is too low or too high compared to the blue line. (It may help if you imagine the blue line being a string then imagine stretching it taut into a straight line with the orange line obediently following along.) The EQ compensation we want to achieve is simply the dips and rises of the orange line under and over the blue line. So next we simply need to note how many dB separate the orange line from the blue line at each of the 31 frequency control points we'll be using in our EQ software:

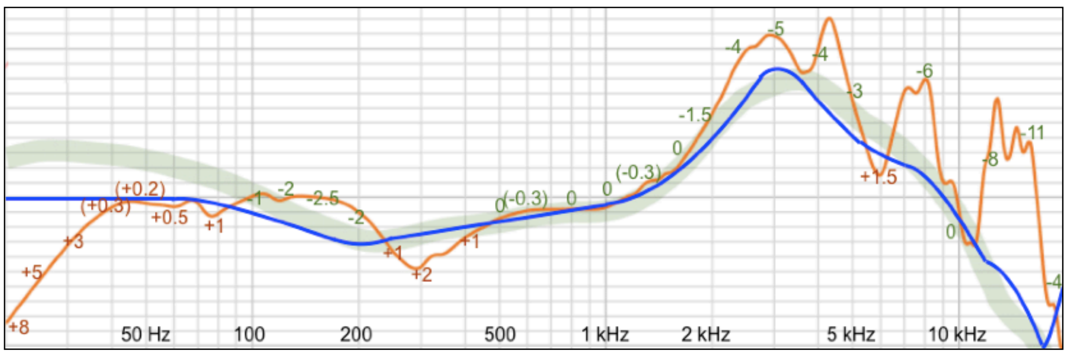


Fig. 12: dB values for 31 control points marked

All I did here was eyeball and record the separation between the orange line and the blue line at each of the following frequencies:

20, 25, 31, 40, 50, 63, 80, 100, 125 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000, 12500 16000 and 20000.

The numbers I marked on the graph are of no great exactness. Since the software only indicates 1 dB changes, places where I recorded values smaller than ½ dB are really overkill. Notice also that I put a plus sign in front of numbers where the orange line falls below the blue line and a minus sign in the opposite case. And that completes the first half of our preparations. Putting the two sets of numbers together using frequency in Hertz and loudness in decibel pairs we get:

20:**8**, 25:**5**, 31.5:**3**, 40:**0**, 50:**0**, 63:½, 80:**1**, 100:**-1**, 125:**-2**, 160:**2½**, 200:**-2**, 250:**1**, 315:**2**, 400:**1**, 500:**0**, 630:**0**, 800:**0**, 1k:**0**, 1.25k:**0**, 1.6k:**0**, 2k:**-1½**, 2.5k,**-4**, 3.15k:**-5**, 4k:**-4**, 5k:**-3**, 6.3k:**1½**, 8k:**-6**, 10k:**0**, 12.5k:**-6**, 16k:**-11**, 20k:**-4**

Caveat: Depending on your headphone model and target measurements may indicate a correction greater than our 6 dB safety limit. Initially reduce the correction to 6 dB, then gradually increase to find the minimum amount needed to achieve acceptable results — but remember to keep your Volume setting correspondingly lower.

Turning the numbers into an EQ curve

Choose Flat from the top dropdown again to start with a clean slate. The first two numbers I marked on the left in Fig. 12 are +8 at 20 Hz and +5 at 25 Hz. As explained just above, I’m going to drop both of them to +3, at least initially. So first I move the 20 Hz dot up to 3 dB (instead of 8 dB) on the eqMac2 graph. Next I move the 25 Hz dot barely to 3 dB, then the 31.5 Hz dot also to 3 dB.

Here’s what that looks like so far — a slight rise at the far left:

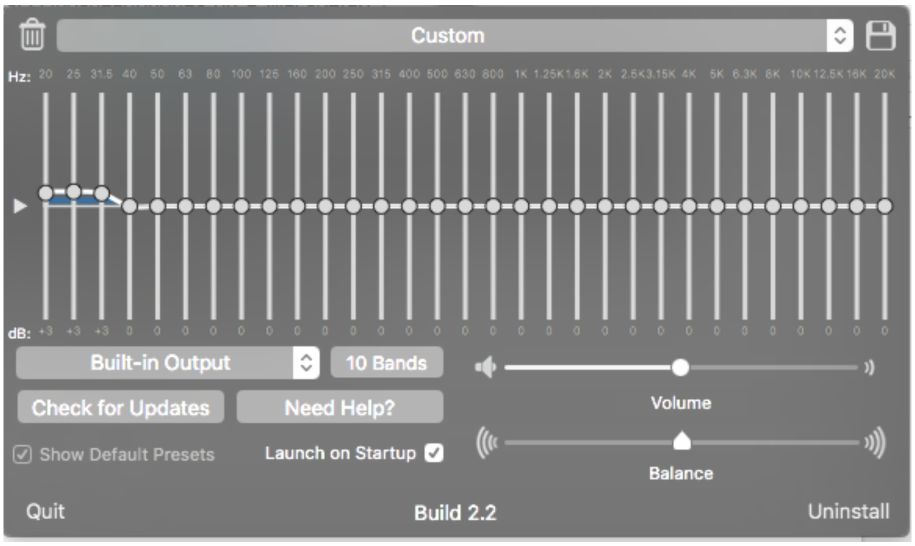


Fig. 13: First three dots have been positioned

The next three dots from 40 to 63 Hz are all fractional values: 0.3, 0.2, 0.4. These can simply be left at zero, since such minute increases are essentially inaudible. The next three values are +1, -1 and -2 for 80, 100 and 125 Hz:

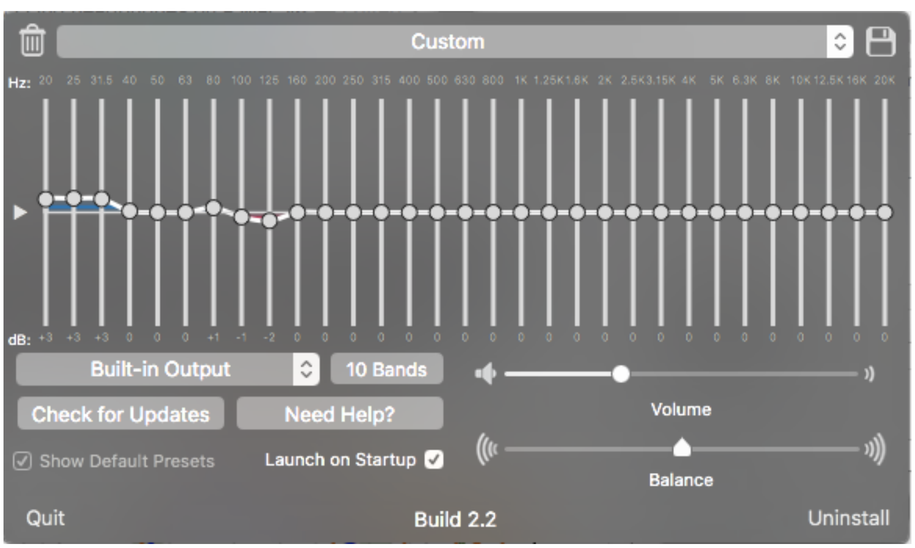


Fig. 14: First eight dots out to 125 Hz have now been positioned

The next value in Fig. 12 for 160 Hz reads -2.5. Here I attempt to place the dot roughly half way between the -2 and -3 positions. A -2 and a +1 take us out to 400 Hz and the next 6 values are either 0 or too close to zero to fuss with. So in fact we’ve completed out to 1600 Hz:

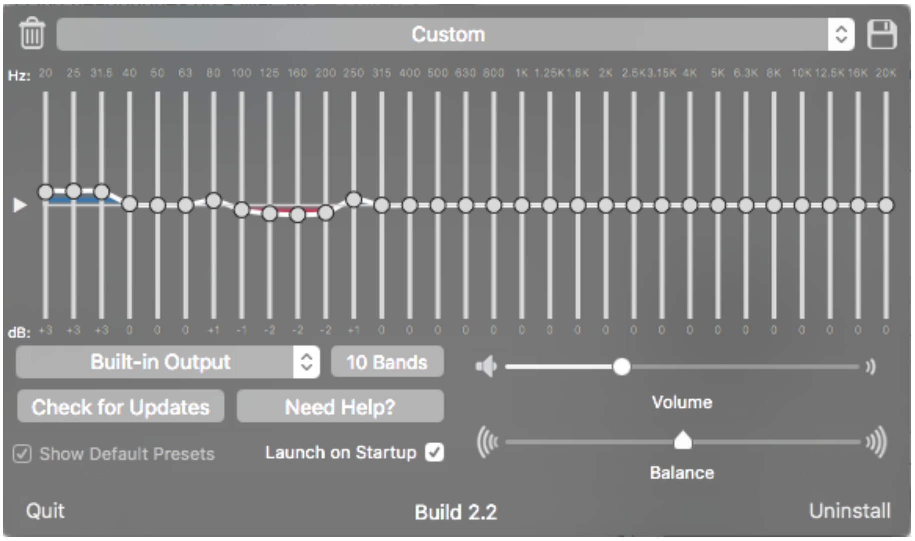


Fig. 15: First half of the EQ curve out to 1.6 kHz is now completed

Finally, the completed curve looks like this:

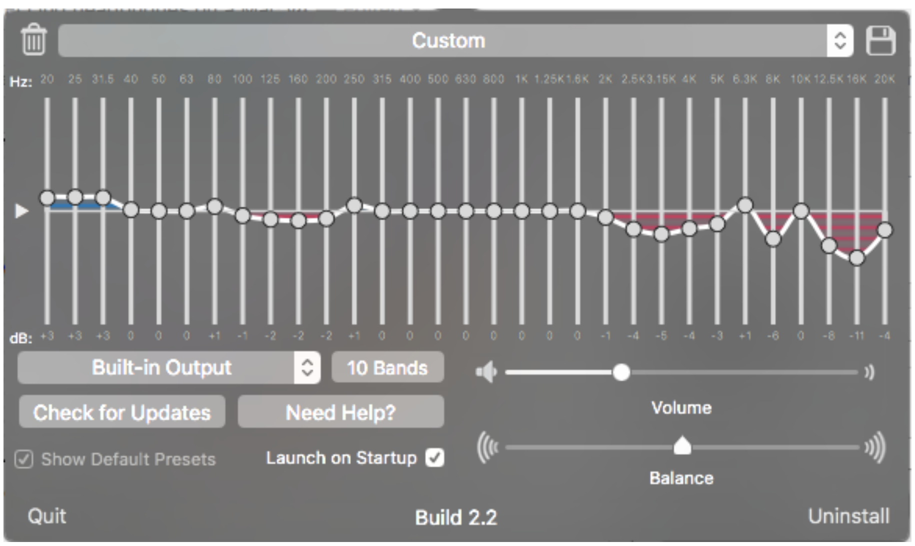


Fig. 16: Finished M50x EQ curve from Oratory1990 graph

At this point be sure to click on the floppy disk icon at right top of the window you’ve been working in to *save your work* using some descriptive name. You may want to include the following in the name you use: the headphone model, the source of the graph you’re working from, the name of your target curve, and possibly the current date or some other information to distinguish it from possible variants.

For example, for the EQ curve shown in Fig. 16 I use the name *M50x -> Harman 2013 -1bass (Or)*. (Translated: M50x EQ’ed to match the 2013 version of the Harman response curve but with a 1dB bass drop and based on Oratory1990’s measurements.)

To pre-amp or not to pre-amp

Unlike many EQ programs, eqMac2 does not provide a software pre-amp option. A pre-amp control simply shifts the loudness of an entire EQ up or down by a user-selected amount to prevent clipping. Technically, you can do the same thing either by building our EQ at a lower dB level or by using the system-level Volume control. Nevertheless, we can simulate a pre-amp by creating and using your own flat EQ “curves” at various dB levels, like so:

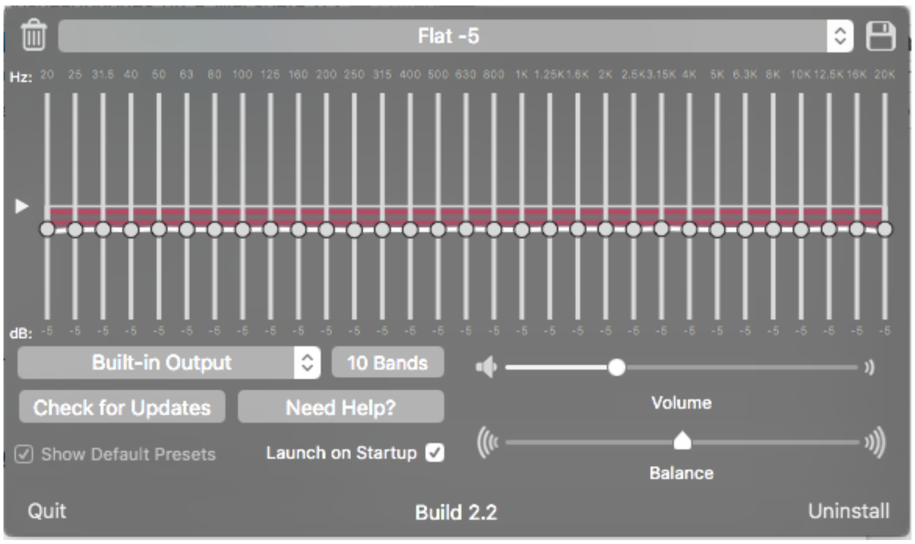


Fig. 17: jury-rigging a -5 dB pre-amp

To use this, first subtract 5 from all your numbers if you’re working from measurements, then select Flat -5 from the top dropdown and use that as a starting point for creating your adjustment curve. If you find this useful, you can make a Flat -2, Flat -3, Flat -5, etc.

Tweaking measurement-based results by ear

Consistency from one unit to the next of the same model headphone varies significantly from manufacturer to manufacturer. Plus, many headphone ear pads flatten a bit with use, changing the headphone’s frequency response to some degree. Plus, the measurements are based on a mythical average human ear, not your own ears. This especially affects everything from 3 KHz on up.

So, the next step is to listen to music tracks you’re familiar with, switching back and forth between your new EQ and the Flat option in eqMac2. Be sure to listen at your normal loudness level. But also use the Online Tone Generator to gradually move through the entire audio range from 20 Hz to somewhere between 10 and 20 kHz, wherever your hearing stops. The only changes in loudness you should hear is a potential increase as you go to the left of 200 Hz down to about 30 Hz due to the modest bass boost built into the Harman target, plus possibly another gradual increase in roughly the 2 kHz to 4 kHz range (a natural amplification thanks to the shape of human ears).

If you hear other loudness increases or decreases, try tweaking your EQ using the corresponding control points. For example, if you hear a drop in loudness from roughly 650 to 900 Hz, raise the 630 and 800 Hz control points as needed. An exact correction may not be possible, nor are you likely to hear small inaccuracies when listening to actual music instead of a test tone. In my case the frequency range from 1700 to 3700 Hz drops in loudness rather than remaining the same or increasing in loudness. So I raised the control points in that range by a couple dB, found there was still some dip in loudness, then finally brought the entire area back up to 0 dB, which nicely eliminated the problem. Unit variation? A consequence of the ear pads being well-used? A combination of the two? In any case, problem solved:

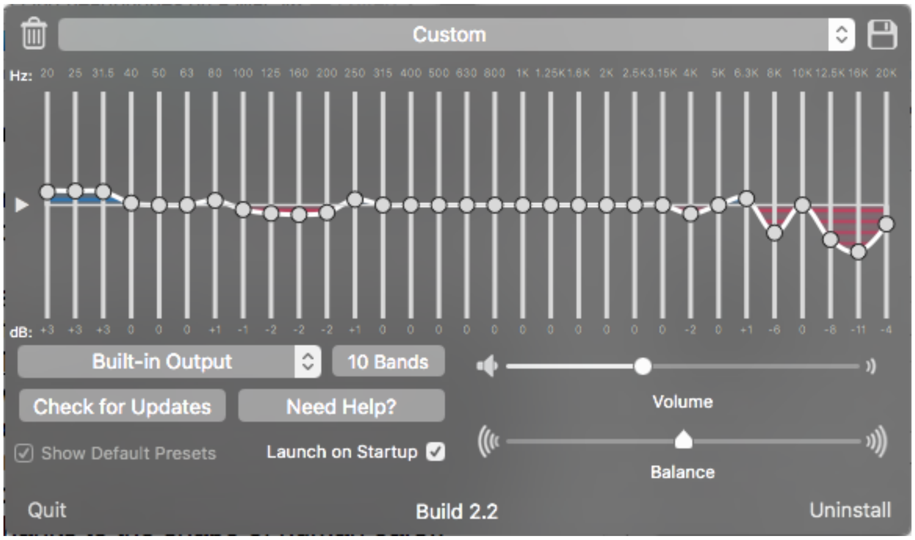


Fig. 18: Tweaked M50x EQ curve

Remember to save any changes you make with a new descriptive name, like *M50x -> 2013 Harman (Rtings) adj.*

Caveat: EQ can occasionally adversely affect soundstage and imaging. If you notice that happening, systematically revert each control point in turn to 0 until you identify the one that is causing the change.

Finding your own target compensation curve

I used an early version of the Harman curve with a slight drop in bass boost for the above example. Sean Olive, the lead on developing the Harman target, estimates the current, 2018, Harman target will suit about ⅔ of headphone users. A target curve suitable for someone who listens to a lot of metal or synth might involve a reduction to the upper mids of the Harman target. At the opposite extreme someone who mainly listens to vocal and acoustic instruments music — whether singer-songwriter, folk, world, jazz or classical — might lean toward a strictly neutral target, meaning no added bass. Someone with high frequency loss from age or with hearing damage may want to add a boost to the treble and/or elsewhere. Someone with treble sensitivity will want to use the Online Tone Generator to identify the high frequencies that irritate and reduce them accordingly.

Finding your own single target response curve often means finding a compromise between conflicting desires. Alternately, you can create a bass-heavy curve for listening to electronic dance music or similar, then switch to a more balanced, more neutral curve when listening to other genres. This is all fine, but the question remains: what to use as a starting point as the basis for your customizations? The 2018 Harman is as good a place to start from as any:

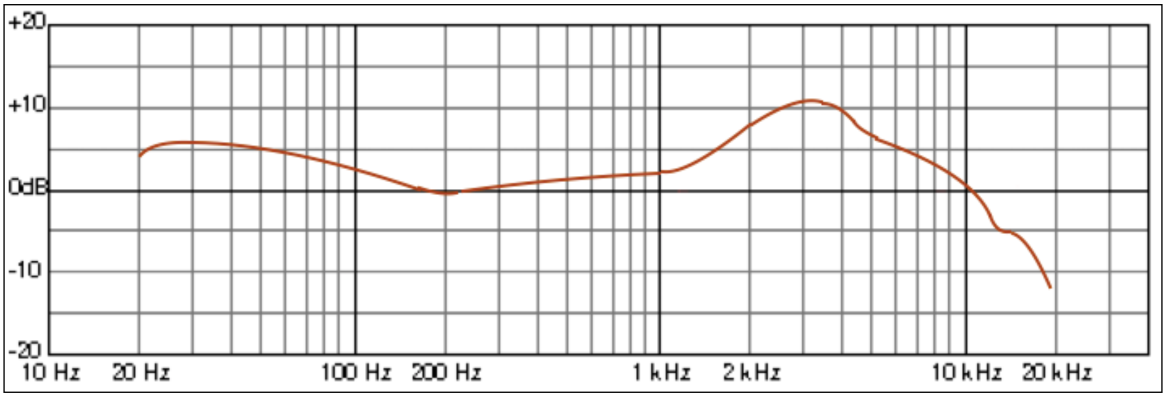


Fig. 19: Harman over-ear and on-ear headphone frequency response target, 2018

And as a bonus, if you use an Oratory1990 graph as your starting point the Harman target is already right there in green.

Numerically, the Harman 2018 target looks like this:

20:**5½**, 25:**6**, 31.5:**6**, 40:**6**, 50:**5½**, 63:**5**, 80:**4**, 100:**3**, 125:**2**, 160:**1**, 200:**0**, 250:**0**, 315:½, 400:**1**, 500:**1**, 630:**1½**, 800:**2**, 1k:**2**, 1.25k:**2½**, 1.6k:**4½**, 2k:**7**, 2.5k,**9½**, 3.15k:**10½**, 4k:**10½**, 5k:**8½**, 6.3k: **7**, 8k:**4½**, 10k:**1½**, 12.5k:**-3**, 16k:**-6½**, 20k:**-18½**

Two examples: To reduce the Harman bass boost from 6 dB to 3 dB you might use these numbers up to 160 Hz instead:

20:**2½**, 25:**3**, 31.5:**3**, 40:**3**, 50:**3**, 63:**2½**, 80:**2**, 100:**1½**, 125:**1**, 160:½

To boost the treble by 2 dB you might use these numbers starting at 2 kilohertz:

2k:**7**, 2.5k,**10**, 3.15k:**10½**, 4k:**10½**, 5k:**9**, 6.3k:**7½**, 8k:**5½**, 10k:**3½**, 12.5k:**-5**, 16k:**-8½**, 20k:**-20½**

The modified 2013 Harman curve we worked with in the previous section is little more than a 3 dB reduction in bass and a 2 dB increase in the upper mids from the 2018 Harman target.

The overall process is simple:

1. Make your best guess as to whether you’re most likely to prefer the Harman target as is or with more bass or less bass or more treble or less treble.
2. Create a new target curve by modifying the Harman target accordingly.
3. Create and save an EQ for your headphones using the numerical method described in the previous section.
4. Listen to music in the genres you intend to use the EQ for over several days.
5. If you feel you need more bass, less treble, etc., repeat the above 4 steps except optionally modify the EQ from your previous attempt instead of going back to the Harman (remembering to save your changes as a new EQ).

Once you achieve satisfaction with a single EQ or set of EQs, you’re good to go. That may be all you ever need to do with EQ … or at least until you buy new headphones or eqMac2’s creator releases a stable new version. (Or it may not be the final word. You can explore further avenues for finding a preference target in the next tutorial in this series.)

EQ sound degradation?

A persistent headphone enthusiast meme is that software EQ introduces audible timing/phase and/or other distortions. From what I’ve read this was quite true years ago in the early days of computer audio. But those days are long past.

What EQ critics hear is more likely the temporary effect of a collision between a person’s brain accommodation/burn-in to the prior frequency response and the new EQ adjustment. If I listen, for example, to a 500 Hz sine tone, normally a sweet, pure sound, then change the EQ for 500 Hz, the tone will often acquire a hissing rasp. But if I leave that EQ in place and come back to the same tone at the same loudness in a few hours or at most the next day the rasp will have disappeared. I suspect this effect lies behind some of the anti-EQ prejudice still lingering in the headphone enthusiast community.

That said, there is a limit to how much EQ can be applied before real distortion kicks in. Every headphone has a measurable amount of something called *total harmonic distortion + noise* (THD). Measurements for this are available from rtings.com and innerfidelity.com, for example:

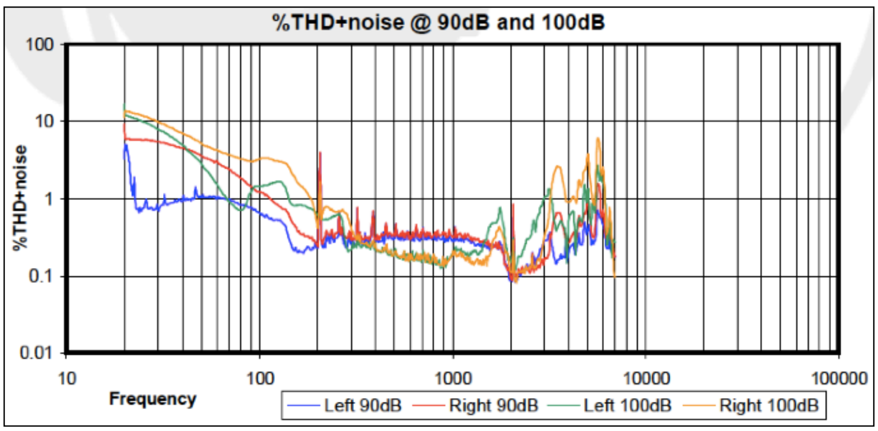


Fig. 20: InnerFidelity distortion measurements for Grado SR60i

While this result will be deemed unacceptably bad by many an objectivist, in fact nothing under 10 dB is even barely audible when listening to even quiet music. Plus, we’re far less able to distinguish low frequency distortion than higher frequency distortion. However, when you elevate a control point in EQ for a given frequency you’re boosting the noise/distortion just as much as the rest of the signal. So the lower the THD+N for a given headphone, the more amenable it will be to EQ changes. The Grado is a very old design. Very few recent headphones will have distortion numbers as high as we see in Fig. 20.

Graphic vs parametric

eqMac2 is a graphic equalizer. It lets you select from 31 specific frequency options; you control the loudness for each of those frequencies. A parametric equalizer puts two more parameters under your control: frequency and bandwidth. A parametric equalizer doesn’t assign specific frequency numbers like 31.5 Hz or 8000 Hz for you to work with. Instead, you specify any audible frequency number, even something crazy-exact like 272.162 Hz. Then you tell it the loudness you want to assign to that specific frequency. But beyond that you also assign a bell-curve-like range centring around your specific frequency called Q. In that range your loudness value tapers off to all lower and higher frequencies that fall within range.

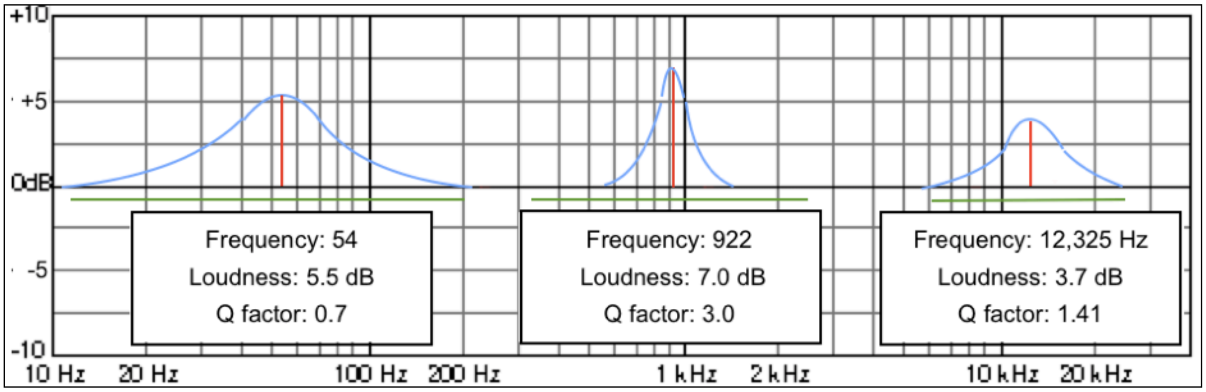


Fig. 26: Parametric EQ examples

Fig. 26 shows three examples of parametric changes. In some ways parametric EQ allows great precision. It also makes it easy to specify smoothly curving shapes. But in practice it becomes very complex to achieve the irregular shapes we've been working with using this method. Doing so requires overlapping the spread of multiple control points, which in turn causes each loudness value to augment the loudness of each of its neighbours — see Figs. 27a and 27b for an example. So both types of EQ have advantages and weaknesses.

Nevertheless, the creator of eqMAC2 is working on an upgrade that he hopes will eventually include the same sort of unlimited control points (called filters) available in the well-regarded Window's EQ program called EqualizerAPO. In theory at least, this would enable using the thousands of EQ presets in eqMAC (it won't be called eqMAC3) that have been created for EqualizerAPO.

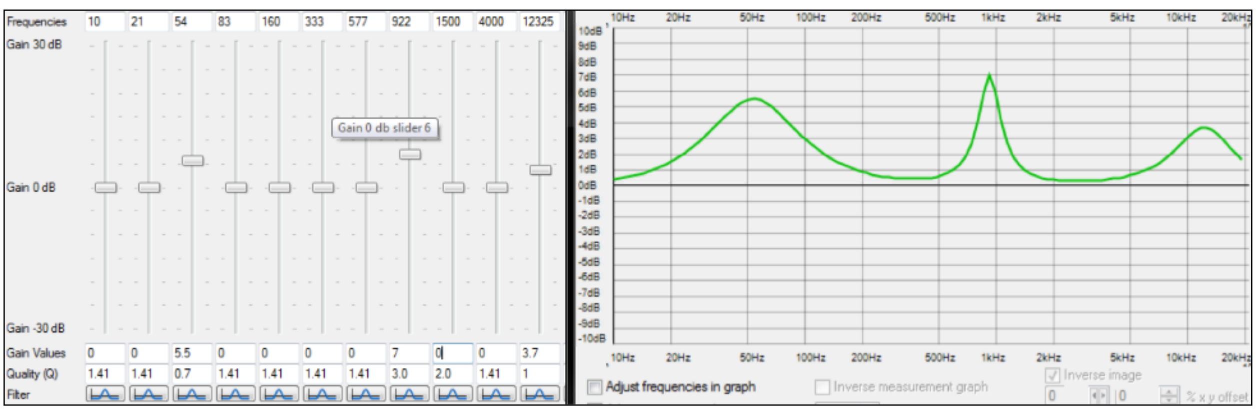


Fig. 27a: EqualizerAPO screen shot, three separated control points

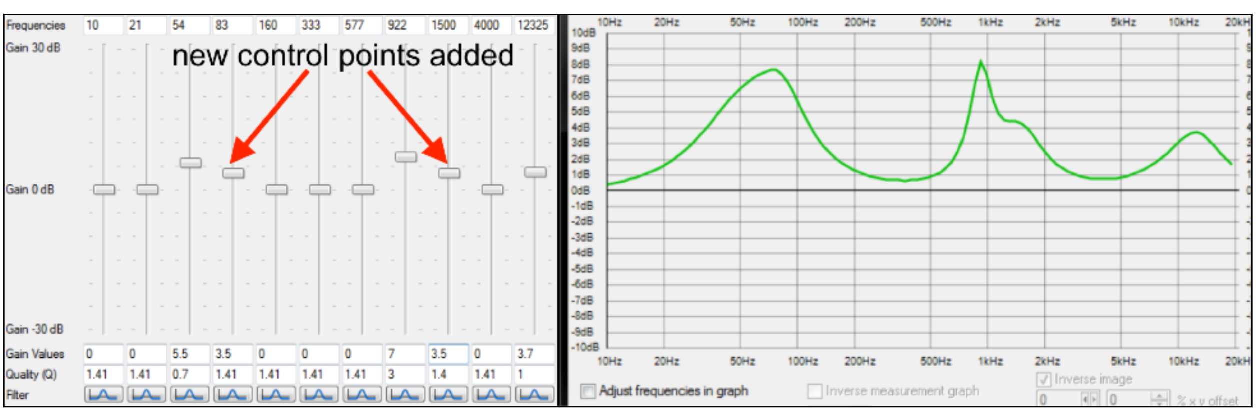


Fig. 27b: two control point added — results in peculiar new shapes and elevations of original peaks.

Final thoughts

There is a pervasive, if gradually dwindling, prejudice against EQ on the part of headphone enthusiasts. They frequently cite the now-outdated idea that EQ introduces audible distortions. An audio purist pursues a holy grail ideal of the minimum number of the best-quality components in his/her audio system. To the purist EQ is just another potential source of impurity that should be eliminated.

You’d think, by this reasoning, a purist would confine himself to source, DAC, amp, headphone and connecting cables. One of each. That’s rare indeed. Instead, the purist is likely to have multiple sources, DACs, amps, headphones and cables. He then mixes and matches them. One arrangement might reduce the strident treble of a particular headphone. Other arrangements might provide alternate sound signatures suitable for listening to different musical genres.

Another anti-EQ meme is that if we EQ every headphone to the same preferred tuning, they’ll all sound pretty much the same. Yes, we have explored the idea of finding a preferred target tuning. But there’s no law that says we’re obligated to take this approach. Nothing stops us from confining our use of EQ to eradicating frequency response annoyances — sometimes to a degree and precision that no amp/DAC combination can achieve — and thereby simply *increase* our enjoyment of the particular sound signatures of each of the headphones we own.

In truth, the real and seldom acknowledged danger from EQ to the audio enthusiast is its insidious effect of eliminating the single most common source of dissatisfaction with a headphone or even loudspeakers: If you can EQ away a frequency response flaw, then you’ll need to find another excuse to justify buying a new piece of gear. But take heart — EQ doesn’t affect detail, speed, dynamics, sound stage, imaging, fit or comfort. When frequency response issues go away any weaknesses in these other areas simply stand out more clearly.

In short, rest assured. Gear Acquisition Syndrome is in no danger from so puny an opponent as mere software EQ.