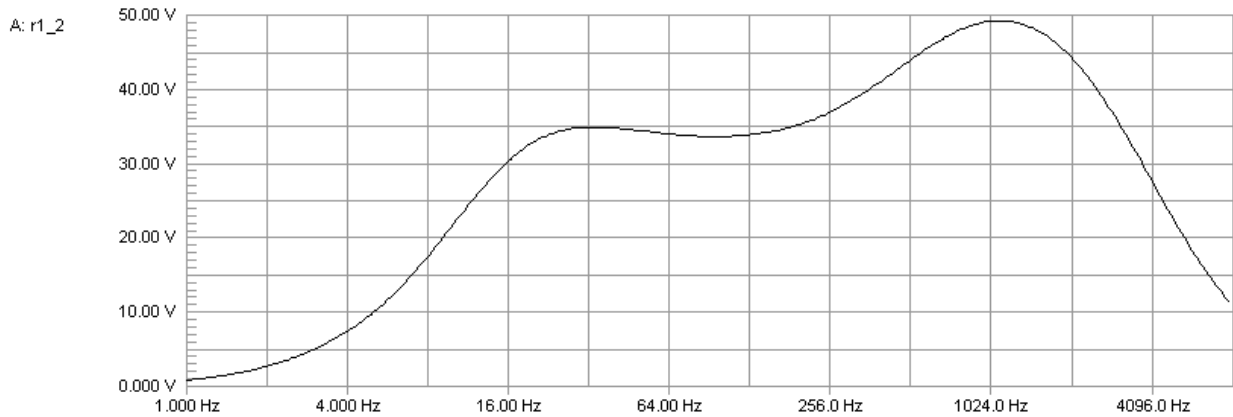


The Lead II Tone Stack Explained

By Iain Williams

Apologies for scaling the graphs in volts rather than decibels, but it's easier to see how the attenuation works this way. Input for the purposes of discussion is 200v p-p, which is a rough estimate of the signal you'd see if the preamp was cranked fairly high.

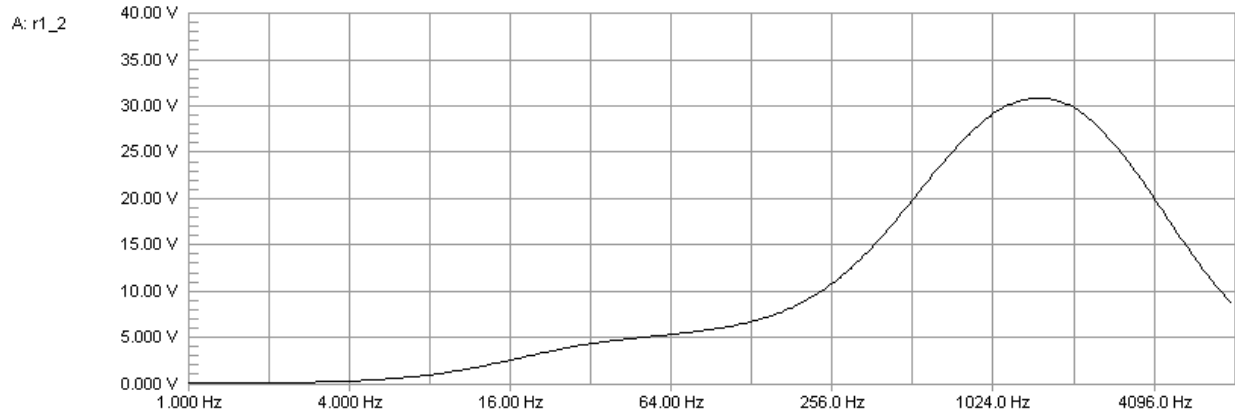
Firstly, lets consider what the tone sculpting looks like when all three tone controls are set to the mid position (50% rotation for all 3, rather than 50% resistance, since the mid pot is log).



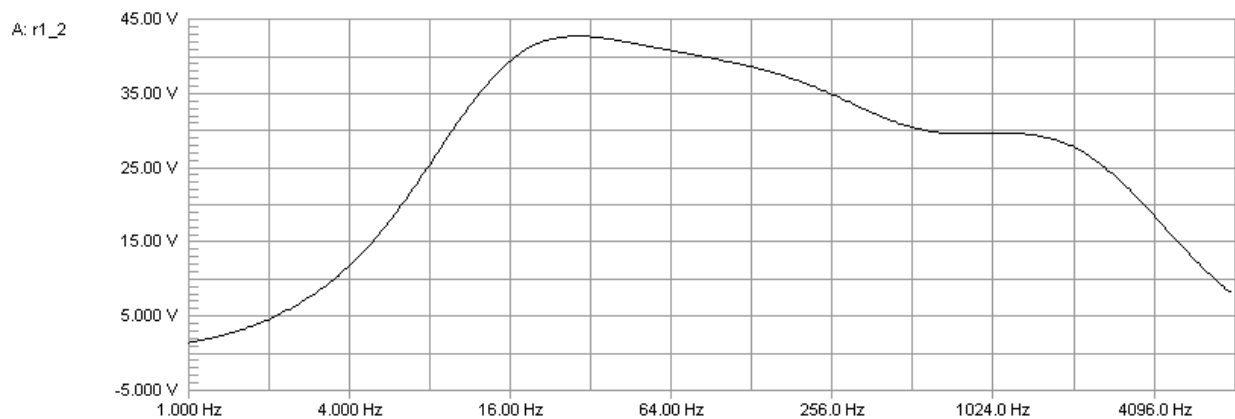
That is pretty much what you want as a starting point for a decent guitar contour really. Plenty of treble scooped out mids and a reasonable amount of bass (there's less in the amp, because the coupling caps roll some off, too). Not perfect, but not bad sounding either.

Bass Control

Now, taking the controls in order, what does the bass control do? If you turn it down, in the conventional sense, it will do exactly what any other bass control does, cut some bass. Also lowers the overall signal level a bit, too. Don't worry about that, a FMV stack does that, too. See...

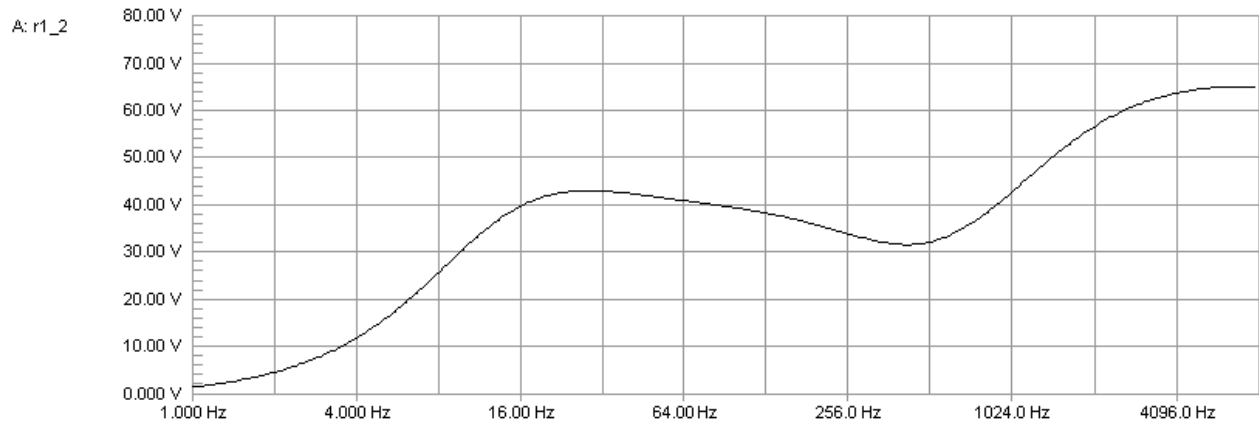


What about winding it the other way? Same thing, the overall signal level goes down a little but now it functions as a treble attenuator, rather than a bass cut. The amount of bass stays essentially the same as it was at 50% rotation. If you now recall that some bass is already being attenuated by the preamp stages, then when you look at the stack's response below, it's easy to imagine that you've now got a more or less totally flat response throughout the guitar range in the actual amp.

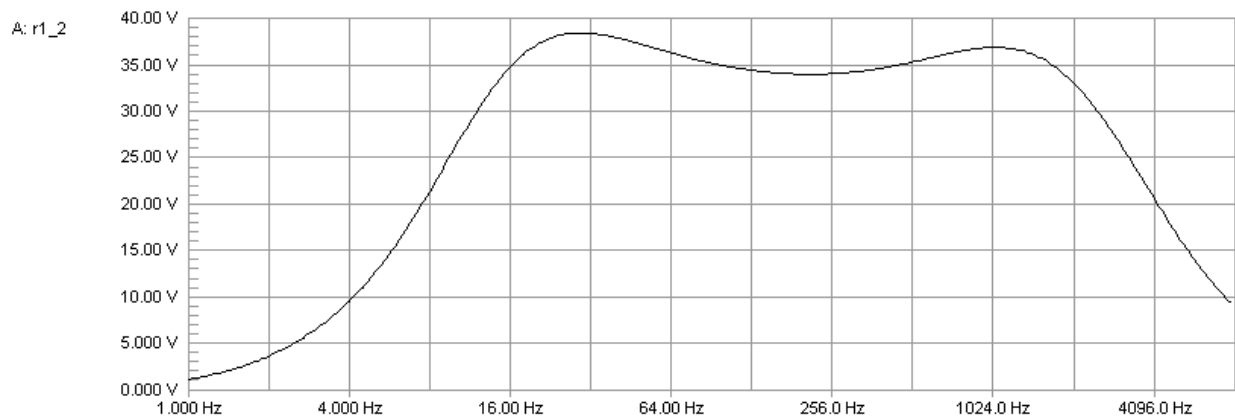


Middle Control

First we'll set the bass back to 50%, so we see the mid control alone. Turning it 'down' will result in this (see below). As you may notice, this looks suspiciously like the classic Fender curve. Putting the control anywhere below 50% will trend towards this, with the scoop becoming slightly deeper and the scoop frequency moving slowly upwards as the pot is turned.

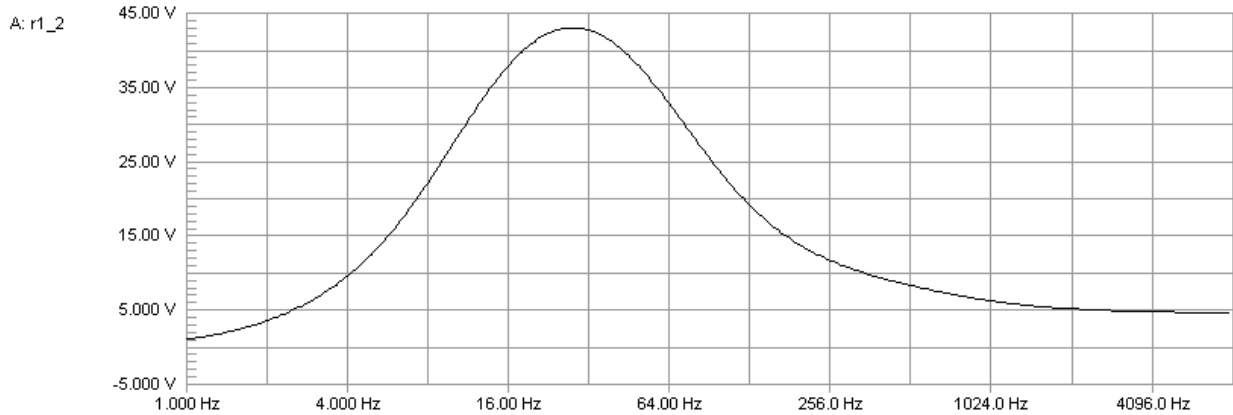


So what about going up past 50%? Well {look below}, it gives you a midrange contour not unlike a Marshall. Again, there's less bass than the picture indicates. A bit of imagination is unfortunately required, as Circuitmaker isn't up to the job of simulating the entire preamp at the same time as the stack.

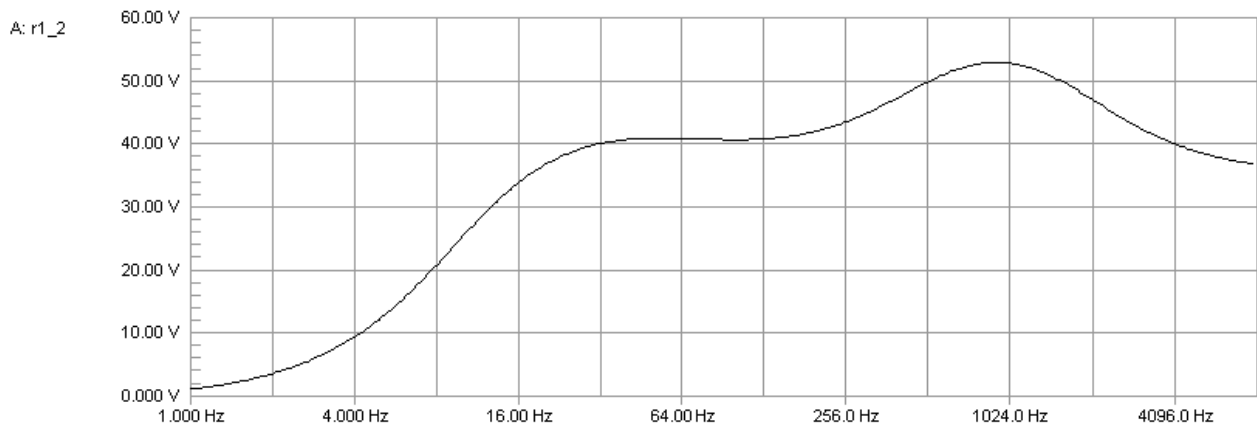


Treble Control

Again, we'll turn the Mid back to 50%. So firstly, we'll turn the treble down. As you can see below, it does exactly what it says on the tin and cuts the Treble, leaving the bass at it's previous level. Pretty normal, I think you'll agree.

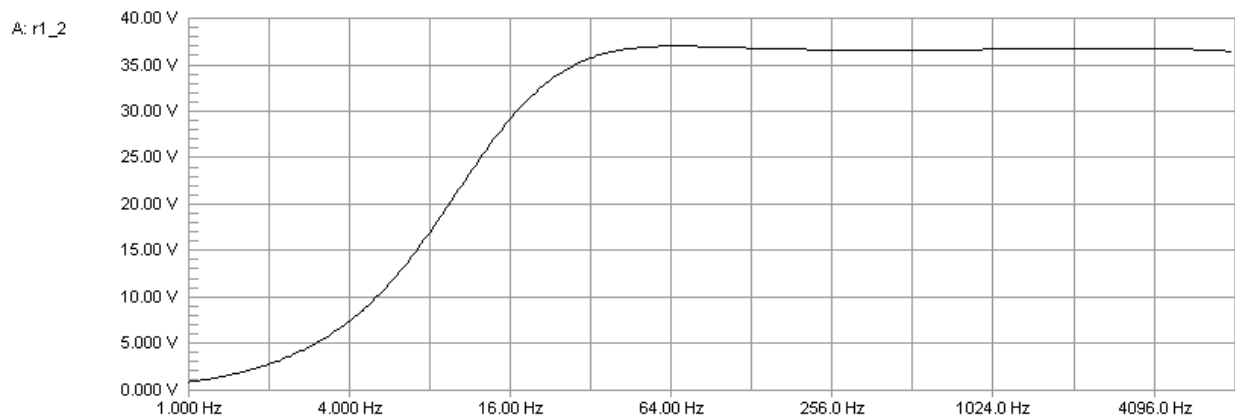


So what if we turn it up, then? Well, we get a flattening of the mid range response and a Treble hump. Again, pretty standard stuff but, if you examine the Treble control in isolation, it's only the same animal as the simple one knob controls found in a Fender Deluxe, Marshall 18W and countless other simple amps. So no surprises expected or got, there. If you want to make your Lead II sound a bit like a Deluxe, put the other two pots in the center position and adjust the Treble. Easy. See...



Now, what if we want to use all three controls at the same time? Who knows, might happen 🤖

What if we want a completely flat response from the tone stack, so only the tone shaping from the preamp is having an effect on tone (or as near as a passive tone stack can come to it, anyway). We turn the treble right up, because there's no need to cut that and the other controls will reduce it, anyway. We turn the Mid right down, to put the scoop in the bass range and leave the mids flat. And then we wind in bass, starting at none, until we get everything the same. It needs about 10% rotation to overcome the slight scoop caused by the mid control, then another 20% or so to pull the bass up to the level of the Treble. You'll note that the signal level has dropped off quite a bit now, as all the low-end attenuation we've thrown in to pull things level is obviously going to dump signal higher up as well, hence setting the treble to 100% to get that Treble hump we mentioned before. There's still a usable amount left to hit the PA with, though. See...



Any requests for tone contours you want to see? 😊